

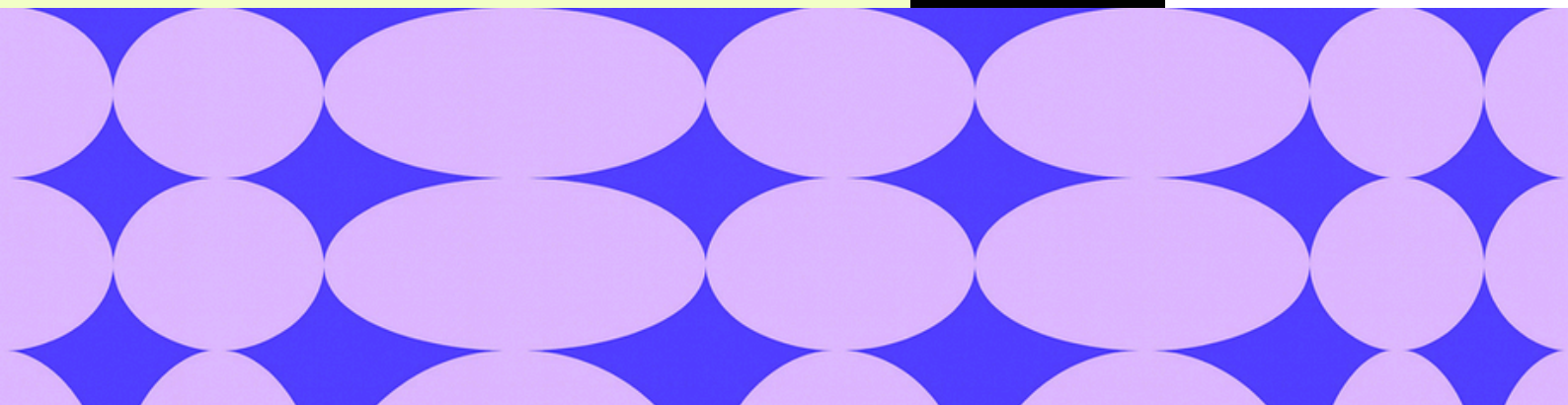
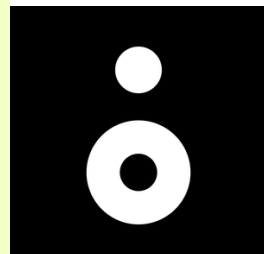
SLEEP QUALITY IN WOMEN AND ITS ASSOCIATION WITH POSTPARTUM ANXIETY

Viljaras Reigas, Dovilė Matulionė

SMK College of Applied Sciences
Klaipėda, Lithuania



SMK



VILJARAS REIGAS, DOVILĖ MATULIONĖ

SMK COLLEGE OF APPLIED SCIENCES

***Sleep Quality in Women and Its Association With Postpartum
Anxiety***

(scientific study)

Klaipėda, 2026

Reviewers:

Prof. dr. Antigoni Sarantaki (University of West Attica, Athens, Greece)

Eirini Orovou (University of Western Macedonia, Greece)

The publication was discussed at the meeting of the Academic Council of the SMK College of Applied Science and is recommended for publication (Minutes No. 4, December 12, 2025)

Bibliographic information for the publication is available in the National Bibliographic Data Bank (NBDN) of the Martynas Mažvydas National Library of Lithuania.

ISBN 978-9955-648-94-9

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INTRODUCTION

The postpartum period is a significant stage of biological, psychological, and social changes in a woman's life, during which intensive adaptation to the role of motherhood, new responsibilities, and changed daily life takes place. During this period, a woman faces not only physical bodily changes after pregnancy and childbirth, but also new emotional experiences, a changed rhythm of life, lack of sleep, fatigue, and increasing responsibility for newborn care. The beginning of motherhood is often accompanied by strong emotions – feelings of joy, love, and closeness to the baby, but at the same time experiences of insecurity, fear, lack of self-confidence, or emotional exhaustion may also arise. For these reasons, the postpartum period is considered a sensitive stage of life requiring significant psychological adaptation.

Although after childbirth most attention is traditionally given to monitoring the woman's physical health and newborn care, an increasing number of scientific studies emphasize the importance of emotional and mental health during this period. In recent years, scientific literature has highlighted that a woman's psychological state after childbirth is closely related to her ability to adapt to motherhood, develop an emotional bond with the baby, and ensure high-quality newborn care. Emotional difficulties after childbirth may affect not only the woman herself, but also the functioning of the entire family, partner relationships, and the overall emotional climate of the family. For this reason, there is increasing discussion about the need to evaluate the postpartum period comprehensively, encompassing both physical and mental health aspects.

One of the most common psychological problems after childbirth is postpartum anxiety, which may manifest as constant concern about the baby's health, emotional sensitivity, tension, insomnia, increased vigilance, and relaxing difficulties. A woman may constantly feel fear of making mistakes while caring for the baby, doubt her abilities to be a good mother, and experience continuous internal anxiety regarding the baby's safety or health condition. In some cases, postpartum anxiety may manifest through intrusive thoughts, increased irritability, emotional instability, or even somatic symptoms such as heart palpitations, shortness of breath, or digestive disorders. It is important to note that anxiety symptoms after childbirth often remain unnoticed or are considered a "normal" process of adaptation to motherhood, therefore many women do not seek help, or their emotional difficulties are not recognized in time by healthcare professionals.

Scientific literature also notes that postpartum anxiety may have a negative impact not only on a woman's emotional well-being, but also on the mother–infant relationship, breastfeeding, family relationships, and the child's emotional development (Nagel et al., 2022). Studies show that long-term maternal anxiety may be associated with a higher level of emotional exhaustion, symptoms of

depression, social isolation, and reduced self-confidence. In addition, the mother's emotional state directly affects the infant's emotional security and early psychological development, as the first months of life are particularly important for the formation of secure attachment. A disrupted emotional bond between mother and infant may lead to difficulties in the areas of the infant's emotional regulation, behavior, and social adaptation in the future.

It is important to emphasize that the development of postpartum anxiety is influenced by many interrelated factors. Researchers identify hormonal changes, previous mental health problems, negative childbirth experiences, lack of social support, financial difficulties, sleep deprivation, difficult newborn care, and increased emotional burden. Partner support, the quality of family relationships, a woman's self-esteem, and societal expectations of motherhood also play a significant role. Women often feel pressure to meet the image of the "ideal mother," therefore they avoid talking about experienced emotional difficulties or fear being misunderstood and negatively judged.

Considering the growing prevalence of postpartum anxiety and its possible consequences for the health of women and children, early recognition of this condition and ensuring timely assistance are becoming increasingly important. The ability of healthcare professionals to recognize emotional difficulties, provide psychological support, inform families, and encourage open communication about a woman's emotional well-being may contribute to more effective prevention and organization of support for postpartum anxiety. Therefore, the topic of postpartum anxiety is becoming relevant not only from a medical perspective, but also from social and public health perspectives, in order to ensure the comprehensive well-being of women and families after childbirth.

In recent years, increasing attention has been paid to the importance of sleep quality during the postpartum period. Scientific studies show that after childbirth women's sleep often becomes fragmented, the duration of uninterrupted sleep decreases, nighttime awakenings increase, and the subjectively perceived quality of rest worsens. Although certain sleep changes are physiologically related to newborn care, long-term poor sleep quality becomes a significant risk factor for emotional health. Research confirms that sleep deprivation weakens emotional regulation, increases sensitivity to stress, and is significantly associated with greater intensity of postpartum anxiety symptoms (Okun et al., 2018). For this reason, the relationship between sleep quality and emotional well-being is becoming an important direction in modern nursing and healthcare research.

Sleep is one of the most important physiological needs of a human being, necessary for body recovery, nervous system functioning, hormonal balance, and maintaining emotional stability. During the postpartum period, a woman's body experiences a great physical and emotional burden, therefore quality rest becomes especially important for successful recovery and adaptation. However, newborn care, frequent feeding during the night, instability of the infant's sleep rhythm, and constant vigilance

often disrupts a woman's natural sleep cycle. For these reasons, many women after childbirth experience chronic fatigue, lack of energy, reduced work capacity, and emotional exhaustion.

Scientific literature notes that poor sleep quality negatively affects not only women's physical but also psychological health. Disturbed sleep may reduce the ability to cope with everyday stress, weaken concentration, and increase irritability and emotional reactivity. Sleep deprivation is also associated with a higher risk of depression, anxiety, and emotional burnout. According to some authors, long-term sleep disturbances may become one of the main factors complicating a woman's adaptation to motherhood and disrupting the formation of a positive mother–infant relationship. It is observed that women who constantly feel fatigued and insufficiently rested after childbirth more often experience emotional instability, anxiety regarding their ability to properly care for the baby, and reduced self-confidence.

It is important to note that sleep disturbances during the postpartum period are often insufficiently evaluated both by women themselves and by healthcare professionals. Some women accept poor sleep as an inevitable part of motherhood and do not seek help even when sleep deprivation begins to significantly affect their emotional condition and daily functioning. Meanwhile, healthcare systems more often focus on monitoring physical health and newborn care, while the assessment of sleep quality and monitoring of emotional well-being often remain secondary. For this reason, the importance of comprehensive postpartum care is increasingly emphasized, including the assessment of sleep quality, monitoring of emotional health, and ensuring timely psychological support.

Growing interest in the relationship between sleep quality and postpartum anxiety encourages the search for effective prevention and support measures that could improve women's emotional well-being after childbirth. Early recognition of sleep disturbances, involvement of family members in supporting the woman, strengthening emotional support, and healthcare professionals' attention to women's rest needs may have a significant positive impact on women's mental health and overall family well-being.

The relevance of the topic is also determined by the fact that symptoms of postpartum anxiety often remain unnoticed or are evaluated as a “natural” part of motherhood. Some women do not seek help because of stigmatization, feelings of guilt, or fear of being negatively judged. Society still holds the attitude that motherhood should be an exclusively positive experience, therefore emotional difficulties after childbirth are often silenced or ignored. Women may feel pressure to meet the image of a “good mother,” therefore they avoid openly talking about experienced anxiety, fatigue, or emotional exhaustion. For this reason, some emotional disorders remain undiagnosed, and support is provided too late, when symptoms already begin to significantly affect the woman's daily life, relationships with relatives, and bond with the baby.

Scientific literature emphasizes that early recognition of emotional difficulties and timely support may reduce the risk of long-term mental health problems and improve women's quality of life (Handa et al., 2024). Studies show that timely emotional support, psychological counseling, information about possible emotional changes after childbirth, and the involvement of relatives in the support process may significantly reduce the intensity of anxiety symptoms and help women adapt more easily to motherhood. It has also been established that positive communication by healthcare professionals, an empathetic approach, and monitoring of emotional condition increase women's self-confidence and encourage them to seek help more actively when facing emotional difficulties.

Therefore, the role of healthcare professionals, especially nurses, becomes particularly important in monitoring women's emotional condition, evaluating sleep quality, and providing education and emotional support. Nurses are often the specialists who communicate with women the longest and most closely both during inpatient care and after discharge from the healthcare institution. For this reason, they have the opportunity to notice changes in emotional well-being, signs of sleep disturbances, or increased anxiety levels at an early stage. In addition, information provided by nurses about the importance of rest, the normality of emotional reactions, and possible methods of support may reduce the tension experienced by women and promote greater emotional security.

In modern healthcare, the importance of holistic care is increasingly emphasized, where women's health is evaluated comprehensively, including physical, emotional, psychological, and social aspects. Considering this, the analysis of the relationship between postpartum anxiety and sleep quality becomes relevant not only from a scientific but also from a practical perspective, aiming to improve the quality of postpartum care, strengthen emotional health prevention, and ensure timely support for women after childbirth.

Scientific literature also emphasizes the need for a holistic approach in postpartum care. A woman's emotional well-being depends not only on biological changes, but also on social support, partner involvement, family relationships, opportunities for rest, and psychological security. The postpartum period is a complex adaptation process during which a woman needs not only medical monitoring, but also emotional support, understanding, and the assurance of a safe environment. Studies show that women who feel the support of relatives, have the opportunity to rest, and receive attentive communication from healthcare professionals more often adapt better to the challenges of motherhood and experience less emotional stress.

Studies show that comprehensive and individualized care may help improve sleep quality, reduce emotional exhaustion, and strengthen women's adaptation to motherhood (Ladyman et al., 2022). Holistic care includes not only the assessment of physical condition, but also monitoring of emotional well-being, assessment of sleep quality, accessibility of psychological support, education about emotional changes after childbirth, and involvement of the family in the support process. An

individualized approach allows better consideration of each woman's needs, life situation, social environment, and emotional condition. Such care may reduce the woman's feeling of loneliness, promote greater self-confidence, and strengthen emotional security.

Scientific literature also notes that insufficient evaluation of emotional health during the postpartum period may lead to long-term negative consequences for women's mental health. Some women, due to fatigue, constant vigilance, and emotional tension, face difficulties in maintaining daily functioning, and over time more pronounced symptoms of anxiety or depression may develop. Therefore, the importance of preventive measures and the need to strengthen healthcare professionals' competencies in recognizing emotional difficulties at an early stage are increasingly emphasized.

For this reason, it is important to analyze not only the biological or psychological aspects of postpartum anxiety, but also the possibilities of nurses and healthcare professionals to contribute to early prevention. Nurses and other healthcare professionals may play a significant role in identifying changes in emotional well-being, evaluating signs of sleep disturbances, providing emotional support, and informing women about possible methods of assistance. Early recognition of emotional difficulties and timely response may contribute to better emotional condition of women, a stronger mother–infant bond, and greater overall family well-being.

Considering the increasing relevance of postpartum anxiety and sleep quality problems, it is important to develop scientific research focused on strengthening emotional health during the postpartum period. The results of such studies may help improve postpartum care models, promote a holistic approach to women's health, and create more effective emotional support and prevention measures for women after childbirth.

Despite the increasing attention to women's mental health after childbirth, emotional difficulties occurring during the postpartum period remain a relevant public health problem. One of the most important factors that may have a significant impact on a woman's emotional well-being is sleep quality. After childbirth, women's sleep often becomes fragmented, the duration of rest decreases, fatigue increases, and emotional sensitivity intensifies. Although certain sleep changes during this period are considered natural due to the needs of newborn care, long-term poor sleep quality may become a significant risk factor for the development of postpartum anxiety. However, in practice, emotional difficulties after childbirth often remain insufficiently recognized, and sleep quality assessment is not always systematically integrated into postpartum care. For this reason, women do not always receive timely emotional support, counseling, or other support measures that could contribute to better emotional well-being and more successful adaptation to motherhood.

Considering the relevance of this problem and its possible consequences for the well-being of the woman and the infant, this study aims to analyze more deeply the relationship between sleep quality and postpartum anxiety. The research also seeks to reveal the role of nursing and other

healthcare professionals in strengthening women's emotional health and ensuring timely support during the postpartum period. Therefore, **the aim of this scientific study is** to analyze the relationship between sleep quality and postpartum anxiety and to reveal the role of nurses and healthcare professionals in improving women's emotional well-being during the postpartum period.

In order to achieve the aim of the study, the following research **hypotheses** were formulated:

H1. Poor sleep quality during the postpartum period is statistically significantly associated with greater intensity of postpartum anxiety symptoms.

H2. Women receiving greater family and social support demonstrate better sleep quality and lower levels of postpartum anxiety.

H3. Early monitoring of emotional condition, education, and counseling by nursing specialists may contribute to reducing the risk of postpartum anxiety and improving women's emotional well-being.

The analysis of these hypotheses may help to better understand the emotional challenges of the postpartum period and the importance of sleep quality for women's mental health. In addition, the results of the study may be significant from a practical perspective in seeking to improve postpartum care models, strengthen a holistic approach to women's health, and promote early prevention of emotional difficulties and the provision of timely support.

1. THE CONCEPT OF THE POSTPARTUM PERIOD AND WOMEN'S PSYCHOPHYSIOLOGICAL CHANGES

1.1. Definition and Stages of the Postpartum Period

Duration of the Postpartum Period. The postpartum period is a complex stage of biological, psychological, and social changes that begins after the birth of the fetus and placenta and continues until the woman's body adapts to the post-pregnancy state. In scientific literature, this period is considered one of the most sensitive stages in a woman's life due to intensive physiological processes and increased psychological vulnerability. During the postpartum period, not only physical recovery of the body takes place, but also the woman's emotional, social, and psychological adaptation to a new life role – motherhood. In recent years, researchers have increasingly emphasized that the significance of this period was underestimated for a long time, although many aspects of long-term women's physical and mental health are formed precisely during the postpartum period (Lopez-Gonzalez, Mikes, 2026).

In traditional obstetrics, the postpartum period is most defined as the first six weeks after childbirth. For a long time, such a definition of the period was based on physiological recovery processes – uterine involution, stabilization of the circulatory system, reduction of hormone concentrations, and the return of the reproductive system to the pre-pregnancy state. However, recent scientific literature increasingly emphasizes that a six-week period does not sufficiently reflect the actual duration of women's recovery. Studies show that physiological, emotional, and social changes may continue much longer – from several months to one year or even longer, especially in cases where women experience postpartum complications, emotional difficulties, or sleep disturbances (Ojomo et al., 2025).

In scientific sources, the postpartum period is usually divided into three main stages: the acute, early, and late postpartum periods. The acute period includes the first 24 hours after childbirth and is considered critical because of the risk of possible obstetric complications. During this period, women experience sudden hemodynamic changes, risk of bleeding, bodily reactions to the physical burden experienced during childbirth, and intensive hormonal fluctuations. In clinical practice, precisely the first hours after childbirth require especially careful monitoring of women's condition, as complications during this stage may be life-threatening (Dol et al., 2022).

The early postpartum period usually includes the period from the first day until the sixth week after childbirth. During this time, the most active recovery processes take place: uterine involution, changes in hormone concentrations, stabilization of lactation, and adaptation of physiological systems to the new state. However, at the same time, women during this stage often face fatigue, pain, sleep

deprivation, and emotional fluctuations. Studies show that it is during the early postpartum period that the first signs of mental health difficulties most often emerge, including anxiety, emotional instability, and depressive symptoms. For this reason, the early postpartum period is considered especially important for the evaluation of women's emotional condition and identification of the need for psychological support (Garapati et al., 2023).

The late postpartum period includes the time after the first six weeks and may continue up to one year after childbirth. This stage is increasingly examined as a period of long-term adaptation of women, including not only physical recovery, but also emotional adaptation to motherhood and a changed rhythm of life. Researchers note that even several months after childbirth many women experience persistent fatigue, disturbed sleep, increased emotional sensitivity, and psychological tension. This is especially relevant for women who do not receive sufficient social or family support, experience financial difficulties, or have previous mental health problems (Baattaiah et al., 2024).

In recent years, increasing attention in literature has been devoted to the biopsychosocial evaluation of the postpartum period. It is emphasized that women's health after childbirth cannot be evaluated solely through the prism of biological parameters. Emotional condition, sleep quality, social relationships, partner support, and quality of life are becoming factors no less important than physiological recovery of the body. Studies show that women's emotional condition and sleep quality are closely related to each other – sleep disturbances increase the risk of emotional exhaustion and anxiety, while constant emotional tension further worsens sleep quality. In this way, a closed cycle of negative symptoms is formed, which may have long-term consequences for women's mental health (Thara, Kamath, 2015).

In modern healthcare practice, the necessity of expanding the approach to the postpartum period and ensuring continuous support for women not only during the first weeks after childbirth, but also over a longer period, is increasingly emphasized. Studies show that early recognition of emotional difficulties, sleep quality problems, and anxiety symptoms allows reduction of the risk of progression of mental health disorders and improvement of women's quality of life. For this reason, the postpartum period is increasingly evaluated as a complex stage of long-term care requiring a multidisciplinary approach and individualized support for women and their families (Saharoy et al., 2023).

Early and Late Postpartum Period. In scientific literature, the postpartum period is divided into several stages that allow a more precise definition of the physiological, emotional, and social changes occurring in a woman's body after childbirth. Such classification is important not only in clinical practice, but also in scientific research, because during different periods women face different health challenges, complication risks, emotional states, and adaptation processes to motherhood. Most commonly, the literature distinguishes the early and late postpartum periods, which differ from each

other not only in duration, but also in the dominant biological and psychosocial processes (Kumarasinghe et al., 2024).

The early postpartum period usually includes the first six weeks after childbirth. During this period, the most intensive physiological recovery processes take place in a woman's body. One of the most important changes is uterine involution – the process during which the uterus gradually returns to its pre-pregnancy state. Significant changes in hormone concentrations also occur estrogen and progesterone levels decrease, prolactin and oxytocin secretion stabilizes, and lactation processes actively develop. In addition, the body adapts to changes in circulation, metabolism, and the endocrine system that developed during pregnancy (Tal, Taylor, 2021).

During the early postpartum period, women often experience pronounced physical fatigue, sleep deprivation, and pain related both to the consequences of childbirth and newborn care. Studies show that during the first weeks after childbirth, sleep structure becomes fragmented, uninterrupted sleep duration decreases, and nighttime awakenings become more frequent. These changes have a significant impact on women's emotional state, cognitive functions, and overall quality of life assessment. Due to prolonged fatigue and insufficient rest during the early postpartum period, the risk of emotional exhaustion, anxiety, and depressive symptoms increases (Roghayyeh et al., 2026).

It is important to note that the early postpartum period is especially sensitive for women's mental health. Scientific literature indicates that it is precisely during the first weeks after childbirth that women most often experience emotional instability, increased sensitivity, anxiety, and adaptation difficulties. During this period, women learn the new role of motherhood, adapt to a changed rhythm of life, and often feel responsibility and uncertainty. Studies show that insufficient social or partner support at this stage may significantly increase the risk of emotional difficulties and postpartum anxiety (Modak et al., 2023).

The late postpartum period begins after the first six weeks and may continue up to one year after childbirth or longer. This period is increasingly analyzed as a stage of long-term physical and psychological adaptation. Although the main physiological recovery processes are usually completed, many women continue to experience fatigue, sleep disturbances, emotional difficulties, and psychological tension. Studies show that for some women sleep quality remains poor even several months after childbirth, which may have long-term consequences for mental health and daily functioning (Witkowska-Zimny et al., 2024).

The late postpartum period is characterized by active adaptation of women to new social, family, and professional roles. During this period, women often return to professional activities, seek to restore their previous rhythm of life, but at the same time remain responsible for infant care. Scientific studies show that long-term sleep deprivation and emotional fatigue may negatively affect

women's interpersonal relationships, self-esteem, motherhood experience, and overall psychological well-being. Some authors note that it is during the late postpartum period that symptoms of prolonged postpartum anxiety or depression may become apparent, which during the early period were not properly recognized or treated (Slomian et al., 2019).

Scientific studies of recent years emphasize that both the early and late postpartum periods should be considered equally important for women's health. Although in clinical practice most attention is traditionally paid to the first weeks after childbirth, increasing scientific evidence shows that emotional and sleep quality disturbances may persist for a long time and significantly affect women's quality of life. For this reason, modern healthcare emphasizes the importance of long-term monitoring, emotional support, and early intervention throughout the entire postpartum period (Iranpour et al., 2016).

Adaptation of the Woman's Body After Childbirth. After childbirth, a woman's body undergoes a complex and multilayered adaptation process during which intensive physiological, hormonal, metabolic, and psychological changes occur. These changes are necessary for the body to return to its pre-pregnancy state and adapt to new motherhood conditions. Scientific literature emphasizes that postpartum adaptation is not a short-term process – for many women complete bodily recovery may continue for several months or even longer than one year after childbirth (Vesting et al., 2025).

One of the most important physiological processes after childbirth is uterine involution. After the placenta is expelled, the uterus begins to gradually decrease in size and return to its pre-pregnancy state. This process usually lasts about six weeks, but its intensity depends on many factors, such as the course of childbirth, breastfeeding, number of deliveries, or the woman's health condition. During uterine involution, uterine contractions, lochia discharge, and gradual stabilization of reproductive system functions are observed. Studies show that physiological recovery processes may be associated with pain, discomfort, and sleep disturbances that negatively affect women's well-being during the early postpartum period (Chauhan & Tadi, 2022).

Hormonal changes play a significant role in the adaptation of a woman's body. After childbirth, estrogen and progesterone concentrations decrease very rapidly because the placenta, which was the main source of these hormones during pregnancy, is expelled from the body. At the same time, prolactin and oxytocin activity increases, especially in breastfeeding women. These hormonal fluctuations are highly significant not only for lactation processes, but also for emotional state, sleep quality, and autonomic nervous system activity. Studies show that sudden changes in hormone concentrations may be associated with emotional sensitivity, mood fluctuations, and increased risk of anxiety symptoms during the postpartum period (Rupanagunta et al., 2023).

During the postpartum period, women's sleep structure also changes significantly. Newborn

care, nighttime feedings, and disrupted circadian rhythm led to fragmented sleep, frequent awakenings, and reduced total sleep duration. Scientific studies show that during the first months after childbirth women often do not achieve the physiologically necessary amount of uninterrupted sleep, which negatively affects their cognitive functions, emotional stability, and physical recovery. Sleep deprivation is also associated with increased activity of inflammatory processes, weakening of the immune system, and greater risk of postpartum anxiety and depression (King et al., 2020).

During adaptation processes, the functioning of the cardiovascular system also changes significantly. The increased circulating blood volume during pregnancy begins to decrease after childbirth, arterial blood pressure stabilizes, and heart rhythm normalizes. However, these changes do not always occur rapidly, therefore some women during the postpartum period may feel weakness, dizziness, or increased fatigue. In addition, the body must adapt to altered metabolism, energy demands, and increased expenditure of physiological resources during lactation (Erkal Aksoy et al., 2025).

An important part of the adaptation of a woman's body is recovery of the pelvic floor and muscular system. During childbirth, pelvic floor tissues, ligaments, and muscles experience great mechanical stress, therefore during the postpartum period symptoms of urinary incontinence, pelvic pain, or reduced physical capacity are often observed. Studies show that these symptoms may negatively affect women's quality of life, self-esteem, and emotional condition, especially if physical changes persist for a long time (Hooper et al., 2022).

Scientific literature increasingly focuses on the psychological aspects of postpartum adaptation. Recovery of a woman's body is closely related to emotional condition, stress level, and psychological adaptation to motherhood. Studies show that physiological fatigue, sleep deprivation, and hormonal fluctuations may significantly affect emotional regulation, increase irritability, emotional sensitivity, and anxiety symptoms. During this period, support from partners, family, and healthcare professionals becomes especially important, as it may reduce the risk of emotional difficulties and improve women's overall well-being (Al-Mutawtah et al., 2023).

In recent years, scientific studies have emphasized that postpartum adaptation should be evaluated holistically, considering not only physical recovery of the body, but also women's emotional and social well-being. It is emphasized that long-term sleep disturbances, emotional exhaustion, and insufficient social support may have long-term consequences for women's mental health and the mother–infant relationship. For this reason, modern healthcare is paying increasing attention to early identification of risk factors, monitoring of emotional condition, and individualized support for women during the postpartum period (Guarneri et al., 2025).

1.2. Hormonal and Physiological Changes After Childbirth

Changes in Estrogen, Progesterone, and Prolactin. During the postpartum period, very pronounced hormonal changes occur in a woman's body, which are necessary for physiological recovery after pregnancy and childbirth and adaptation to motherhood. Sudden fluctuations in hormone concentrations are considered one of the most important biological factors affecting women's emotional state, sleep quality, metabolism, and overall body functioning after childbirth. Scientific literature emphasizes that the postpartum period is characterized by one of the greatest endocrine reorganizations in a woman's life, because the hormonal system formed during pregnancy must rapidly reorganize into a new physiological state after childbirth (Wu, Jin, 2025).

One of the most pronounced hormonal changes after childbirth is the sudden decrease in estrogen concentration. During pregnancy, estrogen levels in the body gradually increase and reach a very high level during the last months of pregnancy. The placenta becomes the main source of estrogen, therefore after childbirth and placental expulsion, estrogen concentration in the blood decreases very rapidly. Studies show that this hormonal change may have a significant impact on women's emotional condition, autonomic nervous system activity, and sleep regulation. Estrogens participate in the regulation of serotonin and other neurotransmitters; therefore their decrease is associated with emotional sensitivity, irritability, mood fluctuations, and increased risk of anxiety symptoms (Albert, Newhouse, 2019).

In addition to the effect on emotional condition, decreased estrogen also affects physiological processes. These hormones are important for vascular tone, thermoregulation, bone metabolism, and sleep architecture. Studies show that reduced estrogen levels after childbirth may be associated with more frequent nighttime awakenings, sweating, thermoregulation disturbances, and decreased sleep quality. Some authors note that estrogen fluctuations may directly affect the REM sleep phase and the stability of circadian rhythm, therefore women during the postpartum period become more sensitive to sleep disturbances (Dorsey et al., 2021).

Changes in progesterone concentration after childbirth are also highly significant for the adaptation of a woman's body. During pregnancy, progesterone maintains pregnancy, suppresses uterine contractions, and affects the central nervous system by producing a calming effect. After childbirth, progesterone concentration decreases extremely rapidly because the placenta no longer produces this hormone. Scientific literature indicates that the decrease in progesterone may be associated with greater emotional reactivity, increased sensitivity to stress, and deterioration of sleep quality (Haufe, Leeners, 2023).

It is important to note that progesterone is closely related to the neurosteroid allopregnanolone, which affects gamma-aminobutyric acid (GABA) receptors in the central nervous system.

Allopregnanolone has calming and anxiolytic effects, therefore its sudden decrease after childbirth may contribute to emotional instability and the emergence of anxiety symptoms. Studies show that women whose bodies react more sensitively to hormonal fluctuations have a greater risk of developing postpartum anxiety and depression (Schiller et al., 2015).

Unlike estrogen and progesterone concentrations, prolactin levels significantly increase after childbirth, especially in breastfeeding women. Prolactin is the main hormone responsible for stimulating milk production and maintaining lactation. Its secretion is stimulated by breastfeeding; therefore prolactin concentration may remain elevated for a long time after childbirth. Scientific studies show that prolactin participates not only in lactation processes, but also in women's emotional adaptation to motherhood. Some authors note that prolactin may be associated with the formation of maternal behavior, emotional attachment to the infant, and reduced stress reactivity (Georgescu et al., 2021). However, the effect of prolactin on sleep quality and emotional condition is not unequivocal.

Although some studies show that prolactin may have a calming effect and promote relaxation, other authors note that frequent nighttime breastfeeding and fluctuations in prolactin secretion may be associated with fragmented sleep and increased fatigue. For this reason, breastfeeding women often experience greater sleep deprivation, which over time may negatively affect emotional health and increase the risk of postpartum anxiety symptoms (Yang, 2025).

In recent years, scientific literature has increasingly focused on the relationship between hormonal changes and mental health during the postpartum period. Studies show that sudden fluctuations in estrogen and progesterone together with long-term sleep deprivation may significantly affect emotional regulation, stress tolerance, and central nervous system functions. For these reasons, hormonal changes are considered one of the most important biological mechanisms that may contribute to the development of postpartum anxiety (Li, 2026).

Scientific evidence also emphasizes the importance of individual bodily reactions. Although hormonal changes after childbirth occur in all women, not all experience pronounced emotional or sleep quality disturbances. This suggests that genetic, neurobiological, psychological, and social factors play an important role and may strengthen or reduce the effect of hormonal fluctuations on women's well-being. Therefore, modern healthcare increasingly emphasizes an individualized approach to evaluating women's condition during the postpartum period and early recognition of the risk of emotional and sleep disturbances (Zhu et al., 2025).

Fatigue and Physical Recovery. Fatigue during the postpartum period is one of the most common and significant symptoms affecting women's physical, emotional, and psychological well-being. In scientific literature, postpartum fatigue is defined as a subjective feeling of physical and emotional exhaustion associated with reduced energy levels, decreased work capacity, and impaired daily functioning. Studies show that fatigue after childbirth may persist for a long time and

significantly affect women's quality of life, sleep quality, mother–infant relationship, and mental health (Khayamim et al., 2016).

The development of postpartum fatigue is determined by many interrelated biological and psychosocial factors. One of the most important causes is physical exhaustion of the body after pregnancy and childbirth. During childbirth, a woman's body experiences a great physiological burden associated with pain, blood loss, hormonal changes, and intensive muscular activity. After childbirth, the body begins active recovery processes that require substantial energy resources. Studies show that women during the first weeks after childbirth often feel general weakness, reduced physical capacity, and a prolonged feeling of lack of energy (Balshi, Bove, 2024).

Physical recovery after childbirth depends on many factors, including the course of labor, mode of delivery, women's health condition, and the presence of complications. After vaginal delivery, a woman's body usually recovers faster, but even in such cases perineal pain, pelvic floor muscle weakness, abdominal wall changes, and general physical fatigue may persist. Meanwhile, after cesarean section, physical recovery is often longer and more complicated due to surgical intervention, postoperative pain, and reduced mobility. Studies show that women after cesarean section more often experience long-term fatigue and slower return to usual daily activities (Duran, Vural, 2023).

One of the most important factors of postpartum fatigue is sleep deprivation and disturbed sleep structure. Newborn care, frequent nighttime awakenings, and fragmented sleep lead to insufficient bodily rest and reduced physiological recovery. Studies show that women during the postpartum period often sleep less than the recommended physiological norm, and sleep quality remains poor even in cases where total sleep time appears sufficient. Due to long-term sleep deprivation, the risk of physical exhaustion, cognitive dysfunction, emotional sensitivity, and anxiety symptoms increases (Shah et al., 2025).

Scientific literature emphasizes that fatigue after childbirth is not only a physiological but also a psychological phenomenon. Constant fatigue may negatively affect women's emotional condition, self-esteem, and ability to adapt to the role of motherhood. Studies show that severe postpartum fatigue is often associated with an increased risk of postpartum anxiety and depressive symptoms. Women who experience long-term physical exhaustion more often face emotional instability, irritability, and difficulties managing stress (Khamidullina et al., 2025).

Hormonal changes also have a significant impact on the process of physical recovery. The sudden decrease in estrogen and progesterone concentrations after childbirth may affect energy balance, muscle recovery, and emotional condition. In addition, increased energy demands during breastfeeding may further intensify the feeling of fatigue. Studies show that women who do not

receive sufficient rest and social support more often experience prolonged physical exhaustion and slower bodily recovery (Bedrov, Gable, 2023).

An important factor related to physical recovery after childbirth is physical activity. Although a gentle regimen is recommended during the first weeks after childbirth, gradually increased physical activity may improve circulation, reduce fatigue, and positively affect emotional condition. Studies show that women who engage in light or moderate-intensity physical activity during the postpartum period more often evaluate their well-being more positively and experience less emotional exhaustion (Lan et al., 2026).

In recent years, scientific studies have increasingly focused on the long-term consequences of postpartum fatigue. It is emphasized that prolonged physical and emotional exhaustion may negatively affect women's mental health, mother–infant relationship, and family relationships. In addition, long-term fatigue may reduce women's ability to care for themselves and the infant, increase feelings of social isolation, and reduce quality of life. For this reason, modern healthcare increasingly emphasizes the importance of comprehensive support for women during the postpartum period, with particular attention paid to ensuring rest, sleep quality, emotional support, and physical recovery (Stein Elger et al., 2025).

Pain, Breastfeeding, and Circadian Rhythm Changes. During the postpartum period, a woman's body faces numerous physiological and psychological changes that directly affect overall well-being, sleep quality, and emotional condition. Among the factors most analyzed in scientific literature are pain, breastfeeding processes, and changes in circadian rhythm. These factors are closely interrelated and may have a significant impact on women's physical recovery, fatigue, and the risk of developing postpartum anxiety (Henderson et al., 2019).

Pain after childbirth is considered one of the most common physical problems during the early postpartum period. Women may experience perineal, abdominal, back, pelvic, or breast pain depending on the mode of delivery, complications, and individual bodily characteristics. After vaginal delivery, sensitivity of perineal tissues, pain after episiotomy or tears most commonly occur, whereas after cesarean section postoperative abdominal wall pain and reduced mobility predominate. Studies show that stronger and longer-lasting pain may significantly worsen women's sleep quality, increase emotional exhaustion, and negatively affect maternal emotional adaptation after childbirth (Akhtar et al., 2025).

Scientific literature emphasizes that postpartum pain has not only a physiological but also a psychological effect. Constant pain may disrupt women's ability to rest, care for the newborn, and adapt to the role of motherhood. Studies show that women who experience more intense postpartum pain more often face increased anxiety levels, emotional sensitivity, and depressive symptoms. In

addition, long-term pain may stimulate increased activity of stress hormones, which additionally negatively affects sleep structure and emotional regulation (Aboushaar, Serrano, 2024).

An important physiological process during the postpartum period is breastfeeding, which has a significant impact on both women's hormonal system and sleep and emotional condition. During breastfeeding, prolactin and oxytocin are actively released in the body – hormones associated with lactation, emotional attachment to the infant, and stress reduction. Studies show that oxytocin may have a calming effect, reduce cortisol concentration, and promote emotional stability. For this reason, some authors associate breastfeeding with a lower risk of postpartum anxiety and depression (Whitley et al., 2020).

However, the effect of breastfeeding on women's well-being is not unequivocal. Although breastfeeding may have positive hormonal and emotional effects, frequent nighttime feedings significantly disrupt women's sleep structure. Studies show that breastfeeding women more often experience fragmented sleep, shorter uninterrupted sleep duration, and greater daytime fatigue. Constant nighttime awakenings may reduce the effectiveness of physiological recovery and over time contribute to emotional exhaustion and the emergence of anxiety symptoms (Desai et al., 2024).

Some women during the breastfeeding period also face additional physical difficulties, such as nipple pain, milk stasis, or mastitis. Studies show that these problems may significantly complicate the breastfeeding process, cause additional stress, and negatively affect women's emotional well-being. In addition, unsuccessful breastfeeding experiences may cause feelings of guilt, lack of self-confidence, and increased emotional sensitivity in some women (Dietrich Leurer, Misskey, 2015).

During the postpartum period, women's circadian rhythm also changes significantly. The sleep and wakefulness regimen formed during pregnancy often becomes irregular after childbirth because of newborn care needs. Newborns do not have an established circadian rhythm, therefore their sleep and feeding cycles do not depend on the time of day. For this reason, women are forced to wake up frequently at night, and their biological rhythm becomes fragmented and unstable. Studies show that disrupted circadian rhythm may negatively affect melatonin secretion, hormonal balance, emotional regulation, and overall psychological well-being (Kim et al., 2015).

Scientific literature emphasizes that circadian rhythm disturbances are closely associated with symptoms of postpartum anxiety and depression. Destabilization of the sleep and wakefulness regimen may promote increased irritability, emotional reactivity, and reduced resistance to stress. Studies show that women whose circadian rhythm is more disrupted after childbirth more often experience emotional difficulties and evaluate their quality of life more poorly (Hall et al., 2022).

In recent years, increasing attention has been paid to the comprehensive evaluation of these factors. Scientific studies show that pain, breastfeeding difficulties, and disrupted circadian rhythm

often act together, creating a negative impact on women's sleep quality and emotional health. For this reason, modern postpartum care increasingly emphasizes a holistic approach to women's health, including not only control of physiological symptoms, but also evaluation of emotional condition, sleep quality, and social support (Kilavuz, Topaloğlu, 2025).

1.3. Psychological and Emotional Changes After Childbirth

Emotional Sensitivity. The postpartum period is a stage of significant emotional and psychological changes during which a woman faces new biological, social, and emotional challenges. One of the phenomena most described in scientific literature during this period is increased emotional sensitivity. Studies show that after childbirth women become more sensitive to emotional stimuli, more often experience mood swings, emotional instability, irritability, and increased intensity of reactions to everyday situations. These changes are considered part of the complex adaptation of the body to motherhood and a new stage of life (Rosebrock et al., 2015).

Emotional sensitivity after childbirth is closely related to hormonal changes occurring in a woman's body. After placental expulsion, estrogen and progesterone concentrations decrease very rapidly, and these hormones are directly related to neurotransmitter activity in the central nervous system. Studies show that sudden hormonal fluctuations may affect the activity of serotonin, dopamine, and gamma-aminobutyric acid systems, therefore women become more sensitive to stress, emotional stimuli, and negative experiences (Gilfarb, Leuner, 2022).

Scientific literature notes that emotional sensitivity after childbirth does not always have a pathological nature. For some women, emotional fluctuations are a temporary physiological reaction to childbirth, sleep deprivation, new feelings of responsibility, and life changes. During the first days after childbirth, the so-called "postpartum blues" often occurs, characterized by increased emotionality, tearfulness, sensitivity, anxiety, and mood instability. Studies show that this condition occurs in the majority of women and usually resolves spontaneously during the first two weeks after childbirth (Tosto et al., 2023).

However, for some women emotional sensitivity becomes more intense and long-lasting. Studies show that persistent emotional instability may be associated with an increased risk of postpartum anxiety and depression. Women who have greater difficulty regulating emotions after childbirth more often experience tension, fear regarding the infant's health, lack of confidence in their ability to care for the newborn, and a constant feeling of anxiety. Emotional sensitivity may also intensify because of chronic fatigue, sleep deprivation, and insufficient social support (Tomaso et al., 2021).

An important aspect of emotional sensitivity is a woman's relationship with her environment

and social support. Studies show that women during the postpartum period become more sensitive to the reactions, evaluations, and emotional support of others. Emotional support from partners, family members, and healthcare professionals may significantly reduce emotional vulnerability and improve women's psychological well-being. Meanwhile, lack of emotional support, family conflicts, or social isolation are associated with greater emotional instability and poorer mental health after childbirth (Mor et al., 2025).

Scientific literature also analyzes the relationship between emotional sensitivity and sleep quality. Studies show that women who experience fragmented sleep and constant fatigue after childbirth more often become emotionally reactive, more irritable, and more sensitive to stressful situations. Sleep deprivation negatively affects emotional regulation, reduces the ability to adapt to stressful situations, and increases the likelihood of negative emotional reactions. For this reason, sleep quality disturbances are considered one of the most important factors of emotional vulnerability during the postpartum period (Horwitz et al., 2026).

Emotional sensitivity after childbirth is also closely related to the formation of maternal identity. Studies show that women during this period often reassess their role in the family, relationships with partners, and personal self-esteem. Adaptation to a new rhythm of life and constant responsibility for the infant may cause emotional tension and feelings of uncertainty. Some women feel pressure to conform to the socially constructed image of the "ideal mother," which may increase feelings of guilt, anxiety, and emotional exhaustion (Iacona, 2025).

In recent years, scientific studies have increasingly focused on the importance of emotional sensitivity for women's mental health. It is emphasized that emotional sensitivity is not only a temporary emotional fluctuation but may also be an important early indicator of psychological difficulties. Early recognition of emotional changes allows timely provision of emotional support, psychological assistance, and reduction of the risk of long-term mental health disorders. For this reason, modern postpartum care recommends greater attention to monitoring women's emotional condition, strengthening emotional support, and providing individualized assistance (Bayram Değer, 2025)

Adaptation to Motherhood. Adaptation to motherhood is a complex and multidimensional process encompassing women's psychological, emotional, social, and behavioral adjustment to the new maternal role. During the postpartum period, women face not only physiological bodily changes, but also significant changes in lifestyle, responsibility, and identity. In scientific literature, adaptation to motherhood is defined as a dynamic process during which maternal identity, emotional attachment to the infant, and the ability to adapt to new daily and emotional challenges are formed (Hwang et al., 2022).

Studies show that adaptation to motherhood begins already during pregnancy, but occurs most

intensively during the first weeks and months after childbirth. During this period, women learn new skills related to infant care, adapt to changed sleep patterns, physical fatigue, and new responsibility. Scientific literature notes that the adaptation process is individual and depends on many factors, such as women's psychological preparation for motherhood, social support, relationships with partners, previous life experience, and emotional health (Vega-Sanz et al., 2025).

One of the most important aspects of adaptation to motherhood is the formation of maternal identity. After childbirth, women often reassess their life priorities, relationships, professional role, and personal self-esteem. Studies show that at the beginning of motherhood many women feel uncertainty, doubt their ability to properly care for the infant, and experience a strong sense of responsibility. Adaptation to motherhood is often accompanied by emotional fluctuations, sensitivity, and increased self-criticism, especially in cases where women face unrealistic societal expectations or social pressure to be a "good mother" (Choi et al., 2005).

Scientific literature emphasizes that emotional attachment to the infant is an essential part of successful adaptation to motherhood. Early mother–infant bonding develops through daily care, physical contact, breastfeeding, and emotional responsiveness to the infant's needs. Studies show that a strong emotional bond with the infant may positively affect women's emotional well-being, reduce stress, and promote greater self-confidence as a mother. However, the formation of emotional attachment may be more difficult for women who experience severe fatigue, sleep disturbances, or symptoms of postpartum anxiety (Ogallar et al., 2025).

Sleep quality also has a major impact on adaptation to motherhood. Studies show that constant sleep deprivation, fragmented sleep, and physical fatigue may complicate emotional regulation, reduce patience, and increase the risk of emotional exhaustion. Women who do not sleep sufficiently after childbirth more often experience anxiety, emotional sensitivity, and difficulties adapting to the role of motherhood. Sleep disturbances may also reduce women's ability to respond appropriately to the infant's needs and negatively affect the mother–infant relationship (Kilavuz, Topaloğlu, 2025).

An important factor in adaptation to motherhood is social and emotional support. Scientific studies show that partner support, family assistance, and positive relationships with relatives significantly contribute to better emotional well-being of women during the postpartum period. Women who feel emotionally secure and receive practical help in caring for the infant more often successfully adapt to motherhood and experience less stress. Meanwhile, lack of social support is associated with greater emotional vulnerability, feelings of loneliness, and increased risk of postpartum anxiety (White et al., 2023).

Scientific literature also discusses the impact of cultural and societal norms on adaptation to motherhood. In some societies, motherhood is idealized as a naturally happy and easy stage of life,

therefore, women may avoid talking about experienced difficulties, fatigue, or emotional experiences. Studies show that such social pressure may promote feelings of guilt, lack of self-confidence, and emotional isolation, especially for those women who face more difficult adaptation to motherhood (García-Plata et al., 2025).

In recent years, increasing attention has been paid to the importance of psychological flexibility and emotional resilience in the process of adaptation to motherhood. Studies show that women who are better able to manage stress, accept changed life circumstances, and seek help more often successfully adapt to motherhood. The importance of early emotional support and psychological monitoring is also emphasized, especially for women who have a history of mental health problems or experience pronounced sleep quality disturbances after childbirth (Kay et al., 2024).

In modern healthcare, adaptation to motherhood is increasingly evaluated as a complex biopsychosocial process requiring an individualized approach to women's needs. It is emphasized that successful adaptation to motherhood depends not only on women's physical condition, but also on emotional support, sleep quality, social environment, and the opportunity to receive timely professional assistance. For this reason, it is recommended to strengthen postpartum emotional healthcare and encourage open communication about the difficulties of motherhood and emotional experiences (Stein et al., 2026).

Stress and Emotional Tension. The postpartum period often becomes a stage of intense emotional experiences and increased psychological tension for women. Although the birth of a child is often associated with positive experiences in society, scientific literature emphasizes that this period is also one of the greatest psychological adaptation challenges in a woman's life. After childbirth, women face significant physiological, social, and emotional changes that may become a strong source of stress. Studies show that postpartum stress and emotional tension are closely associated with deteriorated sleep quality, emotional exhaustion, and an increased risk of postpartum anxiety and depression (Gmelig Meyling et al., 2023).

Stress during the postpartum period is most defined as a psychological and physiological reaction to increased emotional, physical, and social demands. Women after childbirth often feel responsibility for the infant's well-being, anxiety regarding their ability to properly fulfill the maternal role, and fear of making mistakes while caring for the newborn. Studies show that during the first weeks after childbirth many women experience increased vigilance, constant concern about the infant's health, and difficulties relaxing even during rest. Such long-term emotional tension may negatively affect autonomic nervous system functioning, sleep structure, and emotional regulation (Wang et al., 2023).

One of the most important sources of stress after childbirth is sleep deprivation and disrupted circadian rhythm. Scientific studies show that constant nighttime awakenings, fragmented sleep, and

insufficient duration of rest reduces the body's ability to recover physiologically and psychologically. Sleep deprivation directly affects emotional regulation mechanisms, increases irritability, and sensitivity to stress, and reduces the ability to cope with everyday difficulties. Studies show that women who sleep more poorly during the postpartum period more often experience stronger emotional tension, anxiety symptoms, and reduced life satisfaction (Tomaso et al., 2021).

Hormonal changes also have a significant impact on postpartum stress. The sudden decrease in estrogen and progesterone concentrations after childbirth may affect neurotransmitter activity and increase the body's sensitivity to emotional stimuli. Studies show that hormonal fluctuations may intensify emotional reactivity, promote feelings of anxiety, and reduce psychological resistance to stress. In addition, long-term stress activates the hypothalamic–pituitary–adrenal axis and increases cortisol concentration in the body, which additionally negatively affects sleep quality and emotional condition (Mbiyzenyuy et al., 2024).

Scientific literature identifies many factors that may increase the level of emotional tension during the postpartum period. Among the most important are insufficient social support, family conflicts, financial difficulties, feelings of loneliness, and complicated pregnancy or childbirth experiences. Studies show that women who feel a lack of emotional support from partners or relatives more often experience emotional exhaustion and adapt more poorly to motherhood. A greater risk of emotional tension is also identified among women who previously suffered from anxiety or depressive disorders (Zelčāne et al., 2026).

Emotional tension after childbirth is often related to women's self-evaluation and socially constructed expectations. Studies show that many women feel pressure to be “good mothers,” quickly adapt to a new rhythm of life, and independently cope with the challenges of motherhood. Such societal expectations may promote feelings of guilt, lack of self-confidence, and emotional fatigue, especially in cases where women face breastfeeding difficulties, sleep deprivation, or emotional difficulties (Medina, Magnuson, 2009).

An important aspect of emotional tension is constant vigilance and an increased sense of responsibility for the infant's safety. Scientific studies show that during the postpartum period women often become more sensitive to possible threats, constantly monitor the infant's condition, and have difficulty relaxing even when the infant is sleeping or being cared for by other people. This increased vigilance may be adaptive in some cases, but over time it becomes a source of emotional exhaustion and constant anxiety (King et al., 2020).

In recent years, more studies have examined the long-term consequences of postpartum stress. It has been established that prolonged emotional tension may negatively affect women's mental health, the mother–infant relationship, partner relationships, and overall quality of life. In addition, long-term stress is associated with an increased risk of postpartum anxiety, depression, and

chronic sleep disturbances. For this reason, modern healthcare recommends paying more attention to early recognition of emotional tension, strengthening emotional support, and ensuring accessibility of psychological assistance for women after childbirth (Adhikari et al., 2023).

Scientific literature emphasizes that a comprehensive approach is important for reducing emotional tension, including improvement of sleep quality, strengthening social support, partner involvement, and encouragement of emotional expression. Studies show that women who can openly talk about their emotional difficulties and receive professional assistance more often successfully adapt to motherhood and experience less emotional exhaustion (Goodman et al., 2011).

The Importance of Mental Health During the Postpartum Period. The postpartum period is one of the most sensitive stages in a woman's life, during which intensive biological, emotional, and social changes occur. During this period, women's mental health becomes especially important not only for their own well-being, but also for newborn development, the mother–infant relationship, and the functioning of the entire family. Scientific literature emphasizes that mental health after childbirth must be evaluated as an inseparable part of women's overall health, because emotional and psychological difficulties may have long-term consequences for both the mother and the child (Priel et al., 2020).

After childbirth, women face many new challenges: a changed rhythm of life, sleep deprivation, physical fatigue, new responsibility, and hormonal changes. Studies show that the combination of these factors may increase the risk of emotional vulnerability and complicate adaptation to motherhood. For some women, emotional difficulties are temporary and related to physiological adaptation after childbirth, however for others they progress into more serious mental health disorders such as postpartum anxiety, depression, or emotional adjustment disorders (Mughal et al., 2018).

Scientific literature notes that mental health after childbirth has a direct impact on women's quality of life. Women who experience emotional difficulties more often feel constant fatigue, reduced life satisfaction, emotional instability, and difficulties performing daily activities. In addition, deteriorated mental health may reduce women's ability to properly care for themselves, maintain social relationships, and adapt to the new role of motherhood (Phua et al., 2020).

An important aspect is the effect of mental health on the mother–infant relationship. Studies show that women's emotional condition directly affects their ability to respond sensitively to the infant's needs, maintain emotional contact, and form secure attachment. Women who experience severe anxiety or depressive symptoms during the postpartum period more often face difficulties establishing an emotional bond with the infant. This may negatively affect the infant's emotional, social, and cognitive development (Ahun et al., 2018).

Mental health after childbirth is also closely related to sleep quality. Studies show that poor

sleep quality and constant sleep deprivation increase the risk of emotional exhaustion, anxiety, and depressive symptoms. At the same time, emotional difficulties may further worsen sleep quality, therefore a closed cycle of negative symptoms is formed. For this reason, scientific literature increasingly considers sleep quality an important indicator of mental health during the postpartum period (Koutra et al., 2017).

Studies also show that negative changes in mental health after childbirth may have long-term consequences for the entire family. Women's emotional difficulties may negatively affect partner relationships, increase the risk of conflicts, and reduce family emotional stability. In addition, women experiencing emotional stress more often face feelings of social isolation and lower confidence in their ability to be good mothers (Adhikari et al., 2019).

Scientific literature emphasizes that one of the most important problems is insufficient recognition of mental health disorders after childbirth. Many women avoid talking about emotional difficulties because of stereotypes existing in society or fear of being judged as inadequate mothers. For this reason, some emotional disorders remain undiagnosed and untreated. Studies show that early identification of mental health problems and timely support may significantly reduce the risk of long-term complications and improve women's emotional well-being (Sherryl, Goodman, 2020).

In recent years, increasing attention has been paid to preventive measures and comprehensive emotional healthcare after childbirth. Scientific studies show that emotional support, psychological counseling, partner involvement, and high-quality healthcare may significantly reduce the risk of emotional difficulties. The importance of improving sleep quality, stress management, and social support in strengthening women's mental health is also emphasized (Rogers et al., 2020).

In the modern healthcare system, mental health during the postpartum period is increasingly evaluated as a priority area. The necessity of ensuring not only physical care for women after childbirth, but also systematic monitoring of emotional condition is emphasized. Early recognition of emotional difficulties, individualized support, and a multidisciplinary approach allow improvement of women's quality of life, strengthening of the mother–infant relationship, and reduction of the prevalence of long-term mental health disorders (Gotlib et al., 2020).

2. THE CONCEPT OF SLEEP QUALITY AND THE FACTORS DETERMINING IT

2.1. The Concept of Sleep and Its Physiological Significance

Sleep Phases. Sleep is a complex physiological process necessary for the physical, emotional, and cognitive functioning of the human body. In scientific literature, sleep is defined as an active biological state during which important processes of the nervous system, hormonal regulation, metabolism, and bodily recovery take place. Sleep is not a passive period of rest – during sleep, the brain actively processes information, regulates emotions, maintains homeostasis, and strengthens immune system activity. Studies show that sufficient and high-quality sleep is necessary for maintaining emotional stability, cognitive functions, and mental health (Kaczmarek et al., 2025).

The physiology of sleep is regulated by complex neurobiological mechanisms closely related to circadian rhythm and the homeostatic need for sleep. Circadian rhythm is an internal biological clock regulating the sleep and wakefulness cycle over a 24-hour period. The activity of this rhythm is mainly controlled by the suprachiasmatic nucleus located in the hypothalamus, which responds to signals of light and darkness in the environment. The sleep–wakefulness cycle is also regulated by melatonin, cortisol, and various neurotransmitters, including serotonin, dopamine, and gamma-aminobutyric acid (GABA) (Biso et al., 2026).

In scientific literature, sleep is divided into two main phases: non-rapid eye movement sleep (NREM) and rapid eye movement sleep (REM). These phases repeat cyclically throughout the night, forming sleep cycles lasting approximately 90–110 minutes. The sleep of a healthy individual usually consists of 4–6 such cycles per night. Each sleep phase is characterized by different physiological activity and performs specific bodily recovery functions (Patel et al., 2024).

NREM sleep constitutes the majority of total sleep time and is divided into three stages: N1, N2, and N3. The first stage (N1) is considered a transitional state between wakefulness and sleep. During this stage, muscle activity decreases, eye movements slow down, and a person becomes less sensitive to environmental stimuli. The N1 phase is the shortest and usually lasts only a few minutes. Studies show that during this stage a person can still be awakened quite easily (Tononi et al., 2024).

The second NREM stage (N2) constitutes the largest part of sleep. During this stage, heart rate, body temperature, and brain activity decrease. Specific sleep spindles and K-complexes are observed on electroencephalography, which are associated with suppression of sensory information and memory consolidation. Scientific studies show that the N2 stage is important for conserving bodily energy and stabilizing the nervous system (Patel et al., 2024).

The third stage (N3) is called deep sleep or slow-wave sleep. During this phase, brain activity slows down, delta waves dominate, blood pressure and respiratory rate decrease. Deep sleep is

considered the most important phase of physiological recovery because during this stage tissue regeneration, secretion of growth hormone, activation of the immune system, and restoration of energy reserves occur most actively. Studies show that deep sleep is necessary for physical recovery and maintaining the body's resistance to stress (Patel et al., 2024).

REM sleep is characterized by intensive brain activity, rapid eye movements, and reduced muscle tone. During this phase, dreaming most commonly occurs, and brain activity becomes similar to the state of wakefulness. REM sleep is considered especially important for emotional regulation, memory consolidation, and maintenance of cognitive functions. Studies show that emotional information processing and regulation of stress responses occur during REM sleep. For this reason, disturbances of REM sleep are associated with increased risk of anxiety, depression, and emotional instability (Goldstein et al., 2014).

The structure of sleep phases and their interrelationship may significantly change during the postpartum period. Studies show that women after childbirth often experience fragmented sleep, reduced duration of deep sleep, and disturbed REM sleep structure. Frequent nighttime awakenings related to newborn care and breastfeeding disrupt the normal course of sleep cycles and reduce the body's ability to recover physiologically and emotionally. For this reason, women during the postpartum period become more sensitive to fatigue, emotional tension, and mental health disorders (Schwartz, Ketner Villa, 2025).

Scientific literature emphasizes that disturbances in sleep phases have a direct effect on emotional condition and mental health. Reduced duration of deep sleep and REM sleep may negatively affect emotional regulation, stress tolerance, and cognitive functions. Studies show that long-term changes in sleep structure during the postpartum period may be associated with a greater risk of postpartum anxiety and depression (Kalmbach et al., 2018).

In modern scientific literature, sleep is increasingly evaluated as one of the most important indicators of women's health during the postpartum period. It is emphasized that high-quality sleep is necessary not only for physical bodily recovery, but also for emotional balance, adaptation to motherhood, and maintenance of mental health. For this reason, increasing attention is paid to the evaluation of sleep quality and prevention of sleep disturbances in women after childbirth (Gessesse et al., 2022).

The Importance of Sleep for the Nervous System and Emotional State. Sleep is one of the most important biological processes necessary for normal functioning of the central nervous system, emotional regulation, and maintenance of psychological balance. In scientific literature, sleep is described as an active neurophysiological process during which reorganization of neuronal connections, regulation of brain metabolism, information processing, and stabilization of emotional reactions occur. Studies show that sufficient and high-quality sleep is necessary for recovery of the

nervous system and the ability to effectively respond to daily emotional and cognitive stimuli (Eugene, Masiak, 2015).

During sleep, intensive neurobiological processes occur in the central nervous system that are important for maintaining cognitive functions and emotional condition. Studies show that sleep participates in memory consolidation, learning processes, emotional information processing, and stabilization of neural networks. The REM sleep phase is particularly important, during which emotional experiences are actively processed and stress responses are regulated. Scientific literature notes that REM sleep helps reduce emotional reactivity and improves the ability to adapt to stressful situations (Deak, Stickgold, 2010).

Sleep is also necessary for maintaining the balance of the autonomic nervous system. During high-quality sleep, the activity of the sympathetic nervous system decreases, heart rate stabilizes, blood pressure and concentrations of stress hormones normalize. Meanwhile, sleep deprivation activates the sympathetic nervous system and increases cortisol secretion, which may promote constant physiological tension and emotional sensitivity. Studies show that long-term sleep disturbances may lead to hyperactivity of the nervous system and increase the risk of anxiety and depressive symptoms (Hirotsu et al., 2015).

Scientific literature emphasizes that sleep has a direct effect on emotional regulation. During sleep, the brain processes emotional experiences encountered during the day and reduces their emotional intensity. Studies show that people who sleep sufficiently control emotional reactions better, cope more effectively with stress, and demonstrate greater emotional stability. Meanwhile, sleep deprivation reduces the activity of the prefrontal cortex and strengthens the reactivity of the amygdala, therefore a person becomes more sensitive to negative emotional stimuli and has greater difficulty regulating emotions (Medic et al., 2017).

Sleep quality is closely related to mental health. Studies show that poor sleep quality may be both a cause and a consequence of mental health disorders. Long-term sleep disturbances are associated with an increased risk of anxiety, depression, emotional exhaustion, and stress disorders. In addition, emotional difficulties may further worsen sleep quality, therefore a closed cycle of negative symptoms is formed, which over time negatively affects nervous system functioning and emotional condition (Scott et al., 2021).

During the postpartum period, the importance of sleep for the nervous system and emotional condition becomes especially significant. After childbirth, women often experience fragmented sleep, reduced duration of uninterrupted sleep, and disrupted circadian rhythm. Studies show that these sleep changes negatively affect emotional regulation, increase irritability and emotional sensitivity, and

reduce resistance to stress. Because of long-term sleep deprivation, women more often experience emotional tension, anxiety symptoms, and reduced ability to adapt to the challenges of motherhood (Sobol-Kwapińska et al., 2024).

Scientific studies also show that sleep deprivation negatively affects cognitive functions. When sleep is disturbed, concentration decreases, decision-making worsens, short-term memory declines, and the speed of information processing is reduced. During the postpartum period, these changes may complicate daily activities, infant care, and women's ability to adequately respond to stressful situations. Some authors note that long-term sleep deprivation may reduce women's self-confidence and increase the risk of emotional exhaustion (Hunter et al., 2009).

An important aspect is the significance of sleep for the neuroendocrine system. During sleep, the secretion of many hormones is regulated, including cortisol, melatonin, growth hormone, and serotonin metabolism. High-quality sleep helps maintain hormonal balance and reduces the body's response to stress. Meanwhile, disturbed sleep may promote inflammatory processes, increase concentrations of stress hormones, and negatively affect emotional well-being (Jiao et al., 2025).

In recent years, increasing attention has been paid to the relationship between sleep and emotional health. Studies show that improving sleep quality may significantly reduce the intensity of emotional stress, anxiety, and depressive symptoms. For this reason, in modern healthcare sleep is increasingly evaluated as one of the most important factors in maintaining emotional well-being and mental health, especially for women during the postpartum period (Tao et al., 2023).

The Role of Sleep in Women's Health. Sleep is one of the most important biological processes having essential significance for women's physical, emotional, hormonal, and mental health. Scientific literature emphasizes that sleep plays an important role in maintaining body homeostasis, recovery of the nervous system, regulation of immune processes, and ensuring hormonal balance. Women's sleep is characterized by certain physiological features related to hormonal cycles, reproductive function, pregnancy, childbirth, and menopause, therefore sleep quality becomes especially important throughout a woman's life (Chasens et al., 2021).

Studies show that high-quality sleep is necessary for normal functioning of the endocrine system. During sleep, the secretion of many hormones is regulated, including melatonin, cortisol, growth hormone, insulin, and reproductive hormones. Sleep deprivation may disrupt hormonal balance and negatively affect the menstrual cycle, fertility, and overall reproductive health. Scientific literature notes that because of hormonal fluctuations women are more sensitive to sleep disturbances than men, and changes in sleep quality are often associated with changes in estrogen and progesterone concentrations in the body (Liu, Reddy, 2022).

Sleep is especially important for maintaining nervous system functions and emotional health. Studies show that during high-quality sleep emotional regulation, restoration of cognitive functions,

and reduction of stress responses occur. Meanwhile, insufficient or fragmented sleep may increase emotional sensitivity, irritability, anxiety symptoms, and emotional exhaustion. Women who constantly sleep more poorly more often experience depressive symptoms, emotional instability, and reduced resistance to stress (Yazdanpanah, 2020).

Scientific studies also reveal the important role of sleep in immune system functioning. During sleep, regeneration of immune cells and regulation of inflammatory processes actively occur in the body. High-quality sleep strengthens the body's resistance to infections and reduces the risk of chronic inflammation. Meanwhile, long-term sleep deprivation is associated with increased activity of inflammatory cytokines, weaker immune response, and greater risk of various chronic diseases. Studies show that women who constantly sleep less than the recommended physiological norm more often develop metabolic and cardiovascular disorders (Chu et al., 2023).

Sleep also has a significant effect on metabolism and energy balance. Scientific literature notes that sleep deprivation may promote disturbances in appetite regulation, increase the concentration of the hunger hormone ghrelin, and reduce leptin activity. Because of these changes, women who sleep insufficiently more often face weight gain, increased risk of obesity, and metabolic syndrome. In addition, sleep deprivation may negatively affect glucose metabolism and increase the likelihood of insulin resistance (Arab et al., 2023).

During the postpartum period, the importance of sleep for women's health becomes especially significant. After childbirth, women often face fragmented sleep, reduced sleep duration, and disrupted circadian rhythm because of newborn care and breastfeeding. Studies show that poor sleep quality after childbirth negatively affects women's physical recovery, emotional well-being, and ability to adapt to the role of motherhood. Sleep deprivation is also associated with an increased risk of postpartum anxiety, depression, and emotional exhaustion (Niu et al., 2025).

Scientific literature emphasizes that sleep is important for women's cardiovascular health. During sleep, blood pressure decreases, heart rate stabilizes, and activity of the sympathetic nervous system is reduced. Long-term sleep disturbances may promote the development of hypertension, atherosclerosis, and other cardiovascular diseases. Studies show that women who constantly sleep less than six hours per day have a greater risk of cardiovascular diseases (Marjot et al., 2021).

An important aspect is the effect of sleep on women's quality of life. High-quality sleep improves energy levels, emotional well-being, concentration, and the ability to perform daily activities. Meanwhile, poor sleep quality reduces work capacity, increases emotional sensitivity, and may negatively affect social and family relationships. Studies show that women who evaluate their sleep as poor quality more often experience reduced life satisfaction and poorer psychological well-being (Smith et al., 2025).

In recent years, scientific literature has devoted increasing attention to the prevention and

improvement of sleep quality in the context of women's health. It is emphasized that sleep must be evaluated as an essential component of health, and early identification of sleep disturbances may help reduce the risk of various physical and mental health problems. It is especially important to ensure high-quality sleep for women during pregnancy and the postpartum period, because during these stages sleep disturbances may have long-term consequences for both women's and children's health (Beroukhim et al., 2022).

2.2. Assessment of Sleep Quality

The Concept of Sleep Quality. Sleep quality is a multidimensional concept describing not only sleep duration, but also a person's subjective satisfaction with sleep, ability to rest, and ability to function normally during the day. Scientific literature emphasizes that sleep quality is an important indicator of overall physical and mental health, closely related to emotional condition, cognitive functions, quality of life, and physiological recovery of the body. Although sleep duration was long considered the main criterion of good sleep, contemporary studies show that high-quality sleep includes a much broader spectrum of physiological and subjective aspects (Petimar et al., 2020).

There is no single definition of sleep quality in scientific literature, however this concept is most commonly associated with the ability to fall asleep quickly, maintain uninterrupted sleep, sufficient sleep duration, feeling well-rested upon awakening, and appropriate daytime functioning. Studies show that a person may sleep long enough, but still evaluate their sleep as poor quality because of frequent awakenings, shallow sleep, or a constant feeling of fatigue. For this reason, sleep quality is considered a subjective and individually perceived experience (Nelson et al., 2022).

Sleep quality includes both objective and subjective components. Objective indicators are usually assessed using polysomnography, actigraphy, or other physiological methods that allow determination of sleep duration, structure of sleep phases, frequency of awakenings, and other biological parameters. Meanwhile, subjective sleep assessment is based on a person's well-being, satisfaction with sleep, and perception of their rest quality. Scientific literature notes that subjective sleep assessment often has greater significance for emotional health than objective physiological indicators (Harvey et al., 2008).

Studies show that good sleep quality is associated with better emotional well-being, higher energy levels, better cognitive functions, and more effective stress management. Meanwhile, poor sleep quality is associated with increased fatigue, irritability, emotional instability, and reduced resistance to stress. Scientific literature emphasizes that even short-term sleep quality disturbances may negatively affect emotional regulation, while long-term disturbances significantly increase the risk of anxiety and depressive symptoms (Protogerou et al., 2024).

The concept of sleep quality is especially important when evaluating women's health during the

postpartum period. After childbirth, women often face fragmented sleep, frequent nighttime awakenings, and reduced duration of uninterrupted sleep. Studies show that even if total sleep duration appears sufficient, frequent sleep interruptions and reduced deep sleep phase significantly worsen subjective evaluation of sleep quality. For this reason, during the postpartum period it is especially important to evaluate not only the quantity of sleep, but also its quality (Libman et al., 2016).

Scientific literature identifies several main components of sleep quality: sleep duration, sleep onset latency, sleep continuity, frequency of awakenings, sleep efficiency, and well-being upon awakening. Sleep efficiency is defined as the ratio between time spent sleeping and total time spent in bed. Studies show that reduced sleep efficiency is often associated with emotional exhaustion, stress, and mental health problems (Watson et al., 2015).

An important aspect is the relationship between sleep quality and mental health. Studies show that poor sleep quality may be both a cause and a consequence of emotional disorders. Anxiety symptoms often complicate falling asleep and increase the frequency of nighttime awakenings, while poor-quality sleep further intensifies emotional sensitivity and stress responses. This bidirectional relationship is especially relevant for women during the postpartum period, when because of physiological and emotional changes sleep quality becomes particularly vulnerable (Chattu et al., 2018).

In recent years, increasing attention has been paid to the importance of subjective sleep assessment. Studies show that a person's perception of their sleep quality often reflects emotional well-being better than objective physiological indicators. Women who evaluate their sleep as poor more often experience anxiety, emotional exhaustion, and reduced quality of life assessment, even when objective sleep indicators are not significantly altered (O'Donnell et al., 2009).

In modern scientific literature, sleep quality is considered an important health indicator and one of the most significant conditions of emotional well-being. It is emphasized that evaluation of sleep quality must be comprehensive and include both physiological and subjective aspects. It is especially important to identify sleep quality disturbances in women during the postpartum period in a timely manner, because they may be an early indicator of emotional and mental health problems (DelRosso, 2025).

Subjective and Objective Assessment. In scientific literature, assessment of sleep quality is considered a complex process because sleep includes physiological, psychological, and subjectively perceived aspects. For this reason, two main assessment methods are usually applied in sleep quality analysis – subjective and objective assessment. These methods allow evaluation not only of biological sleep parameters, but also of a person's well-being, satisfaction with sleep, and its impact on daily functioning. Scientific literature emphasizes that in order to comprehensively assess sleep quality, it is important to combine both assessment methods, because physiological indicators alone do not always reflect the sleep quality experienced by a person (Sosso et al., 2023).

Subjective assessment of sleep quality is based on a person's personal perception of sleep and well-being. This assessment includes individual satisfaction with sleep, ease of falling asleep, frequency of awakenings, feeling rested upon awakening, and energy level experienced during the day. Studies show that subjective sleep assessment is closely related to emotional condition, stress level, and mental health. A person may objectively sleep long enough, but still evaluate their sleep as poor quality because of frequent awakenings, restless sleep, or a constant feeling of fatigue (Hunter, Hayden, 2018).

Scientific literature notes that subjective assessment of sleep quality is especially important when evaluating emotional and psychological factors. Studies show that women who evaluate their sleep as poor more often experience anxiety symptoms, emotional exhaustion, and reduced quality of life assessment, even when objective physiological indicators are not significantly altered. For this reason, subjective perception of sleep is considered an important indicator of mental health, especially during the postpartum period (Kwon et al., 2024).

Various questionnaires and self-assessment scales are most commonly used for subjective assessment of sleep quality. One of the most widely applied instruments is the Pittsburgh Sleep Quality Index (PSQI), which allows evaluation of sleep quality over the past month. This questionnaire includes aspects such as sleep duration, sleep onset time, frequency of awakenings, sleep efficiency, and daytime sleepiness. Studies show that subjective questionnaires are effective in evaluating relationships between sleep quality and emotional condition (Dadzie et al., 2024).

Objective assessment of sleep quality is based on observation and recording of physiological parameters. The purpose of this assessment is to determine biological sleep indicators independently of a person's subjective perception. One of the most accurate objective methods is polysomnography, which is considered the "gold standard" in sleep studies. During polysomnography, electrical brain activity, eye movements, muscle tone, heart rate, breathing, and other physiological parameters are recorded. This method allows precise evaluation of sleep phases, sleep structure, and identification of various sleep disorders (Liu, Reddy, 2022).

Another frequently used objective method is actigraphy. During this method, a special device, usually worn on the wrist, is used to record a person's movements and calculate sleep and wakefulness periods based on them. Actigraphy is considered a less invasive and more practical method for long-term sleep monitoring in a natural environment. Studies show that this method is especially useful for assessing women's sleep during the postpartum period, when the application of polysomnography may be complicated because of newborn care (Verde et al., 2022).

Scientific literature emphasizes that differences between subjective and objective sleep assessment are often identified. Some people may objectively sleep with sufficient quality, but evaluate their sleep poorly because of emotional tension or anxiety. Meanwhile, other individuals may fail to

recognize significant physiological sleep disturbances. Studies show that subjective sleep assessment is strongly influenced by emotional condition, stress, and mental health disorders, therefore objective indicators alone do not always reflect a person's actual well-being (Boulos, 2019).

During the postpartum period, differences between subjective and objective assessment become especially relevant. Studies show that women after childbirth often evaluate their sleep more poorly than objective physiological indicators demonstrate. This may be related to emotional sensitivity, constant vigilance because of infant care, and increased anxiety levels. In addition, even short-term sleep interruptions in postpartum women may be perceived as highly exhausting and significantly affect emotional well-being (Wallace et al., 2021).

Scientific studies show that objective sleep assessment is important for identifying physiological sleep disturbances, however subjective assessment often better reflects a person's emotional condition and quality of life. For this reason, in modern clinical practice it is recommended to combine both methods in order to comprehensively evaluate sleep quality and its impact on human health (Griffith et al., 2021).

In recent years, increasing attention has been paid to individualized assessment of sleep quality, taking into account a person's emotional condition, life circumstances, and physiological characteristics. It is especially important to comprehensively evaluate women's sleep during the postpartum period, because at this time sleep quality disturbances may be closely associated with an increased risk of postpartum anxiety and emotional exhaustion (Hirshkowitz et al., 2015).

Most Commonly Used Instruments. Assessment of sleep quality is an important part of both scientific research and clinical practice, allowing identification of sleep disturbances, their intensity, and possible impact on physical and mental health. Scientific literature emphasizes that sleep quality is a multidimensional phenomenon, therefore its assessment requires the application of various methods that include both subjective human sensations and objective physiological indicators. Properly selected assessment instruments allow not only identification of sleep problems, but also analysis of their associations with emotional condition, quality of life, fatigue, and mental health (DelRosso et al., 2021).

During the postpartum period, the importance of sleep assessment increases even more because of frequent changes in sleep structure, disrupted circadian rhythm, and emotional vulnerability. Studies show that women after childbirth often experience fragmented sleep, reduced duration of uninterrupted sleep, and increased daytime fatigue. Since these changes may be closely related to postpartum anxiety, emotional exhaustion, and depressive symptoms, sleep quality assessment instruments become an important means of early diagnosis and prevention (Migueis et al., 2021).

One of the most widely used instruments for subjective assessment of sleep quality is the Pittsburgh Sleep Quality Index (PSQI). This questionnaire was developed to assess a person's sleep

quality during the past month and is currently considered one of the most commonly used sleep assessment instruments worldwide. The PSQI consists of 19 self-assessment questions and five additional questions intended for observations by a partner or roommate regarding sleep. Seven main components are assessed: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction (Lim et al., 2023).

Each PSQI component is scored from 0 to 3, and the total score may range from 0 to 21 points. A higher score indicates poorer sleep quality. Studies show that a total score higher than 5 points is usually associated with clinically significant sleep quality disturbances. Scientific literature evaluates the PSQI as a reliable and valid instrument in various populations, including pregnant women and women during the postpartum period (Carpi, 2025).

The PSQI is especially important in investigating associations between sleep and emotional condition. Studies show that higher PSQI scores are often associated with greater emotional sensitivity, stronger anxiety symptoms, fatigue, and reduced quality of life. During the postpartum period, this questionnaire allows assessment not only of physiological sleep disturbances, but also of women's subjective perception of sleep, which is often closely related to emotional well-being (Park, 2020).

Another important instrument is the Insomnia Severity Index (ISI), designed to assess the intensity of insomnia symptoms. The ISI consists of seven questions covering the main aspects of insomnia: difficulties falling asleep, problems maintaining sleep, early awakening, satisfaction with sleep, impact of sleep on daily life, noticeability of sleep problems to others, and emotional concern about sleep disturbances. Each question is evaluated on a five-point scale from 0 to 4, and the total score may reach 28 points (Morin et al., 2011).

Scientific studies show that the ISI demonstrates good sensitivity and specificity in identifying both clinical and subclinical insomnia. The instrument is widely used in both clinical practice and scientific research analyzing the relationship between sleep disturbances and mental health. Studies show that higher ISI scores are often found in individuals experiencing greater stress, emotional exhaustion, and anxiety symptoms. During the postpartum period, the ISI is especially important for evaluating women's difficulties falling asleep and their emotional relationship with their sleep problems (Thakral et al., 2021).

Actigraphy is often used for objective assessment of sleep quality. This method is based on the use of a special movement recording device – an actigraph. Usually, the actigraph is worn on the wrist and records a person's physical activity, according to which sleep and wakefulness periods are calculated. Unlike polysomnography, actigraphy allows long-term observation of a person's sleep habits in a natural environment and less disrupts the usual rhythm of life (Smith et al., 2018).

Actigraphy is especially useful during the postpartum period because it allows objective assessment of frequent nighttime awakenings, sleep fragmentation, and disrupted circadian rhythm.

Studies show that women after childbirth often do not accurately perceive their sleep duration, therefore objective data may supplement subjective evaluations. Actigraphy also allows analysis of long-term sleep changes and their associations with emotional well-being and postpartum anxiety symptoms (Kaliush et al., 2024).

One of the most accurate objective methods for sleep assessment is polysomnography. This method is considered the “gold standard” in sleep research because it allows detailed recording of brain electrical activity, eye movements, breathing, heart rate, muscle tone, and other physiological parameters. Polysomnography provides the possibility to accurately determine sleep phases, sleep architecture, and various sleep disorders, such as sleep apnea or periodic limb movements (Weinhouse et al., 2022).

However, the application of polysomnography during the postpartum period has certain limitations. The examination is usually performed in laboratory conditions, which may disrupt a woman’s natural sleep, especially if she is caring for a newborn. For this reason, scientific studies often combine several methods – polysomnography, actigraphy, and subjective questionnaires – in order to obtain the most comprehensive picture of sleep quality (Manconi et al., 2024).

Scientific literature emphasizes that subjective and objective sleep assessment methods often provide different results. A person may objectively sleep sufficiently long, but evaluate their sleep as poor quality because of emotional stress or anxiety. On the other hand, some people may fail to recognize significant physiological sleep disturbances. Therefore, it is recommended to apply a comprehensive approach when assessing sleep quality and combine different assessment instruments (Masaki et al., 2025).

During the postpartum period, sleep quality assessment instruments become especially important because of the close relationship between sleep, emotional condition, and mental health. Early identification of sleep disturbances allows timely identification of women who may have a greater risk of postpartum anxiety or emotional exhaustion. For this reason, in modern clinical practice it is increasingly recommended to systematically assess women’s sleep quality after childbirth using validated and scientifically based instruments (Iranpour et al., 2016).

2.3. Factors Affecting Women's Sleep Quality After Childbirth

Infant Sleep Regimen. One of the most important factors affecting women's sleep quality during the postpartum period is the infant's sleep regimen. Scientific literature emphasizes that the sleep structure of newborns and infants differs significantly from adult sleep, therefore women after childbirth often face fragmented sleep, frequent nighttime awakenings, and reduced duration of uninterrupted sleep. Studies show that infant sleep habits are one of the strongest predictors of maternal sleep quality during the first months after childbirth (Creti et al., 2017).

Newborns are born without a developed circadian rhythm; therefore their sleep and wakefulness cycles are not dependent on daytime or nighttime. During the first months of life, infants often awaken because of physiological needs – feeding, physical contact, or discomfort. Scientific studies show that newborns sleep on average 14–17 hours per day, however their sleep consists of short cycles and is often interrupted every 2–4 hours. For this reason, maternal sleep becomes fragmented, deep sleep phases are shortened, and opportunities for physiological recovery are reduced (Rivkees, 2003).

Scientific literature notes that frequent infant awakenings during the night directly affect women's sleep structure. Studies show that women during the postpartum period often do not achieve sufficient duration of uninterrupted sleep necessary for deep and REM sleep phases. As a result, emotional regulation worsens, concentration decreases, and the risk of emotional exhaustion increases. In addition, constant awakenings disrupt the body's biological rhythm and reduce overall sleep efficiency (Spaeth et al., 2021).

Studies show that infant sleep problems are closely related to maternal emotional condition. Women whose infants frequently awaken at night or have difficulty falling asleep more often experience emotional stress, fatigue, and anxiety symptoms. Some authors note that mothers may become highly vigilant during infant sleep, constantly monitoring the infant's breathing or reactions, therefore even while the infant is sleeping, they are not always able to fully relax. This constant vigilance further worsens subjective evaluation of sleep quality (Lin et al., 2022).

It is important to note that maternal sleep quality is influenced not only by the frequency of infant awakenings, but also by the infant's ability to fall asleep independently. Studies show that infants who are able to fall asleep without intensive parental assistance awaken less frequently during the night and fall back asleep more quickly. In such cases, mothers more often experience longer periods of uninterrupted sleep and evaluate their sleep quality more positively (Bai et al., 2020).

Scientific literature also analyzes the relationship between infant sleep regimen and breastfeeding. Breastfed infants usually awaken more frequently than formula-fed infants because breast milk is digested more quickly. For this reason, breastfeeding women awaken more often during

the night and experience greater sleep fragmentation. However, some studies show that breastfeeding women often fall asleep more quickly after nighttime awakenings because of the effects of prolactin and oxytocin on the body (Abdul Jafar et al., 2021).

Infant sleep regimen may have a long-term effect on women's physical and emotional health. Studies show that long-term infant sleep disturbances are associated with greater risk of maternal emotional exhaustion, depressive symptoms, and postpartum anxiety. Constant sleep deprivation may also reduce women's ability to respond effectively to stress, weaken cognitive functions, and worsen quality of life (Witkowska-Zimny et al., 2024).

Scientific studies are devoting increasing attention to infant sleep education and its effect on maternal sleep. It has been established that educating parents about infant sleep physiology, formation of sleep routines, and principles of safe sleep may improve both infant and maternal sleep quality. Studies show that a clear evening routine, stable sleep regimen, and consistent responses to infant awakenings may reduce the frequency of nighttime awakenings and improve women's emotional well-being (Abuhamad et al., 2024).

In recent years, scientific literature has emphasized that infant sleep regimen must be evaluated as an important factor in women's mental health during the postpartum period. Because of the close relationship between infant sleep, maternal sleep quality, and emotional condition, it is recommended that healthcare professionals devote more attention to assessment of women's sleep problems and assistance in addressing infant sleep difficulties (Astbury et al., 2025).

Nighttime Feeding. Nighttime feeding is one of the most important factors affecting women's sleep quality during the postpartum period. During the first months of an infant's life, nighttime feeding is physiologically necessary because of the newborn's small stomach capacity, rapid growth, and high energy demand. For this reason, most women after childbirth face frequent nighttime awakenings, disrupted sleep structure, and reduced duration of uninterrupted sleep. Scientific literature emphasizes that nighttime feeding is one of the main causes of fragmented sleep during the postpartum period (Doan et al., 2014).

During the first weeks of life, newborns are usually fed every 2–4 hours regardless of the time of day. Studies show that because of this regimen maternal sleep becomes characterized by short episodes, while deep sleep and REM sleep phases, which are necessary for physiological and emotional recovery, are shortened. Frequent awakenings disrupt the natural course of sleep cycles

and reduce sleep efficiency, therefore even sufficient total sleep duration does not always ensure quality rest (Sharkey et al., 2016).

Scientific literature notes that breastfeeding women more often face more intensive sleep fragmentation than women feeding infants with formula. Breast milk is digested more quickly than formula, therefore breastfed infants awaken more frequently because of hunger. For this reason, breastfeeding women usually awaken more often during the night, and their uninterrupted sleep episodes are shorter (Abdul Jafar et al., 2021).

However, study results show that the effect of breastfeeding on women's sleep is not unequivocal. Some authors note that although breastfeeding women awaken more often during the night, they fall asleep more quickly after feeding and may experience lower physiological stress. This is explained by hormonal processes – prolactin and oxytocin released during breastfeeding promote relaxation and may have a calming effect on the central nervous system. Studies show that oxytocin reduces cortisol concentration and helps women return more easily to sleep after awakening (Astbury et al., 2022).

Nighttime feeding has a significant effect not only on physiological sleep structure, but also on women's emotional condition. Studies show that frequent nighttime awakenings may increase fatigue, emotional sensitivity, irritability, and reduce the ability to effectively cope with stressful situations. Long-term sleep deprivation may also reduce women's energy levels, worsen concentration, and increase the risk of emotional exhaustion (Doan et al., 2014).

Scientific literature emphasizes that the effect of nighttime feeding on women's well-being depends not only on feeding frequency, but also on the overall emotional and social context. Women who receive help from partners or relatives in caring for the infant more often have the opportunity to compensate for sleep deprivation during the day and adapt better to the changed rhythm of life. Meanwhile, lack of social support may intensify emotional tension and worsen subjective evaluation of sleep quality (Smith, Forrester, 2021).

An important aspect is women's emotional relationship with nighttime feeding. Studies show that some women perceive nighttime feedings as a natural part of motherhood and adapt more easily to temporary sleep deprivation. However, for others constant nighttime vigilance becomes a strong source of emotional stress, especially if fatigue, anxiety symptoms, or breastfeeding difficulties are also present. For this reason, emotional perception of sleep deprivation may be no less important than objective sleep indicators (Doan et al., 2014).

Studies also show that long-term nighttime feeding may affect women's mental health. Frequent and prolonged sleep fragmentation is associated with increased risk of postpartum anxiety and depression. Sleep deprivation negatively affects emotional regulation, increases sensitivity to

stress and reduces psychological resilience. In addition, overtime constant fatigue may reduce women's self-confidence and ability to enjoy the experience of motherhood (Hall et al., 2022).

In recent years, scientific literature has devoted increasing attention to support measures that may reduce the negative effect of nighttime feeding on women's sleep. Studies show that partner involvement, opportunities for daytime rest, education about infant sleep physiology, and emotional support may significantly improve women's well-being during the postpartum period. The necessity for healthcare professionals to assess women's sleep quality and timely identify signs of emotional exhaustion is also emphasized (Mirzakhmetova et al., 2024).

In scientific literature, nighttime feeding is evaluated as a physiologically important process that simultaneously significantly affects women's sleep quality. Because of the close relationship between nighttime feeding, sleep quality, and emotional condition, this factor is considered one of the most important in analyzing the associations between postpartum anxiety and sleep disturbances (Iao et al., 2022).

Hormonal Changes. Hormonal changes are one of the most important biological factors affecting women's sleep quality during the postpartum period. After childbirth, abrupt changes occur in the endocrine system, which directly affect the nervous system, emotional condition, sleep structure, and overall adaptation of the body. Scientific literature emphasizes that fluctuations in hormone concentrations after childbirth are closely associated with sleep disturbances, emotional sensitivity, fatigue, and increased risk of postpartum anxiety and depression (Wu, Jin, 2025).

One of the most significant changes after childbirth is the abrupt decrease in estrogen and progesterone concentrations. During pregnancy, the levels of these hormones gradually increase, however after placental delivery their concentrations rapidly decline. Studies show that estrogen and progesterone have an important effect on central nervous system functioning, emotional regulation, and sleep mechanisms. Estrogens participate in the regulation of serotonin and melatonin, therefore their reduction may negatively affect sleep quality, emotional stability, and resistance to stress (Hedges et al., 2021).

In scientific literature, progesterone is often described as a hormone with a natural calming effect. It acts on gamma-aminobutyric acid (GABA) receptors and helps maintain relaxation and sleepiness. After childbirth, when progesterone concentration abruptly decreases, women may become more sensitive to stress, experience greater difficulty falling asleep, and more frequently feel emotional restlessness. Studies show that these hormonal changes may be associated with increased sleep fragmentation and poorer subjective evaluation of sleep quality (Stefaniak et al., 2023).

An important role during the postpartum period is played by prolactin – the hormone responsible for milk production and maintenance of breastfeeding. Prolactin concentration increases after childbirth, especially in breastfeeding women. Studies show that prolactin may have a calming

effect and promote sleepiness, however constant nighttime breastfeeding simultaneously disrupts the natural structure of sleep. For this reason, breastfeeding women often experience a contradictory effect – hormonal relaxation combined with frequent sleep interruptions (Astbury et al., 2022).

Another important hormone is oxytocin, which is released during breastfeeding, physical contact, and emotional bonding with the infant. Scientific studies show that oxytocin reduces the activity of stress hormones, promotes emotional attachment, and may help women relax more easily after nighttime awakenings. Some authors note that oxytocin may reduce cortisol concentration and help women return to sleep more quickly after nighttime infant feeding (Modak et al., 2023).

Scientific literature pays particular attention to changes in cortisol – the main stress hormone – after childbirth. Cortisol regulates the body's response to stress and is closely associated with circadian rhythm. During the postpartum period, because of sleep deprivation, emotional tension, and physical fatigue, cortisol secretion may become disrupted. Studies show that increased cortisol activity is associated with difficulties falling asleep, more frequent nighttime awakenings, and greater emotional sensitivity (Weiss, Xu, 2024).

Melatonin is also an important hormone regulating the sleep–wake cycle. After childbirth, women's circadian rhythm is often disrupted because of nighttime infant care episodes, therefore the stability of melatonin secretion may decrease. Studies show that frequent nighttime awakenings, artificial lighting, and disrupted sleep regimen may negatively affect melatonin production and worsen sleep quality (Paditz et al., 2024).

Hormonal changes after childbirth are also closely related to women's emotional condition. Studies show that abrupt hormonal fluctuations may increase emotional sensitivity, irritability, mood swings, and anxiety symptoms. Some women, because of neurobiological sensitivity to hormonal changes, may be more vulnerable to the development of postpartum anxiety or depression. Scientific literature emphasizes that hormonal mechanisms and sleep quality closely interact with each other – hormonal fluctuations worsen sleep, while sleep deprivation further destabilizes the neuroendocrine system (Hendrick et al., 1998).

During the postpartum period, hormonal changes also affect the autonomic nervous system and the body's ability to recover from stress. Studies show that disrupted hormonal balance may reduce physiological resilience, promote fatigue, and over time negatively affect women's quality of life. For this reason, hormonal processes are considered one of the most important biological mechanisms explaining changes in women's sleep quality and emotional health after childbirth (Marano, Mazza, 2026).

In recent years, scientific literature has devoted increasing attention to the interaction between hormonal changes and sleep quality. It is emphasized that women's sleep problems during the postpartum period should not be evaluated only as a natural part of motherhood. Early recognition of

hormonal and sleep disturbances may help timely identify women who are at greater risk of emotional and mental health disorders and provide the necessary assistance (McBean et al., 2016).

Fatigue and Pain. Fatigue and pain are among the most common symptoms experienced by women during the postpartum period, and they significantly affect sleep quality and emotional well-being. Scientific literature emphasizes that after childbirth, the female body undergoes intensive physical recovery, and together with constant newborn care this creates substantial physiological and emotional burden. Fatigue and pain often become long-term factors that disrupt sleep, reduce the body's ability to recover, and increase the risk of emotional exhaustion (Erkal Aksoy et al., 2025).

Postpartum fatigue is described in scientific literature as a persistent feeling of physical and emotional exhaustion that does not always improve even after rest or sleep. Studies show that postpartum fatigue is caused by several interrelated factors: sleep fragmentation, hormonal changes, physical recovery of the body, blood loss during childbirth, and continuous infant care. Women often experience lack of energy, reduced work capacity, weakness, and difficulties concentrating (Baattaiah et al., 2024).

Scientific studies show that fatigue during the postpartum period is directly associated with poorer sleep quality. Women who frequently awaken at night because of infant care or feeding do not achieve sufficient uninterrupted sleep duration, therefore the body cannot fully recover physiologically. When deep sleep and REM sleep phases are shortened, daytime sleepiness, emotional sensitivity, and reduced stress tolerance increase. Studies show that prolonged fatigue is one of the most important risk factors for postpartum emotional exhaustion and anxiety (Kawashima et al., 2022).

The postpartum period is often accompanied by various types of pain, which may also negatively affect sleep quality. Pain after childbirth may be related to perineal tears, episiotomy, cesarean section surgery, uterine contractions, back pain, or pelvic pain. Studies show that even moderate-intensity pain can significantly disturb falling asleep, increase the frequency of nighttime awakenings, and reduce overall sleep efficiency (Zhou et al., 2025).

Scientific literature notes that pain and sleep disturbances are closely interconnected. Pain disrupts sleep, while poor sleep quality reduces the body's ability to tolerate pain. Studies show that women who sleep more poorly often perceive physical discomfort more intensely and demonstrate greater pain sensitivity. As a result, a vicious cycle develops in which pain worsens sleep, while poor-quality sleep further intensifies the perception of pain (Rouhi et al., 2023).

Cesarean section-related pain has particular significance during the postpartum period. Studies show that women after operative delivery more frequently experience more severe sleep disturbances compared to women after vaginal childbirth. Postoperative pain may limit mobility, complicate infant care, and interfere with relaxation during nighttime. In addition, because of pain women more often experience emotional tension and fatigue (Jintadawong et al., 2025).

Fatigue and pain also significantly affect women's emotional condition. Scientific studies show that prolonged physical exhaustion and constant discomfort may increase irritability, emotional sensitivity, anxiety symptoms, and reduce satisfaction with motherhood. Women who experience severe fatigue after childbirth more often doubt their ability to care for the infant and experience greater difficulty adapting to a new lifestyle (Zelčāne et al., 2026).

Scientific literature points out that postpartum fatigue is often underestimated and considered a “natural part of motherhood.” However, studies show that prolonged fatigue may have significant consequences for physical and mental health. Continuous sleep deprivation and physical exhaustion are associated with increased risk of postpartum anxiety, depression, and emotional burnout. In addition, severe fatigue may negatively affect the mother–infant relationship and the woman's ability to respond effectively to the infant's needs (Zhou et al., 2025).

An important aspect is the significance of social support in reducing the impact of fatigue and pain on sleep quality. Studies show that partner support, opportunities to rest during the day, and emotional encouragement may help women adapt more easily to the physical challenges of the postpartum period. The importance of effective pain management for improving sleep quality and emotional well-being is also emphasized (Zhu et al., 2025).

In recent years, scientific literature has increasingly focused on comprehensive assessment of fatigue and pain during the postpartum period. It is emphasized that these symptoms should not be regarded merely as temporary physiological condition. Early recognition of fatigue and pain, together with appropriate support, may help reduce the risk of sleep disturbances, emotional exhaustion, and mental health problems in postpartum women (Weinhouse et al., 2022).

Social Support. Social support is one of the most important psychosocial factors influencing women's sleep quality and emotional well-being during the postpartum period. In scientific literature, social support is defined as emotional, informational, practical, and psychological assistance received from a partner, family members, friends, or healthcare professionals. Studies show that adequate social support can significantly reduce emotional stress, improve adaptation to motherhood, and protect against postpartum anxiety and depressive symptoms (White et al., 2023).

The postpartum period often becomes a stage of major life changes for women, requiring both physical and emotional adaptation. Due to constant newborn care, sleep deprivation, hormonal changes, and responsibility for the infant's well-being, women may experience significant emotional and physical exhaustion. Scientific literature emphasizes that social support during this period acts as a protective factor, helping women adapt more easily to a new lifestyle and reducing the impact of stress on sleep quality (Vega-Sanz et al., 2025).

One of the most important sources of social support during the postpartum period is the partner. Studies show that emotional support from the partner, involvement in infant care, and

practical help with household responsibilities are closely associated with better emotional well-being and improved subjective sleep quality. Women who feel supported by their partners are more likely to have opportunities to rest during the day, share nighttime caregiving responsibilities, and experience lower emotional burden (Tosto et al., 2023).

Scientific literature notes that emotional support is no less important than practical assistance. Studies show that women highly value feelings of understanding, safety, and emotional acceptance. The opportunity to openly discuss difficulties, fatigue, or emotional experiences reduces feelings of loneliness and helps women cope with stress more effectively. In contrast, lack of emotional support may increase anxiety symptoms, emotional sensitivity, and worsen subjective sleep quality evaluation (Stein et al., 2026).

Support from family members and close relatives is also highly significant. Studies show that women who receive practical assistance with infant care or household tasks are more likely to have time for rest and better compensate for sleep deprivation. Social networks may also reduce emotional burden and strengthen women's confidence in their ability to care for the infant (Tao et al., 2023).

Scientific literature emphasizes that lack of social support is a significant risk factor for postpartum mental health disorders. Women who feel lonely, misunderstood, or insufficiently supported more often experience emotional exhaustion, sleep disturbances, and postpartum anxiety symptoms. Studies show that feelings of loneliness may increase emotional hypervigilance and make it more difficult to relax even when opportunities for rest are available (Tal, Taylor, 2021).

Social support is also closely associated with women's sleep quality. Studies show that women who are able to share infant care responsibilities more often experience longer uninterrupted sleep episodes and evaluate their rest more positively. Partner support during nighttime may reduce sleep fragmentation and emotional fatigue. In addition, social support reduces stress hormone activity and may positively affect autonomic nervous system functioning (Smith, Forrester, 2021).

Research also demonstrates the important role of healthcare professionals in strengthening women's emotional well-being after childbirth. Providing information about normal infant sleep patterns, emotional changes after childbirth, and principles of sleep hygiene may reduce maternal anxiety and help women more realistically evaluate postpartum challenges. Scientific literature emphasizes that empathy-based communication and emotional support from healthcare professionals can significantly improve women's emotional condition (Saharoy et al., 2023).

In recent years, increasing attention has been given to the interaction between social support and sleep quality. Studies show that social support may function as a protective factor against the

negative effects of sleep deprivation. Women who experience strong emotional support more often demonstrate greater emotional resilience, lower anxiety levels, and better adaptation to motherhood (Rogers et al., 2020).

Scientific literature considers social support one of the most important biopsychosocial factors determining women's emotional health and sleep quality during the postpartum period. Due to the close relationship between social support, sleep quality, and mental health, it is recommended to strengthen family involvement, accessibility of emotional assistance, and support systems for women after childbirth (Paditz, 2024).

Partner Involvement. Partner involvement during the postpartum period is one of the most important psychosocial factors that can significantly influence a woman's sleep quality, emotional well-being, and adaptation to motherhood. In scientific literature, partner involvement is defined as emotional support, practical assistance with infant care, participation in daily household responsibilities, and active sharing of responsibility for family well-being. Studies show that women who experience partner support and active participation in infant care more often demonstrate better sleep quality, lower emotional exhaustion, and reduced risk of postpartum anxiety (Nagel et al., 2022).

The postpartum period often becomes a stage of substantial physical and emotional burden for women. Constant newborn care, nighttime awakenings, breastfeeding, and sleep deprivation may cause significant fatigue and emotional tension. Scientific literature notes that partner involvement can reduce this burden and help women adapt more easily to a new daily routine. Studies show that practical partner support, such as soothing the infant, bathing, changing diapers, or participating in nighttime caregiving, allows women to sleep longer without interruption and reduces sleep fragmentation (Modak et al., 2023).

One of the most important aspects of partner involvement is emotional support. Research indicates that women after childbirth highly value feelings of emotional safety, understanding, and the opportunity to openly discuss their difficulties. Partner empathy and emotional support may reduce stress, emotional sensitivity, and anxiety symptoms. Scientific literature emphasizes that women who feel supported by their partners more often evaluate their motherhood experience positively and demonstrate greater self-confidence as mothers (Mor et al., 2025).

Partner involvement is also closely associated with women's sleep quality. Studies show that sharing nighttime caregiving responsibilities may reduce the number of maternal awakenings and improve overall sleep efficiency. Women whose partners actively participate in infant care more often have opportunities to compensate for sleep deprivation and experience less daytime fatigue. In addition, partner support may reduce emotional tension related to constant vigilance and responsibility for the infant's well-being (McBean et al., 2016).

Scientific literature notes that partner involvement may have a protective effect on women's

mental health. Studies show that women who experience strong partner support less frequently report postpartum anxiety and depressive symptoms. Emotional availability and active participation in daily activities reduce feelings of loneliness and help women cope with stress more effectively. In contrast, insufficient partner involvement may increase emotional vulnerability and negatively affect women's emotional well-being (Lim et al., 2023).

An important aspect is the partner's role in establishing family sleep routines. Studies show that couples who jointly plan infant care and share responsibilities more often maintain more stable rest schedules. Partner assistance may provide women with opportunities to rest during the day or at least temporarily withdraw emotionally from constant caregiving responsibilities. Such periods of rest are important for reducing emotional exhaustion and improving overall quality of life (Libman et al., 2016).

Research also demonstrates that partner involvement may influence women's satisfaction with motherhood. When women feel that responsibility for infant care is shared, pressure to "manage everything alone" decreases. This may reduce feelings of guilt, emotional fatigue, and increase psychological resilience. Scientific literature notes that positive cooperation between partners during the postpartum period strengthens family emotional stability and improves women's psychological well-being (Koutra et al., 2017).

However, some studies indicate that partner involvement may be limited by cultural stereotypes, traditional gender roles, or social expectations. In some families, infant care is still considered primarily the woman's responsibility, therefore partner support remains minimal. In such situations, women more often experience sleep deprivation, emotional exhaustion, and greater risk of mental health disorders (Khayamim et al., 2016).

In recent years, scientific literature has increasingly emphasized the promotion of partner involvement as an important component of postpartum care. Studies show that partner education regarding women's emotional and physiological needs after childbirth may improve family adaptation to the new situation and reduce women's emotional burden. It is also emphasized that healthcare professionals should more actively involve partners in postpartum care and encourage shared responsibility for infant care (Jintadawong et al., 2025).

Scientific literature considers partner involvement one of the most important protective factors capable of improving women's sleep quality and emotional condition during the postpartum period. Due to the close relationship between partner support, sleep quality, and mental health, it is recommended to strengthen family-oriented postpartum care and encourage active partner participation in the adaptation to motherhood process (Yazdanpanah et al., 2020).

Socioeconomic Factors. Socioeconomic factors are important determinants that significantly influence women's sleep quality and emotional well-being during the postpartum period. Scientific

literature emphasizes that financial status, education, employment, living conditions, social security, and access to healthcare services may directly or indirectly affect women's physical and mental health after childbirth. Studies show that lower socioeconomic status is often associated with greater emotional stress, poorer sleep quality, and increased risk of postpartum anxiety and depression (Iacona et al., 2025).

The postpartum period often becomes a financially sensitive stage for many families because of reduced income, increased expenses related to infant care, and changes in employment patterns. Scientific literature notes that financial instability may increase chronic stress, anxiety about the future, and emotional insecurity. Studies show that women experiencing economic difficulties after childbirth more frequently report sleep problems, persistent fatigue, and emotional exhaustion (Hunter et al., 2009).

One of the most important socioeconomic factors is income level. Studies show that women with lower income more often live in environments less favorable for quality rest, such as noisy neighborhoods, smaller living spaces, or conditions lacking privacy and opportunities for rest. In addition, financial difficulties may limit access to additional childcare assistance or healthcare services, thereby increasing women's physical and emotional burden (Hooper et al., 202).

Scientific literature also notes that education is an important factor related to women's sleep quality and emotional health. Higher educational attainment is often associated with better knowledge about sleep hygiene, infant care, and the importance of emotional health. Studies show that women with higher education more often seek information and professional help when facing sleep or emotional difficulties. In contrast, lower education levels may be associated with greater stress, lower self-confidence, and more difficult adaptation to motherhood (Guarneri et al., 2025).

Employment situation and occupational status also significantly influence women's well-being after childbirth. Research indicates that women who feel insecure about their employment or financial future more often experience emotional tension and sleep disturbances. Concerns related to returning to work, balancing employment and motherhood roles, and fears about professional future may increase anxiety symptoms and complicate emotional recovery after childbirth (Duran, Vural, 2023).

Scientific literature further emphasizes the importance of social inequality in women's health. Studies show that socially vulnerable women more often face limited access to healthcare, reduced emotional support, and greater psychological stress. Such circumstances may contribute to poorer sleep quality, increased emotional sensitivity, and elevated risk of mental health disorders (Chu et al., 2023).

An important aspect is the impact of living conditions on sleep quality. Research demonstrates that living in overcrowded or unstable housing environments may disrupt rest and reduce

opportunities for quality sleep. In addition, socioeconomic difficulties are often associated with increased stress hormone activity, which negatively affects sleep initiation and sleep continuity (Beroukhim et al., 2022).

Scientific studies also reveal a relationship between socioeconomic factors and women's emotional condition. Financial difficulties and social insecurity may promote constant vigilance, fear about the future, and emotional exhaustion. As a result, women more often experience postpartum anxiety symptoms, irritability, and reduced ability to relax even when opportunities for rest are available (Akhtar et al., 2025).

Scientific literature notes that socioeconomic factors often operate in combination with other risk factors, such as lack of social support, loneliness, or chronic emotional tension. Therefore, assessment of women's sleep quality and emotional condition should be conducted comprehensively, considering not only biological but also social and economic aspects (Griffith et al., 2024).

In recent years, increasing attention has been paid to the role of social policy and healthcare systems in improving women's well-being during the postpartum period. Studies show that financial support for families, more flexible working conditions, emotional support programs, and better accessibility of psychological care may significantly reduce emotional stress and improve women's sleep quality after childbirth (Hall et al., 2024).

Scientific literature considers socioeconomic factors an important component of women's health and quality of life. Due to the close relationship between economic security, emotional condition, and sleep quality, it is recommended that postpartum care place greater emphasis on assessing social risk factors and providing comprehensive support for women experiencing financial or social difficulties (Horwitz et al., 2026).

3. POSTPARTUM ANXIETY: CONCEPT, PREVALENCE, AND RISK FACTORS

3.1. The concept of postpartum anxiety

Differences between anxiety and depression. During the postpartum period, women may experience various emotional and mental health difficulties, among which anxiety and depression symptoms are most commonly mentioned. Although these conditions often occur together and share certain common features, scientific literature emphasizes that postpartum anxiety and postpartum depression are distinct mental health disorders characterized by different symptoms, emotional reactions, and effects on women's daily functioning. Proper differentiation of these conditions is important in order to recognize emotional difficulties early and provide appropriate support for women (Kaczmarek et al., 2025).

Postpartum anxiety is most described as persistent excessive worrying, tension, and fear related to the infant's health, safety, or the woman's ability to adequately fulfill the maternal role. Studies show that women experiencing postpartum anxiety often feel constant vigilance, difficulty relaxing, irritability, intrusive thoughts, and increased sensitivity to potential threats. Anxiety symptoms may also be accompanied by physiological reactions such as heart palpitations, sweating, muscle tension, or sleep disturbances (Kaliush et al., 2025).

In contrast, postpartum depression is most associated with prolonged sadness, emotional exhaustion, lack of motivation, and decreased interest in daily activities. Studies show that women experiencing postpartum depressive symptoms often feel hopelessness, guilt, emotional emptiness, reduced self-confidence, and difficulties experiencing joy even when interacting with the infant. Depression is characterized by emotional "withdrawal," whereas anxiety more commonly manifests as persistent emotional activation and tension (Ladyman et al., 2025).

Scientific literature notes that one of the main differences between anxiety and depression is the nature of emotional reactions. Postpartum anxiety is usually characterized by excessive concern and constant mental activity, when women cannot stop thinking about possible threats or dangers. In contrast, depression is more often associated with emotional suppression, apathy, and reduced emotional reactivity. Studies show that women experiencing anxiety often remain highly active and vigilant while constantly feeling tension, whereas depression is more commonly associated with reduced energy and emotional detachment (Marano, Mazza, 2026).

An important difference is also observed in sleep. Studies show that postpartum anxiety is most associated with difficulties falling asleep, frequent awakenings, and a persistent sense of vigilance even when the infant is sleeping. Women experiencing anxiety often cannot relax and feel a constant need to monitor the infant. In contrast, depression may present with either insomnia or

the opposite symptom—excessive sleepiness and lack of energy (Phua et al., 2020).

Scientific literature notes that postpartum anxiety was historically less studied than postpartum depression. As a result, anxiety symptoms often remain unnoticed or are mistakenly attributed to depression. Studies show that some women diagnosed with postpartum depression actually experience predominantly anxiety symptoms. This is important in clinical practice because treatment and support strategies for anxiety and depression may differ (Rogers et al., 2020).

Although postpartum anxiety and depression are distinct conditions, scientific studies show that they frequently occur together. Women who experience severe anxiety for a prolonged period may become emotionally exhausted and eventually develop depressive symptoms. Likewise, depression may increase feelings of insecurity and contribute to the development of anxiety. Therefore, scientific literature increasingly emphasizes the necessity of assessing not only depressive but also anxiety symptoms during the postpartum period (Smith et al., 2018).

An important aspect is the impact of postpartum anxiety on the mother–infant relationship. Studies show that women experiencing anxiety may become excessively controlling or extremely vigilant toward the infant, constantly fearing for the child’s health or safety. In contrast, depression is more often associated with emotional withdrawal and reduces sensitivity to the infant’s needs. Both conditions may negatively affect the emotional bond between mother and infant as well as overall family functioning (Medic et al., 2017).

Scientific literature emphasizes that postpartum anxiety symptoms are often less noticeable to others than depressive symptoms. Because women experiencing anxiety often remain active and caring, their emotional difficulties may go unnoticed even by healthcare professionals. Therefore, it is recommended to actively assess women’s emotional condition after childbirth and pay attention to signs of persistent worrying, tension, and sleep disturbances (Medina, Magnuson, 2009).

In recent years, increasing research attention has been given to the importance of postpartum anxiety for women’s mental health. It is emphasized that this condition may have long-term consequences for women’s emotional well-being, sleep quality, adaptation to motherhood, and child emotional development. For this reason, early recognition of anxiety symptoms and appropriate support are considered important components of postpartum care (Nelson et al., 2022).

Postpartum anxiety symptoms. Postpartum anxiety is one of the most common mental health disorders after childbirth; however, for a long time it was less recognized and studied than postpartum depression. In scientific literature, postpartum anxiety is described as persistent tension, excessive worrying, and heightened emotional vigilance occurring during the postpartum period and interfering with a woman’s daily functioning and emotional well-being. Studies show that anxiety

symptoms after childbirth may represent either a temporary adaptive reaction to a new life situation or a clinically significant disorder requiring professional support (Priel et al., 2020).

One of the main symptoms of postpartum anxiety is persistent and difficult-to-control worrying. Women often experience intense concern about the infant's health, safety, sleep quality, or their own ability to adequately fulfill the maternal role. Studies show that such anxiety is often disproportionate to the actual situation and may persist even when there are no objective threats. Women may constantly check the infant's breathing, monitor the baby's behavior, or excessively fear possible illnesses and accidents (Mughal et al., 2018).

Scientific literature notes that postpartum anxiety is often accompanied by constant vigilance and an inability to relax. Even when the infant is sleeping or being cared for by others, women may feel internal tension and a need to remain prepared to respond to possible problems. Studies show that this persistent emotional activation may interfere with rest, make it difficult to fall asleep, and worsen overall sleep quality (Ogallar et al., 2025).

One of the most common symptoms of postpartum anxiety is sleep disturbance. Studies show that women experiencing anxiety frequently face difficulties falling asleep, frequent nighttime awakenings, and an inability to return to sleep after waking. Even when given an opportunity to rest, they may experience constant mental activity or fear, causing sleep to become light and ineffective. In scientific literature, sleep problems are considered one of the most important symptoms of postpartum anxiety and at the same time one of the most significant factors worsening women's emotional well-being (Priel et al., 2020).

Postpartum anxiety often also manifests through physiological symptoms. Studies show that women may experience heart palpitations, shortness of breath, sweating, trembling, dizziness, or muscle tension. These symptoms are associated with activation of the autonomic nervous system and the body's response to persistent stress. In some cases, physiological symptoms may become so intense that women perceive them as signs of a serious physical illness (Rosebrock et al., 2015).

Scientific literature also identifies intrusive thoughts as a common symptom of postpartum anxiety. Women may experience unwanted and repetitive thoughts about possible harm to the infant or accidents occurring. Studies show that these thoughts often provoke strong feelings of guilt and fear, although women themselves usually understand that such thoughts do not reflect their true intentions. Because of fear of being misunderstood or judged, many women avoid discussing these experiences even with relatives or healthcare professionals (Scott et al., 2021).

An important symptom of postpartum anxiety is emotional sensitivity and irritability. Studies show that constant tension and sleep deprivation may reduce emotional resilience, making women more sensitive to daily stressors and more likely to react with tears, anger, or emotional exhaustion.

Some women may feel guilty for not being able to “enjoy motherhood” as they expected or as it is portrayed in society (Smith et al., 2022).

Postpartum anxiety may also affect the mother–infant relationship. Studies show that excessive anxiety may encourage overcontrol, constant monitoring of the infant, or difficulty trusting others to care for the child. Due to persistent tension, women may find it harder to relax while interacting with the infant and may experience less satisfaction with motherhood (Hedges et al., 2021).

Scientific literature notes that postpartum anxiety symptoms often remain unrecognized because many of them are considered a “natural part of motherhood.” Fatigue, vigilance, and concern for the infant are frequently viewed as normal postpartum experiences; therefore, women may not seek help even when experiencing clinically significant anxiety. Studies show that for this reason postpartum anxiety is often diagnosed late (Hirshkowitz et al., 2015).

In recent years, increasing attention has been devoted to the early recognition of postpartum anxiety. Scientific studies show that timely emotional support, psychological counseling, and assistance in improving sleep quality can significantly reduce symptom severity and improve women’s quality of life. It is also emphasized that healthcare professionals should actively assess not only depressive but also anxiety symptoms during the postpartum period (Hendrick et al., 1998).

Scientific literature considers postpartum anxiety a significant mental health issue that may have long-term consequences for both the mother and the infant. Due to the close relationship between anxiety symptoms, sleep quality, and emotional well-being, recognition and proper assessment of these symptoms are regarded as important components of postpartum care (Yazdanpanah et al., 2020)

Clinical forms of postpartum anxiety. In scientific literature, postpartum anxiety is described as a multifaceted mental health condition that may manifest in various clinical forms. Although the postpartum period is often associated with emotional sensitivity and increased concern for the infant, for some women anxiety symptoms become intense, long-lasting, and significantly interfere with daily functioning. Studies show that postpartum anxiety may present as generalized anxiety disorder, panic disorder, obsessive-compulsive disorder, post-traumatic stress disorder, or specific fears related to motherhood (Kaczmarek et al., 2025).

One of the most common clinical forms is generalized anxiety disorder. This condition is characterized by persistent and difficult-to-control worrying about various aspects related to the infant and motherhood. Women often experience intense concern regarding the infant’s health, nutrition, sleep quality, or their own ability to be a “good mother.” Studies show that generalized anxiety during the postpartum period is frequently accompanied by constant vigilance, tension, irritability, sleep disturbances, and emotional exhaustion (Kawashima et al., 2022).

Scientific literature notes that women experiencing generalized postpartum anxiety are often

unable to relax even when no objective threats are present. They may constantly check the infant's breathing, monitor the baby's behavior, or excessively fear possible accidents. Such continuous emotional activation significantly worsens sleep quality and reduces psychological resilience to stress (Kilavuz et al., 2025).

Another important clinical form is panic disorder. Studies show that some women begin to experience recurrent panic attacks after childbirth, characterized by sudden episodes of intense fear accompanied by strong physiological reactions. During panic attacks, symptoms may include heart palpitations, shortness of breath, sweating, trembling, dizziness, chest pain, or fear of dying. Scientific literature emphasizes that panic symptoms may be especially frightening during the postpartum period because women often fear that their condition will prevent them from properly caring for their infant (Libman et al., 2016).

Obsessive-compulsive disorder is also considered one of the clinical forms of postpartum anxiety. Studies show that during the postpartum period some women experience intrusive and repetitive thoughts about possible harm coming to the infant. These thoughts are often unwanted and provoke intense feelings of guilt and fear. Scientific literature notes that women usually recognize the irrational nature of these thoughts and are deeply afraid of being misunderstood or perceived as dangerous to their child. For this reason, they frequently conceal symptoms and avoid discussing them (Marano, Mazza, 2026).

Compulsive symptoms may manifest as constant checking on the infant, excessive hygiene practices, ritualistic behaviors, or repeated beliefs that the environment must be constantly controlled to prevent possible harm to the baby. Studies show that these behavioral patterns may consume considerable time, increase emotional exhaustion, and significantly interfere with women's daily lives (Modak et al., 2023).

Scientific literature also identifies postpartum post-traumatic stress disorder. This condition is most commonly associated with a traumatic childbirth experience, complicated delivery, emergency medical intervention, or the woman's perception that her own or the infant's life was threatened during childbirth. Studies show that women may experience intrusive memories of childbirth, nightmares, emotional detachment, irritability, and persistent vigilance. Symptoms of post-traumatic stress often significantly worsen sleep quality and emotional well-being (Okun et al., 2018).

An important clinical form involves specific fears related to motherhood. Studies show that some women experience intense fear of being alone with the infant, making mistakes while caring for the child, or being unable to recognize the infant's needs. Such fears may encourage excessive dependence on relatives or avoidance of certain situations. Scientific literature notes that these fears

are often associated with reduced self-confidence and greater emotional vulnerability (Nagel et al., 2022).

Clinical forms of postpartum anxiety frequently overlap and may occur together with depressive symptoms. Studies show that women rarely experience only one type of symptom; instead, a mixed pattern of emotional difficulties is more commonly observed. Therefore, it is important to conduct a comprehensive assessment of emotional well-being and pay attention to various forms of anxiety and their severity (Manconi et al., 2024).

Scientific literature emphasizes that clinical forms of postpartum anxiety often remain unrecognized because some symptoms are mistakenly considered a normal adaptation to motherhood. Women may avoid seeking help because of guilt, shame, or fear of being judged as “bad mothers.” For this reason, healthcare professionals are encouraged to actively assess women’s emotional well-being and pay attention to various anxiety symptoms during the postpartum period (Kumarasinghe et al., 2024).

In recent years, increasing attention has been devoted to the early diagnosis of postpartum anxiety and individualized support. Studies show that timely psychological assistance, emotional support, and improvement of sleep quality can reduce symptom severity and improve women’s quality of life. It is also emphasized that recognition of the clinical forms of postpartum anxiety is an important component of comprehensive postpartum care (Iao et al., 2022).

3.2. Postpartum Anxiety Prevalence

International epidemiological data. In recent years, postpartum anxiety has increasingly been recognized as a significant public health problem affecting women’s emotional well-being, sleep quality, adaptation to motherhood, and child development. Although for a long time the primary focus during the postpartum period was placed on depression, recent scientific studies indicate that anxiety disorders after childbirth are no less common and, in some cases, even more prevalent than depressive symptoms. International epidemiological data show that the prevalence of postpartum anxiety varies across countries depending on assessment methods, cultural factors, social environment, and characteristics of the studied population (Horwitz et al., 2026).

Scientific literature indicates that the prevalence of postpartum anxiety most commonly ranges from 10 to 20 percent of all women who have given birth. However, some studies report that clinically significant anxiety symptoms may be experienced by up to 25–30 percent of women during the first months after childbirth. Research shows that anxiety symptoms are usually most intense

during the first weeks after delivery, when women face pronounced hormonal changes, sleep deprivation, and adaptation to new maternal roles (Jintadawong et al., 2025).

One of the largest meta-analyses covering studies from various countries found that the overall prevalence of postpartum anxiety disorders worldwide is approximately 15 percent. The authors of the study note that this rate may be underestimated due to diagnostic difficulties and insufficient recognition of anxiety symptoms in clinical practice. Some women do not seek help because they believe that constant worrying and emotional tension are a “normal” part of motherhood (Koutra et al., 2017).

International studies show that the prevalence of postpartum anxiety may differ depending on a country’s economic situation and social support systems. In lower-income countries, women more often face financial insecurity, limited access to healthcare, and lower emotional support, therefore postpartum anxiety symptoms are more frequently identified in these populations. Research indicates that social inequality, poverty, and unstable living conditions are significant risk factors for emotional disorders after childbirth (Marjot et al., 2021).

Scientific literature notes that higher prevalence of postpartum anxiety is identified among women who have previously experienced mental health disorders, had complicated pregnancies or childbirth, face a lack of social support, or experience significant sleep deprivation. Research shows that women who sleep more poorly during the postpartum period more frequently exhibit stronger anxiety symptoms and emotional sensitivity (Mor et al., 2025).

International epidemiological data also reveal a relationship between postpartum anxiety and cultural factors. In some cultures, motherhood is associated with extremely high social expectations, therefore women may feel greater pressure to be “perfect mothers.” Research shows that such expectations may promote feelings of guilt, emotional insecurity, and constant anxiety regarding infant care or maternal competence (Patel et al., 2024).

Studies conducted during the COVID-19 pandemic demonstrated a significant increase in the prevalence of postpartum anxiety. Scientific literature notes that social isolation, limited access to healthcare services, fear of infection, and reduced social support negatively affected women’s emotional health after childbirth. Research shows that during the pandemic period, postpartum anxiety symptoms were identified in more than one-third of postpartum women in some countries (Rouhi et al., 2023).

An important aspect is that postpartum anxiety often occurs together with depressive symptoms. Research shows that some women experience mixed emotional difficulties, where constant worrying is combined with emotional exhaustion, sadness, and lack of motivation. In such cases, the impact of emotional disorders on women’s quality of life and the mother–infant relationship may be even more pronounced (Smith et al., 2018).

Scientific literature emphasizes that epidemiological data on postpartum anxiety may be insufficiently accurate due to differences in assessment methods and diagnostic criteria. Different studies use varying questionnaires, assessment periods, and symptom threshold values, therefore results may differ. Nevertheless, most scientific studies confirm that postpartum anxiety is a common and significant problem with important consequences for women's mental health (Sharkey et al., 2016).

In recent years, increasing attention has been devoted to the early diagnosis and prevention of postpartum anxiety. International recommendations emphasize the necessity of systematically assessing women's emotional condition after childbirth, with particular attention to anxiety symptoms and sleep quality. Research shows that early identification of emotional difficulties and timely assistance may reduce the risk of long-term mental health problems and improve the quality of life of both mother and infant (Stefaniak et al., 2023).

In scientific literature, the prevalence of postpartum anxiety is evaluated as a significant public health problem, the extent of which may be greater than previously believed for a long time. Due to the close relationship between anxiety symptoms, sleep quality, and emotional well-being, it is recommended to strengthen emotional health monitoring and support systems for women during the postpartum period (Valizadeh et al., 2026).

The Scale of the Problem in Society. In modern society, postpartum anxiety is increasingly recognized as a significant public health problem affecting not only a woman's emotional condition but also family functioning, infant development, and the healthcare system. Scientific literature emphasizes that emotional disorders after childbirth are among the most common complications during the postpartum period; however, for a long time, most attention was focused on postpartum depression, while anxiety symptoms often remained insufficiently assessed. Recent studies show that the prevalence of postpartum anxiety is high and that its consequences may be long-lasting for both the mother and the child (Wallace et al., 2021).

International epidemiological studies indicate that a significant proportion of women experience postpartum anxiety after childbirth. Some studies report that clinically significant anxiety symptoms may occur in as many as one in four women during the first months after delivery. Scientific literature notes that the true scale of the problem may be even greater, as some women do not seek help or their symptoms remain unrecognized due to limited emotional health assessment in postpartum care (Witkowska-Zimny et al., 2024).

The problem of postpartum anxiety in society is important not only because of its high prevalence but also because of its significant impact on women's quality of life. Research shows that women experiencing persistent anxiety after childbirth more frequently face sleep disorders, emotional exhaustion, reduced self-confidence, and difficulties adapting to the maternal role.

Constant emotional tension may disrupt daily functioning, professional activity, social relationships, and overall psychological well-being (Sobol-Kwapińska et al., 2024).

Scientific literature emphasizes that postpartum anxiety affects not only the woman but also infant development. Research shows that severe and long-term maternal anxiety may affect the emotional bond between mother and infant, reduce sensitivity to the infant's needs, and complicate the formation of secure attachment. It has also been established that maternal emotional tension may be associated with increased infant irritability, sleep problems, and emotional regulation difficulties later in life (Schiller et al., 2015).

An important aspect is the impact of postpartum anxiety on family relationships and social functioning. Research shows that constant emotional tension and sleep deprivation may worsen partner relationships, increase the risk of conflicts, and reduce overall family emotional stability. Women experiencing severe anxiety more often feel misunderstood, lonely, and emotionally exhausted, which may negatively affect communication with their partner and other family members (O'Donnell et al., 2009).

Scientific studies also reveal the economic consequences of postpartum anxiety for society. Emotional disorders after childbirth may increase the need for healthcare services, work incapacity, reduce women's productivity, and over time increase the need for social support. Research indicates that insufficiently recognized and untreated postpartum anxiety may lead to long-term mental health problems that have economic consequences for both the family and the healthcare system (Marjot et al., 2021).

Scientific literature notes that one of the greatest problems is the insufficient recognition of postpartum anxiety. Some women do not seek help because of feelings of guilt, fear of being misunderstood, or stigmatization. In addition, an idealized image of motherhood still exists in society, which may encourage women to hide their emotional difficulties. Research shows that most women feel pressure to be "happy mothers," therefore perceiving anxiety symptoms as personal weakness or failure (Khayamim et al., 2016).

The problem of postpartum anxiety became even more apparent during the COVID-19 pandemic. Research shows that social isolation, reduced social support, limited access to healthcare services, and an increased sense of insecurity significantly increased the prevalence of emotional disorders among postpartum women. In some countries, postpartum anxiety symptoms during the pandemic were identified in more than one-third of women after childbirth (Hwang et al., 2022).

Scientific literature increasingly focuses on the early prevention of emotional difficulties and improving access to support. Research shows that systematic assessment of emotional condition during pregnancy and the postpartum period may help identify anxiety symptoms earlier and reduce

the risk of long-term consequences. The importance of psychological support, social assistance, and improving sleep quality for women's emotional health is also emphasized (Handa et al., 2024).

In recent years, postpartum anxiety has increasingly been viewed not only as an individual woman's problem but also as a significant public health issue. Due to the close relationship between women's emotional condition, infant development, and family well-being, it is recommended to strengthen emotional healthcare, increase public awareness, and reduce stigmatization associated with emotional difficulties after childbirth (Erkal Aksoy et al., 2025).

Insufficient Diagnosis. Insufficient diagnosis of postpartum anxiety is one of the most important problems complicating the provision of timely assistance to women after childbirth. Although scientific studies show that postpartum anxiety is a common and significant mental health disorder, in clinical practice it is still recognized less frequently than postpartum depression. Scientific literature notes that many women experiencing intense anxiety after childbirth do not receive appropriate diagnosis and support, therefore symptoms may persist and have long-term consequences for their emotional and physical health (Doan et al., 2014).

One of the main reasons for insufficient diagnosis is that some postpartum anxiety symptoms are considered a "normal" phenomenon of motherhood. Worrying about the infant's health, nighttime vigilance, emotional sensitivity, or fatigue are often perceived as a natural part of adaptation to motherhood. For this reason, both women themselves and healthcare professionals may underestimate the intensity of symptoms and their impact on daily functioning (Goodman et al., 2011).

Scientific literature emphasizes that symptoms of postpartum anxiety often overlap with other postpartum conditions. Sleep disturbances, fatigue, irritability, or difficulties concentrating may be associated with physiological exhaustion due to newborn care, therefore emotional difficulties remain unnoticed. Research shows that because of this symptom overlap, anxiety disorders after childbirth are often diagnosed late or incorrectly attributed solely to depression (Handa et al., 2024).

An important aspect is that many emotional condition assessment tools during the postpartum period are mainly focused on depressive symptoms. One of the most commonly used instruments, the Edinburgh Postnatal Depression Scale (EPDS), may help identify some signs of anxiety but is not specialized for assessing postpartum anxiety. Scientific literature notes that due to the limited use of specific anxiety assessment instruments, some women experiencing pronounced anxiety symptoms remain unidentified (Kwon et al., 2013).

Insufficient diagnosis is also influenced by social stigma and prevailing ideals of motherhood in society. Research shows that women often fear talking about their emotional difficulties because of feelings of guilt or fear of being considered "bad mothers." Some women believe that after

childbirth they must feel happy and grateful, therefore they hide anxiety symptoms even from relatives or healthcare professionals (Lim et al., 2014).

Scientific literature notes that forms of postpartum anxiety such as obsessive-compulsive disorder or panic disorder are especially rarely recognized. Women experiencing intrusive thoughts about possible harm to the infant often fear speaking about them because of fear of being misunderstood or losing the right to care for the child. For this reason, intrusive anxiety symptoms often remain hidden and untreated (Yazdanpanah et al., 2020).

Healthcare system factors also contribute to insufficient diagnosis. Research shows that postpartum care often focuses more on the physical condition of the woman and infant, while emotional health assessment remains secondary. Lack of time during consultations, limited mental health specialist resources, and insufficient specialist preparedness to recognize anxiety symptoms may complicate early diagnosis (Liu et al., 2022).

Scientific literature also emphasizes the influence of cultural factors on diagnosis. In some societies, emotional difficulties after childbirth are still stigmatized or considered a sign of personal weakness. In such cultures, women seek help less frequently, and emotional symptoms are more often concealed. Research shows that cultural expectations regarding women's roles in the family may complicate open discussion about emotional well-being (Ogallar et al., 2025).

Insufficient diagnosis of postpartum anxiety has significant consequences for women's health. Research shows that untreated anxiety may become chronic, worsen sleep quality, increase the risk of depression, and negatively affect the mother–infant relationship. In addition, long-term emotional stress may impair women's social functioning, reduce quality of life, and complicate adaptation to motherhood (Rogers et al., 2020).

In recent years, increasing attention has been devoted to the early identification of emotional difficulties during the postpartum period. Scientific studies show that systematic assessment of emotional condition, the use of validated anxiety scales, and greater healthcare professional attention to sleep quality may improve recognition of postpartum anxiety. The importance of accessibility to psychological support and public awareness in reducing stigmatization and encouraging women to seek help in a timely manner is also emphasized (Thara, Kamath, 2015).

In scientific literature, insufficient diagnosis of postpartum anxiety is considered a significant barrier to effective women's emotional healthcare. Due to the close relationship between anxiety symptoms, sleep quality, and women's quality of life, it is recommended to strengthen emotional health monitoring and integrate postpartum anxiety assessment into routine postpartum care (Lopez-Gonzalez, Mikes, 2026).

3.3. Risk Factors for Postpartum Anxiety

Previous Mental Disorders. Previous mental disorders are considered one of the most important risk factors for postpartum anxiety. Research shows that women who have experienced anxiety, depression, or other emotional health disorders before pregnancy or during pregnancy are significantly more likely to face increased anxiety, emotional instability, and adaptation difficulties during the postpartum period (Mbiydzennyuy, Qulu, 2024). Previous mental disorders increase the likelihood of emotional vulnerability because pregnancy and the postpartum period are characterized by intense biological, hormonal, and psychosocial changes that may activate previously experienced emotional difficulties.

Hormonal changes occurring in a woman's body during pregnancy and after childbirth have a direct effect on emotional state and psychological stability. Due to these changes, women who have previously experienced depression or anxiety disorders become more sensitive to stress, uncertainty, and everyday difficulties. Research reveals that previous depression, anxiety disorders, and a history of psychological or psychiatric treatment are significant predictors of postpartum anxiety both during pregnancy and in the early postpartum period (Okun et al., 2018). This indicates that mental health has long-term significance for women's emotional well-being after childbirth.

It is important to note that the risk is increased not only by officially diagnosed mental disorders. Subclinical symptoms such as persistent anxiousness, emotional sensitivity, panic episodes, obsessive thoughts, or previously experienced severe emotional crises may also have a significant impact. Some women may not have been treated by a psychiatrist or psychologist before pregnancy, yet long-term emotional tension and unresolved psychological difficulties remain important risk factors. Researchers emphasize that comprehensive assessment of mental health history allows more accurate prediction of postpartum anxiety or depression onset than formal diagnosis alone (Spaeth et al., 2021).

Previous anxiety disorders are particularly closely associated with the development of postpartum anxiety. Many women during the postpartum period experience not a completely new disorder, but rather an exacerbation or recurrence of previously existing anxiety symptoms. The postpartum period is characterized by increased responsibility for the newborn, constant vigilance, sleep deprivation, and fear of making mistakes while caring for the infant. All of this may intensify already existing anxiety reactions. Research shows that the prevalence of postnatal anxiety is high, and among the most important risk factors are prenatal anxiety and previous depressive symptoms (Liu, Reddy, 2022).

Previous depression is also closely associated with postpartum anxiety. During the perinatal period, symptoms of depression and anxiety often overlap, therefore women may simultaneously

experience both mood suppression and intense anxiety. In such cases, constant concern about the infant's health, excessive fear of responsibility, emotional exhaustion, sleep disturbances, and intrusive thoughts occur. Multicenter studies have found that women who experienced symptoms of depression or anxiety during pregnancy more frequently encounter pronounced emotional instability and increased anxiety after childbirth (McBean et al., 2016).

When analyzing the significance of previous mental disorders, it is important to evaluate treatment history as well. Previous psychological consultations, psychiatric treatment, medication use, or hospitalization may indicate not only the existence of a disorder but also its severity, duration, and impact on daily life. Such women more frequently experience recurrence of emotional symptoms after childbirth, especially if social support is lacking or additional stressors are encountered during this period. Research confirms that previous psychological or psychiatric treatment is significantly associated with increased risk of postpartum anxiety (Paditz, 2024).

Previous mental disorders rarely act in isolation. Most often, they interact with other risk factors such as low social support, lack of emotional support from a partner, financial difficulties, complicated childbirth, traumatic experiences, or infant health problems. For this reason, the onset of postpartum anxiety is often determined by a combination of several interconnected factors rather than by a single isolated risk factor. Research shows that women with previous mental health difficulties who also experience social or emotional difficulties belong to the highest-risk group (Schiller et al., 2015).

In clinical practice, previous mental disorders should be regarded as an important signal for early prevention and individualized support. Early assessment of emotional condition during pregnancy allows identification of women who may require additional psychological or psychiatric support after childbirth. The World Health Organization emphasizes that perinatal mental disorders are a significant public health problem affecting not only maternal but also infant health and family well-being (Rogers et al., 2020). Therefore, systematic mental health assessment during pregnancy should become an integral part of maternity care.

Previous depression, anxiety disorders, emotional crises, or a history of psychological treatment increase the likelihood that a woman will experience emotional difficulties, anxiety, and adaptation problems after childbirth. For this reason, early assessment of mental health risks, timely specialist support, and continuous emotional assistance during pregnancy and the postpartum period are extremely important.

Sleep Deprivation. Sleep deprivation is one of the most significant biological and psychological risk factors for postpartum anxiety. During the postpartum period, a woman's sleep structure often becomes fragmented due to newborn care, nighttime feedings, physiological recovery after childbirth, and emotional tension. Continuous awakenings and insufficient sleep duration impair

the body's ability to regulate emotions, increase sensitivity to stress, and weaken psychological resilience. Research shows that poor sleep quality and short sleep duration are directly associated with a higher frequency and severity of postpartum anxiety symptoms (Smith, Forrester, 2021).

During the postpartum period, sleep deprivation affects not only physical well-being but also the functioning of the central nervous system. Insufficient sleep is associated with increased cortisol levels, emotional regulation disturbances, heightened irritability, and mood fluctuations. Women who experience prolonged sleep deprivation more frequently suffer from tension, excessive concern about the infant's health, emotional exhaustion, and a constant sense of vigilance. These symptoms become particularly significant when a woman has no opportunity to rest adequately or receive support from relatives. Schiller et al. (2015) found that poor sleep quality is significantly associated with higher levels of depression and anxiety symptoms after childbirth.

Sleep deprivation may also function as a vicious cycle in which anxiety worsens sleep quality, while poor sleep further intensifies anxiety symptoms. Due to constant worrying, women find it more difficult to fall asleep even when the infant is sleeping. Intrusive thoughts, heightened vigilance, fear of not hearing the infant, or anxiety about potential dangers are common. Such a condition prevents the body from fully recovering and over time increases the risk of emotional exhaustion. Analyses of perinatal mental health problems indicate that sleep disturbances are among the earliest signs of emotional difficulties (Okun et al., 2018).

The impact of sleep deprivation on postpartum anxiety is also closely related to women's self-esteem and motherhood experience. Women experiencing fatigue more often doubt their ability to properly care for the infant, feel guilt because of emotional instability, or perceive themselves as unable to cope with daily tasks. Long-term fatigue reduces emotional resilience; therefore, even minor everyday problems may be perceived as difficult to overcome. Such emotional reactions increase the intensity of anxiety and may negatively affect the relationship between mother and infant. Scientific studies show that poorer sleep quality is associated with greater emotional sensitivity and poorer adaptation to the maternal role (Sharkey et al., 2016).

It is important to note that sleep deprivation often interacts with other risk factors for postpartum anxiety. Sleep quality may be worsened by lack of social support, limited partner involvement in infant care, financial insecurity, complicated childbirth, or newborn health problems. For this reason, women who already have increased emotional vulnerability become even more sensitive to prolonged sleep deprivation. Research reveals that women who experience persistent sleep deficits after childbirth more frequently face not only anxiety but also symptoms of depression and greater psychological distress (Aboushaar, Serrano, 2024).

In clinical practice, assessment of sleep quality should be an important part of postpartum care. Emotional difficulties are often evaluated without considering the quality of women's rest,

although sleep disturbances may be an early sign of mental health problems. Specialists should actively inquire about women's sleep duration, difficulties falling asleep, nighttime awakenings, and subjective quality of rest. Early recognition of sleep problems and provision of support may reduce the risk of postpartum anxiety and improve women's overall emotional well-being.

Sleep deprivation has a significant impact not only on maternal psychological condition but also on overall family functioning. Constant fatigue reduces the ability to maintain social relationships, increases the risk of family conflicts, and complicates adaptation to new life circumstances. For this reason, improving sleep quality, involving relatives in infant care, and strengthening emotional support are considered important measures for the prevention of postpartum anxiety.

Lack of Social Support. Lack of social support is one of the most important psychosocial risk factors for postpartum anxiety. During the postpartum period, women experience intense emotional, physical, and social changes; therefore, support from relatives becomes extremely important in adapting to the maternal role. When a woman does not receive sufficient emotional, practical, or informational support from her partner, family members, or environment, feelings of loneliness, emotional exhaustion, and insecurity increase. Research shows that low levels of social support are significantly associated with a higher frequency and severity of postpartum anxiety symptoms (Bayram Değer, 2025).

Social support during the postpartum period includes not only practical help with infant care but also emotional support, understanding, recognition of women's needs, and strengthening of the sense of security. Women who feel support from their partner or relatives adapt more easily to new responsibilities, experience emotional burnout less frequently, and cope better with stressful situations. In contrast, lack of social support may intensify feelings of insecurity, promote constant worrying, and reduce confidence in one's ability to care for the infant. DelRosso (2025) found that women who felt less emotional support from their partner after childbirth more frequently experienced symptoms of anxiety and depression.

One of the most important aspects of social support is partner involvement in motherhood and infant care. Emotional availability of the partner, help with household tasks, participation in infant care, and the ability to provide emotional security reduce women's psychological tension. When a woman feels solely responsible for infant care, the risk of emotional fatigue and anxiety increases. Research shows that conflictual relationships with a partner or lack of emotional connection are significantly associated with increased levels of postpartum anxiety (Gilfarb, Leuner, 2022).

Lack of social support is especially important for first-time mothers who do not yet have experience with motherhood. Uncertainty, doubts about infant care, fear of making mistakes, and lack of confidence in one's abilities may become a strong source of emotional tension. If during this period

a woman does not receive encouragement or support; anxiety symptoms often intensify. Researchers emphasize that emotional support helps women adapt better to motherhood and reduces the likelihood of psychological distress (Henderson et al., 2019).

It is important to note that lack of social support may be influenced by various social and cultural factors. Some women live far from their family, do not have close social relationships, or experience emotional distancing from their partner. In other cases, social isolation is strengthened by financial difficulties, migration, single motherhood, or limited opportunities to receive professional support. Such circumstances increase emotional vulnerability and reduce women's ability to effectively cope with postpartum difficulties. Research shows that women with limited social networks more frequently experience anxiety, emotional instability, and poorer quality of life after childbirth (Iacona et al., 2025).

Lack of social support is also closely associated with increased stress and sleep disturbances. Women who do not have the opportunity to rest or share responsibilities with other family members more frequently experience constant fatigue, emotional exhaustion, and increased irritability. Over time, this may promote constant vigilance, intrusive thoughts about infant safety, and excessive concern regarding everyday situations. For this reason, lack of social support is considered not only emotional but also a physiological stressor affecting women's mental health (Kilavuz, Topaloğlu, 2025).

In clinical practice, it is important to assess not only women's emotional condition but also their social environment. Specialists should inquire whether a woman has support from relatives, whether her partner participates in infant care, and whether she feels understood and emotionally supported. Early identification of lack of social support allows timely provision of psychological support and involvement of social workers, community services, or peer support groups. Such measures may reduce emotional tension and improve women's adaptation to the postpartum period.

Strengthening social support is considered one of the most important measures for the prevention of postpartum anxiety. Emotional security, partner involvement, family support, and the opportunity to share everyday difficulties help reduce women's emotional burden and strengthen psychological resilience. For this reason, the social environment should be regarded as a significant component of maternal mental health, having a direct impact on the onset and course of postpartum anxiety.

Complicated Childbirth. Complicated childbirth is a significant risk factor for postpartum anxiety, having a direct impact on women's emotional condition, psychological security, and adaptation to motherhood. Complications experienced during childbirth, severe physical pain, emergency medical interventions, unexpected changes during labor, or threats to the health of the mother and newborn may become strong emotional stressors. Such experiences often cause feelings

of fear, helplessness, loss of control, and insecurity, which may persist in the postpartum period. Research shows that negative childbirth experiences are significantly associated with an increased frequency of postpartum anxiety symptoms (Lim et al., 2023).

Complicated childbirth may be associated both with physiological complications and with women's subjective evaluation of their childbirth experience. Even a medically successful childbirth may be perceived as traumatic if the woman felt uninformed, ignored, insufficiently supported, or deprived of control during the situation. Emotional insecurity experienced during childbirth often becomes a cause of long-term anxiety, especially if the woman constantly recalls difficult moments of labor or feels fear regarding her own and her infant's health. Scientific studies emphasize that a negative subjective childbirth experience may be as significant as objective medical complications (Medic et al., 2017).

Some of the most common complicated childbirth situations include emergency cesarean section, prolonged labor, vacuum extraction, heavy bleeding, severe labor pain, or newborn health disorders. In such situations, women often experience intense emotional stress that may persist for a long time after childbirth. Research shows that women after emergency cesarean section more frequently experience anxiety symptoms, emotional instability, and difficulties adapting to the maternal role (Hedges et al., 2021). Emotional tension becomes especially high when a threat to the infant's life or health arises during childbirth.

Complicated childbirth may also be associated with symptoms of post-traumatic stress. Some women after traumatic childbirth experience recurring memories, intense emotional sensitivity, avoidance of discussing the childbirth experience, or constant vigilance. Such a condition often overlaps with postpartum anxiety and may complicate emotional bonding with the infant and everyday functioning. Kawashima et al. (2022) found that traumatic childbirth experience significantly increases the risk of developing both post-traumatic stress and postpartum anxiety.

Medical support received during childbirth also has great significance for women's emotional condition. Empathetic communication, provision of clear information, emotional support, and involving women in decision-making reduce the likelihood of emotional trauma. In contrast, cold communication, lack of information, or disrespectful behavior may intensify feelings of insecurity and loss of control. Research shows that women who felt unsupported during childbirth more frequently experience anxiety, lack of self-confidence, and emotional difficulties after childbirth (DelRosso, 2025).

Complicated childbirth often has a long-term impact on women's self-esteem and confidence in their maternal abilities. Some women after traumatic childbirth experiences feel guilt, disappointment in themselves or their bodies, especially if childbirth did not meet their expectations or plans. Such emotions may promote constant self-blame, excessive concern about the infants'

condition and fear of possible future problems. For this reason, complicated childbirth is considered not only a medical but also a psychological risk factor affecting long-term emotional health.

It is important to note that the impact of complicated childbirth may be intensified by other risk factors such as lack of social support, previous mental disorders, sleep deprivation, or financial difficulties. Women who do not receive emotional support after complicated childbirth or do not have the opportunity to openly discuss their experience more frequently face long-term emotional difficulties. Research shows that early psychological support after traumatic childbirth may reduce the intensity of anxiety symptoms and improve emotional adaptation (Mughal et al., 2018).

In clinical practice, it is extremely important to identify women who perceive childbirth as a traumatic experience. During postpartum care, specialists should assess not only women's physical condition but also their emotional well-being, attitudes toward childbirth experience, fears, and psychological difficulties. Timely provision of emotional support, the opportunity to discuss the course of childbirth, and psychological consultations may help reduce the risk of postpartum anxiety and improve women's emotional well-being.

Financial and Family Difficulties. Financial and family difficulties are important psychosocial factors that increase the risk of postpartum anxiety. During the postpartum period, women face not only physical and emotional changes but also new social and economic responsibilities. Increased expenses related to infant care, reduced family income, fear of job loss, or an unstable financial situation may cause a constant sense of insecurity and strong emotional stress. Research shows that financial instability is significantly associated with a higher frequency of postpartum anxiety and depression symptoms (Kay et al., 2024).

Financial insecurity often causes long-term emotional tension because women begin to worry about their ability to meet the child's needs, the family's future, and the stability of everyday life. Constant thoughts about financial obligations, maintaining housing, infant care expenses, or work prospects may promote constant vigilance and emotional exhaustion. In such situations, women more frequently experience sleep disturbances, irritability, reduced emotional resilience, and increased anxiety levels. Scientific studies reveal that lower income and economic difficulties are among the most significant risk factors for postpartum mental health problems (Verde et al., 2022).

Financial difficulties are also often closely associated with limited opportunities to receive quality support. Women facing economic deprivation may seek mental health specialists less frequently, receive insufficient emotional support, or lack opportunities to ensure adequate rest. For this reason, emotional difficulties may remain unnoticed or ignored for a long time. In addition, financial tension may negatively affect partner relationships and increase the likelihood of family conflicts, which further strengthens women's emotional vulnerability.

Family difficulties are also considered a significant risk factor for postpartum anxiety.

Conflictual relationships with a partner, lack of emotional support, disagreements regarding infant care, or an unstable family environment may cause constant emotional tension. Women who feel misunderstood, criticized, or left alone to solve everyday problems more frequently experience loneliness, lack of self-confidence, and emotional exhaustion. Research shows that poor partner relationships and family conflicts significantly increase the risk of postpartum anxiety symptoms (Modak et al., 2023).

The emotional availability and involvement of the partner in infant care are also of great importance. When a woman feels solely responsible for newborn care and everyday concerns, the likelihood of emotional burnout and anxiety increases. Partner assistance with household tasks, emotional support, and the ability to share responsibilities reduce psychological tension and help women adapt more easily to the new stage of life. In contrast, emotional distancing or conflictual communication may intensify feelings of insecurity and loss of control. Researchers emphasize that social and emotional support within the family is one of the most important protective factors for women's mental health after childbirth (Stapleton et al., 2012).

Family difficulties may also be associated with domestic violence, psychological pressure, or emotional instability within the family. Such circumstances cause constant stress and feelings of fear, which become even more intense during the postpartum period due to increased emotional sensitivity in women. Research shows that women experiencing emotional or physical violence within the family more frequently face pronounced postpartum anxiety, depression, and symptoms of post-traumatic stress (Hall et al., 2022).

Financial and family difficulties often interact with other risk factors such as sleep deprivation, lack of social support, previous mental disorders, or complicated childbirth experiences. Such interaction of multiple factors may significantly worsen women's emotional condition and complicate adaptation to motherhood. For this reason, it is important to assess not only individual emotional symptoms but also the overall social and family context of women's lives.

In clinical practice, specialists should pay attention to women's living conditions, economic situation, quality of partnership, and emotional safety within the family. Early identification of financial and family difficulties allows timely provision of psychological, social, or practical support. Involvement of social workers, psychologists, community services, and support groups may reduce emotional tension and improve women's psychological well-being after childbirth.

Financial stability and a safe family environment are important protective factors helping women feel secure and stable during the postpartum period. Emotional support, respectful communication, sharing of responsibilities, and the opportunity to receive assistance reduce the risk of anxiety and strengthen women's ability to adapt to the changes of motherhood.

Maternal Age and First Childbirth. Maternal age and first childbirth are important

demographic and psychosocial factors that may have a significant impact on the development of postpartum anxiety. At different stages of life, women face varying levels of emotional maturity, social stability, financial opportunities, and challenges related to adaptation to motherhood. Research shows that both very young and older maternal age may be associated with an increased risk of emotional difficulties after childbirth (Stein Elger, 2025).

Younger women more frequently face emotional insecurity, limited life experience, and lower confidence in their ability to care for an infant. Due to insufficient experience, lower social stability, or limited financial opportunities, young mothers more often experience tension, fear of making mistakes, and constant concern regarding infant care. Research reveals that younger women after childbirth more frequently experience emotional instability, social isolation, and increased anxiety levels, especially when support from a partner or family is lacking (Wallace et al., 2021).

Older women may also belong to a higher-risk group. Although they often demonstrate greater emotional maturity and more stable social circumstances, pregnancy and childbirth at an older age are more frequently associated with increased risk of medical complications, greater anxiety regarding fetal health, and a stronger sense of responsibility. Such women more often experience perfectionistic expectations toward themselves and stronger pressure to perform the maternal role “properly.” Research shows that older women more frequently experience intense concern regarding infant safety and health, which may promote constant vigilance and emotional tension (Zhu et al., 2025).

First childbirth is considered one of the most significant risk factors for postpartum anxiety. Women giving birth for the first time face an entirely new life situation requiring adaptation to changed daily routines, new responsibilities, and the maternal role. Uncertainty, lack of experience, and fear of making mistakes often become strong sources of emotional tension. Many first-time mothers experience anxiety regarding infant feeding, sleep, health, or their ability to properly care for the infant. Research shows that women who give birth for the first time experience postpartum anxiety more frequently than those who already have motherhood experience (Horwitz et al., 2026).

First childbirth is also often associated with greater emotional sensitivity to the evaluation of others. Women may feel pressure to conform to the socially prevailing image of a “good mother,” therefore they begin excessively controlling themselves, blaming themselves for even minor failures, or doubting their competence. Constant information searching, comparison with other mothers, and the influence of social media may intensify lack of self-confidence and promote anxiety symptoms. In such situations, emotional support and professional assistance helping women realistically evaluate the challenges of motherhood are especially important.

First-time mothers also more frequently experience heightened vigilance regarding the infant. Constant monitoring of the infant, fear of missing possible health problems, or uncertainty regarding

everyday care decisions may promote emotional exhaustion. Researchers note that women becoming mothers for the first time more frequently experience intrusive thoughts, sleep disturbances, and stronger emotional fatigue (García-Plata, Garcia-Molina, 2025).

The impact of maternal age and first childbirth is often intensified by other risk factors such as lack of social support, financial difficulties, complicated childbirth, or previous mental health disorders. Younger women may be more dependent on support from relatives, whereas older women more frequently experience stronger pressure of responsibility and fear regarding possible complications. For this reason, emotional support and individualized care should be adapted according to women's life stage and motherhood experience.

In clinical practice, it is important to pay attention to the emotional condition of first-time mothers, their self-confidence, social environment, and adaptation to motherhood. Specialists should encourage open discussion about the difficulties of motherhood, normalize emotional experiences, and provide clear information regarding infant care. Such support may reduce emotional tension, strengthen women's self-confidence, and reduce the risk of postpartum anxiety.

Maternal age and first childbirth are important factors shaping women's emotional experiences after childbirth. Adaptation to a new role, responsibility for the infant, and life changes may become significant emotional challenges, especially if women do not have sufficient social support or previous motherhood experience.

3.4. The Impact of Postpartum Anxiety on the Mother and Infant

Maternal Emotional Health. Postpartum anxiety has a significant impact on maternal emotional health and daily functioning. During the postpartum period, women experience intense physical, hormonal, and psychosocial changes; therefore, emotional stability becomes extremely important for adaptation to the maternal role. When anxiety symptoms become persistent or intense, they may negatively affect women's well-being, emotional resilience, relationships with others, and ability to care for themselves and the infant. Research shows that postpartum anxiety is often associated with poorer quality of life, increased emotional exhaustion, and long-term psychological difficulties (Khayamim et al., 2016).

One of the most common effects of postpartum anxiety on maternal emotional health is a constant sense of inner tension and insecurity. Women often experience persistent concern about the infant's health, fear of making mistakes, excessive responsibility, or constant vigilance. Over time,

such an emotional state becomes psychologically exhausting and reduces the ability to relax even in safe situations. Anxiety often becomes a constant background experience preventing women from feeling satisfaction with motherhood and fully experiencing connection with the infant. Research shows that postpartum anxiety is significantly associated with reduced emotional satisfaction during the motherhood period (Medina, Magnuson, 2009).

Postpartum anxiety often negatively affects women's self-esteem and self-confidence. Some women begin doubting their ability to be a "good mother," become highly self-critical, and sensitive to the evaluation of others. Constant self-monitoring, perfectionistic expectations, and fear of not meeting socially prevailing motherhood standards may intensify emotional instability. Women often feel guilt regarding their emotional condition because they believe motherhood should be only a joyful experience. Such internal conflicts may promote even greater anxiety and emotional withdrawal (Ogallar et al., 2025).

Emotional exhaustion is another important consequence of postpartum anxiety. Constant tension, sleep disturbances, excessive vigilance, and inability to relax emotionally over time reduce women's psychological resources. Women may feel constantly tired, irritable, emotionally sensitive, or depressed. Such a condition complicates everyday activities, reduces motivation to care for themselves, and increases the risk of burnout. Research reveals that long-term postpartum anxiety may be associated with chronic stress and difficulties in emotional regulation (Rouhi, 2023).

Postpartum anxiety is also closely associated with the development of depressive symptoms. Anxiety and depression during the perinatal period often overlap; therefore, women may simultaneously experience both intense emotional anxiety and depressed mood, feelings of hopelessness, or emotional withdrawal. Research shows that women experiencing intense postpartum anxiety have a greater risk of developing postpartum depression or long-term emotional disorders (Sobol-Kwapińska et al., 2024). For this reason, postpartum anxiety should not be regarded as a temporary or insignificant emotional difficulty.

Negative effects also appear in women's social lives. Due to constant anxiety, some women avoid social situations, limit communication with relatives, or give up activities that previously brought pleasure. Increased sensitivity to environmental evaluation and constant concern may promote emotional withdrawal and feelings of loneliness. Over time, social isolation reduces opportunities for emotional support and may further intensify anxiety symptoms. Scientific studies emphasize that emotional withdrawal and reduced social activity often become long-term consequences of untreated postpartum anxiety (Handa et al., 2024).

Postpartum anxiety may also negatively affect women's relationships with their partner and family. Constant emotional tension, irritability, sleep deprivation, and increased sensitivity to stress often become causes of family conflicts. Women may feel misunderstood or insufficiently supported,

which further intensifies emotional insecurity. Relationship difficulties, in turn, increase psychological tension and complicate emotional adaptation to motherhood. Research shows that poorer relationship quality is significantly associated with more intense postpartum anxiety symptoms (Bai et al., 2020).

In clinical practice, it is extremely important to recognize early the impact of postpartum anxiety on women's emotional health. Specialists should assess not only women's physical condition but also emotional well-being, sleep quality, self-esteem, relationships with relatives, and changes in psychological functioning. Early recognition of emotional difficulties allows timely provision of psychological support, reduction of the risk of long-term mental health problems, and improvement of women's quality of life after childbirth.

Maternal emotional health has a direct impact not only on women's own well-being but also on the mother–infant relationship, family climate, and the child's emotional development. For this reason, prevention of postpartum anxiety, timely diagnosis, and emotional support should be considered important components of maternal and child healthcare.

Mother–Infant Bond. The mother–infant bond is one of the most important components of early child development and maternal emotional well-being. During the postpartum period, emotional attachment is formed, which has a significant impact on the infant's sense of security, emotional development, and maternal adaptation to the motherhood role. However, postpartum anxiety may complicate the formation of this bond because constant emotional tension, fear, and heightened vigilance reduce women's ability to relax emotionally and respond sensitively to the infant's needs. Research shows that women experiencing pronounced postpartum anxiety more frequently encounter difficulties in creating a close emotional relationship with the infant (Chauhan, Tadi, 2022).

Women experiencing postpartum anxiety often become excessively focused on possible threats or dangers to the infant. Constant vigilance, excessive monitoring of the infant, and fear regarding the infant's health or safety may lead to emotional exhaustion and complicate spontaneous emotional interaction. In such situations, women devote more attention to control and prevention of possible problems than to emotional closeness. Research reveals that intense maternal anxiety may reduce emotional sensitivity to infant cues and impair the quality of interaction between mother and infant (Dorsey et al., 2021).

Maternal emotional condition has a direct impact on infant emotional security. During early life, infants are highly sensitive to maternal emotions, tone of voice, body language, and touch. If the mother frequently feels tense, anxious, or emotionally exhausted, the infant may become more sensitive to stress, cry more often, have greater difficulty calming down, or experience sleep difficulties. Scientific studies show that maternal anxiety may be associated with increased infant irritability and difficulties regulating emotional reactions (Griffith, 2024).

Postpartum anxiety may also affect women's ability to trust themselves in caring for the infant. Women often doubt their competence, fear making mistakes, or worry about being unable to properly understand the infant's needs. For these reasons, they may become excessively controlling or, conversely, emotionally withdrawn from the infant care process. Such inner tension complicates the natural formation of emotional bonding and may reduce satisfaction with motherhood. Research shows that lower maternal self-confidence is significantly associated with weaker emotional attachment to the infant (Hunter et al., 2009).

It is important to note that the quality of the mother–infant bond is determined not only by emotional symptoms but also by their duration and intensity. Short-term anxiety often does not cause long-term consequences, especially if women receive emotional support and assistance. However, prolonged or untreated postpartum anxiety may disrupt the formation of a stable emotional bond and affect the infant's social and emotional development. Researchers emphasize that early strengthening of emotional bonding is an important protective factor for infant development and family well-being (Scott et al., 2021).

Postpartum anxiety may also influence the infant feeding process. Anxious women more frequently experience difficulties during breastfeeding, feel greater stress regarding infant feeding, or doubt whether the infant is receiving sufficient nutrition. Such emotions may reduce self-confidence and complicate the formation of a positive feeding experience. Research shows that postpartum anxiety is associated with shorter breastfeeding duration and greater emotional discomfort during infant care (Sharkey et al., 2016).

The mother–infant bond is also significantly influenced by the social environment. Partner support, assistance from relatives, and emotional security within the family may reduce women's anxiety symptoms and help them establish an emotional connection with the infant more easily. In contrast, lack of social support, family conflicts, or emotional exhaustion may intensify feelings of withdrawal and loneliness. For this reason, emotional support for women after childbirth is important not only for their own mental health but also for the infant's emotional development.

In clinical practice, it is important to assess not only women's emotional symptoms but also their relationship with the infant. Specialists should observe maternal emotional involvement, sensitivity to infant needs, self-confidence, and the quality of interaction with the infant. Early recognition of emotional difficulties allows timely provision of psychological support, strengthening of maternal self-confidence, and promotion of a positive mother–infant bond.

A strong emotional bond between mother and infant is important both for the infant's emotional security and for maternal psychological well-being. For this reason, prevention of postpartum anxiety and timely support should focus not only on reducing symptoms but also on strengthening a secure and close relationship between mother and infant.

Infant Development. Postpartum anxiety may have a significant impact on infant emotional, cognitive, and social development. The early period of an infant's life is extremely important for brain development, formation of emotional security, and creation of social relationships; therefore, maternal emotional condition becomes one of the most important environmental factors. When mothers experience persistent anxiety, emotional tension, or exhaustion after childbirth, this may affect their interaction with the infant, sensitivity to infant needs, and ability to ensure a stable emotional bond. Research shows that maternal postpartum anxiety is associated with a greater risk of infant emotional and behavioral difficulties (Tal, Taylor, 2021).

Infant emotional development is closely dependent on early interaction with the mother. Infants learn to regulate emotions by observing maternal reactions, tone of voice, touch, and communication style. If the mother frequently feels tense, anxious, or emotionally exhausted, the infant may become more sensitive to environmental stress and have greater difficulty calming down. Research shows that maternal anxiety may be associated with increased infant irritability, more frequent crying, and sleep disturbances (Tomaso et al., 2021). Such early difficulties may affect the child's emotional stability and ability to adapt to the environment over time.

Postpartum anxiety may also affect infant cognitive development. Early emotional contact, eye contact, verbal communication, and sensitive responses to infant cues are important for the development of language, attention, and cognitive abilities. When mothers become emotionally withdrawn due to anxiety or excessively focused on their fears, the frequency of quality interactions with the infant may decrease. Research reveals that long-term maternal emotional difficulties may be associated with slower cognitive and language development in children (Astbury et al., 2022).

The quality of maternal ability to regulate emotions is also important for infant development. Constant maternal tension may create an emotionally unstable environment in which the infant experiences stress more frequently. Infants are sensitive to the emotional climate within the family; therefore, long-term maternal emotional tension may affect their nervous system responses to stress. Research shows that infants whose mothers experience pronounced anxiety or depression more frequently demonstrate increased sensitivity to stress, emotional irritability, and difficulties regulating emotions (Choi et al., 2005).

Postpartum anxiety may also affect infant social development. Early secure attachment to the mother is important for the child's future ability to form secure social relationships, trust others, and regulate emotions. If maternal emotional condition complicates sensitive responses to infant needs, the formation of secure emotional attachment may be disrupted. Researchers emphasize that maternal mental health has a long-term impact on child social and emotional development (Dietrich Leurer, Misskey, 2015). Infant development may also be affected by indirect consequences of postpartum anxiety.

Anxious women more frequently experience breastfeeding difficulties, sleep deprivation, emotional exhaustion, and social isolation, which may reduce their ability to provide quality infant care. Increased emotional tension within the family may result in less positive interaction and greater stress in the everyday environment. Over time, such circumstances may negatively affect children's emotional well-being and overall development.

It is important to note that not all women experiencing postpartum anxiety encounter pronounced difficulties in forming a bond with the infant or ensuring healthy development. Availability of emotional support, partner involvement, timely psychological assistance, and early recognition of emotional difficulties are highly significant. Research shows that appropriate support and emotional assistance may reduce the negative impact of postpartum anxiety on infant development (Georgescu et al., 2021).

In clinical practice, it is important to assess not only maternal emotional condition but also infant emotional and behavioral signs. Specialists should observe mother–infant interaction, emotional contact, infant reactions to the environment, and the overall emotional climate within the family. Early provision of psychological support may improve maternal emotional well-being, strengthen the mother–infant bond, and ensure more favorable conditions for child development.

Infant emotional and cognitive development is closely associated with maternal mental health and the quality of the early environment. For this reason, prevention of postpartum anxiety and timely support are important not only for maternal emotional well-being but also for long-term child development and family functioning.

Breastfeeding Problems. Postpartum anxiety may have a significant impact on the breastfeeding process, maternal self-confidence, and the infant feeding experience. Breastfeeding is not only a physiological method of infant feeding but also an important part of the emotional bond between mother and infant. However, women experiencing intense anxiety after childbirth often face various breastfeeding difficulties that may negatively affect both maternal emotional condition and infant well-being. Research shows that postpartum anxiety is significantly associated with shorter breastfeeding duration, greater lack of confidence in the ability to breastfeed, and increased emotional stress during feeding (Hedges et al., 2021).

One of the most common difficulties is women's doubts regarding milk supply and the quality of infant feeding. Anxious women often fear that the infant is not receiving enough nutrition, even when there are no objective signs of this. Such thoughts may encourage constant monitoring of infant weight, frequent feeding, emotional tension, and excessive concern regarding infant health. Due to constant anxiety, women may lose confidence in their bodies and their ability to properly care for the infant. Research reveals that low maternal breastfeeding confidence is closely associated with higher levels of postpartum anxiety (Yazdanpanah et al., 2021).

Postpartum anxiety may also affect the physiological processes of breastfeeding. Constant emotional tension and increased levels of stress hormones in the body may disrupt oxytocin release, which is important for the milk let-down reflex. As a result, women may experience more difficult milk flow, painful breastfeeding, or difficulties maintaining lactation. Such problems often further intensify women's anxiety and emotional exhaustion. Scientific studies show that emotional stress and anxiety may negatively affect the course of breastfeeding and women's satisfaction with the breastfeeding experience (Kaczmarek et al., 2025).

Breastfeeding problems often become an additional source of emotional tension. Many women feel strong pressure to breastfeed because breastfeeding is frequently associated in society with the concept of a "good mother." When women encounter breastfeeding difficulties, they may begin blaming themselves, feeling disappointment, or experiencing feelings of inadequacy. Such emotions become especially intense when relatives do not provide emotional support or when women feel pressure to meet societal expectations. Research shows that negative breastfeeding experiences may intensify postpartum anxiety symptoms and worsen women's emotional well-being (Lan et al., 2026).

Postpartum anxiety may also affect the emotional bond between mother and infant during breastfeeding. Breastfeeding is often regarded as a moment of closeness, security, and emotional contact; however, constant anxiety may prevent women from relaxing and emotionally engaging in interaction with the infant. Mothers may become excessively focused on technical aspects of feeding, infant weight, or possible problems, reducing spontaneous emotional connection and satisfaction with the breastfeeding process. Research emphasizes that maternal emotional condition has a direct impact on the quality of the breastfeeding experience and infant emotional security (McBean et al., 2016).

Breastfeeding difficulties are often intensified by other factors such as sleep deprivation, lack of social support, complicated childbirth, or previous mental health disorders. Women who do not receive sufficient support from their partner or specialists more frequently feel alone in dealing with breastfeeding problems. In such situations, even minor difficulties may be perceived as major failures, which further increases emotional tension and lack of self-confidence.

In clinical practice, it is important to assess not only the physiological aspects of breastfeeding but also women's emotional well-being during feeding. Specialists should pay attention to women's anxiety levels, self-confidence, fears, and emotional experiences related to infant feeding. Empathetic support, clear information, and emotional encouragement may help reduce women's tension and improve the breastfeeding experience. It is also important to avoid blaming women or placing pressure on them, as this may further worsen emotional condition.

Breastfeeding problems are closely associated with maternal emotional health and overall adaptation to motherhood. Timely emotional and practical support may reduce the impact of

postpartum anxiety on the breastfeeding process, strengthen women's self-confidence, and improve the mother–infant relationship.

Long-Term Consequences. Postpartum anxiety may have long-term consequences for both maternal mental health and the child's emotional, social, and cognitive development. Although anxiety symptoms decrease during the first months after childbirth for some women, in other cases emotional difficulties may persist for a long time or develop into chronic mental health disorders. Untreated or insufficiently recognized postpartum anxiety often affects women's quality of life, family relationships, and the relationship between mother and child. Research shows that long-term postpartum anxiety is associated with a greater risk of depression, chronic stress, and emotional exhaustion (O'Donnell et al., 2009).

Some of the most important long-term consequences appear in maternal emotional health. Women who experience anxiety symptoms for a prolonged period more frequently face constant emotional fatigue, sleep disturbances, reduced self-confidence, and difficulties regulating emotions. Constant inner tension may affect daily functioning, reduce the ability to enjoy motherhood, and complicate adaptation to changes in family life. Research reveals that untreated postpartum anxiety may become the beginning of long-term anxiety disorders or depression (Rosebrock et al., 2015).

Long-term consequences also frequently appear in women's social relationships. Due to constant emotional sensitivity, irritability, and increased stress, women may find it more difficult to maintain close relationships with partners, family members, or friends. Some women become more emotionally withdrawn, avoid social situations, or feel misunderstood by others. Over time, this may promote social isolation and feelings of loneliness, which further intensify psychological difficulties. Research shows that poorer quality of social relationships is often associated with more prolonged postpartum anxiety symptoms (Smith et al., 2022).

Postpartum anxiety may also have a long-term impact on the mother–child relationship. If women remain emotionally tense for a prolonged period, they may find it more difficult to respond sensitively to the child's emotional needs, ensure a stable emotional bond, and consistently maintain positive interaction. In such situations, the child may become more sensitive to stress and more frequently experience difficulties regulating emotions or feelings of insecurity. Research emphasizes that long-term maternal emotional difficulties may affect child emotional development and the quality of attachment (Stein et al., 2018).

Maternal postpartum anxiety may have both short-term and long-term consequences for child development. Research shows that children whose mothers experienced pronounced and prolonged anxiety after childbirth more frequently demonstrate emotional difficulties, increased sensitivity to stress, behavioral problems, and difficulties in social relationships. Associations have also been identified between maternal emotional disorders and characteristics of child cognitive and language

development (Valizadeh et al., 2026). For this reason, maternal mental health is considered an important factor of the child's early environment.

Long-term consequences may also be associated with women's attitudes toward future pregnancies and motherhood. Traumatic emotional experiences after childbirth may promote strong fear of becoming pregnant or giving birth again, reduce confidence in the ability to care for children, and shape a negative perception of motherhood. Some women remember the postpartum period for a long time as an extremely emotionally difficult stage, which may affect their psychological well-being in the future. Research shows that negative postpartum experiences may be associated with an increased risk of emotional disorders later in life (Witkowska-Zimny et al., 2024).

It is important to note that the risk of long-term consequences is significantly reduced by early recognition of postpartum anxiety and timely support. Emotional support, psychological counseling, partner involvement, and strengthening of social support may improve women's emotional condition and reduce negative effects on family life. Research emphasizes that early interventions help not only reduce symptom intensity but also protect the mother–child relationship and child development (Zhu et al., 2025).

In clinical practice, it is important to view postpartum anxiety not as a temporary emotional reaction but as a significant mental health problem capable of having long-term consequences for the entire family. Specialists should ensure continuous monitoring of women's emotional condition, encourage open discussion about emotional difficulties, and provide timely psychological support. Such an approach may help reduce long-term negative effects on maternal emotional health, child development, and family well-being.

4. ASSOCIATIONS BETWEEN SLEEP QUALITY AND POSTPARTUM ANXIETY

4.1. Biological and Psychological Mechanisms of Associations

Impact of Sleep Deprivation on Emotion Regulation. Sleep deprivation is one of the most important biological factors affecting emotion regulation and psychological stability during the postpartum period. After childbirth, women's sleep often becomes fragmented due to newborn care, nighttime feedings, hormonal changes, and increased emotional vigilance. Insufficient sleep duration and poor sleep quality negatively affect the functioning of the central nervous system, emotional resilience, and the ability to adapt to stressful situations. Studies show that sleep deprivation is significantly associated with increased emotional sensitivity, anxiety, and difficulties regulating emotional responses (Zhou et al., 2025).

Emotion regulation involves the ability to recognize, manage, and appropriately express emotions in various life situations. When a person does not get enough sleep, the functioning of brain regions responsible for emotional control and rational evaluation of situations weakens. Studies indicate that sleep deprivation reduces prefrontal cortex activity and increases amygdala reactivity to negative stimuli, making emotional responses more intense and harder to control (Whitley et al., 2020). During the postpartum period, this biological response becomes particularly significant because women experience constant stress, new responsibilities, and emotional sensitivity.

Sleep deprivation often leads to increased irritability, emotional instability, and a reduced ability to cope with everyday difficulties. Women may react more strongly to minor problems, more frequently experience tension, anxiety, or emotional exhaustion. Due to impaired emotion regulation, even ordinary newborn care situations may be perceived as difficult to manage or threatening. Research reveals that sleep deprivation during the postpartum period is directly associated with higher levels of emotional distress and anxiety symptoms (Tosto et al., 2023).

It is important to note that sleep deprivation and emotional difficulties often form a vicious cycle. Anxiety makes it harder to fall asleep, increases the frequency of nighttime awakenings, and prevents women from obtaining quality rest even when there is an opportunity to sleep. Meanwhile, poor sleep further intensifies emotional sensitivity, anxiety, and internal tension. Over time, this interaction may lead to persistent emotional exhaustion and increase the risk of mental health disorders. Scientific studies indicate that women experiencing long-term sleep disturbances after childbirth more frequently face symptoms of anxiety and depression (Smith et al., 2018).

Sleep deprivation also negatively affects stress regulation systems in the body. Insufficient rest increases cortisol concentration, activates the sympathetic nervous system, and maintains the

body in a state of alertness. Due to these physiological changes, women may constantly feel tension, inner restlessness, and difficulty relaxing. Long-term elevated stress hormone levels are associated with greater emotional vulnerability and difficulties regulating emotions. Studies emphasize that disrupted sleep may have a direct impact on emotional well-being and psychological resilience (Rogers et al., 2020).

During the postpartum period, difficulties in emotion regulation may also affect the mother's relationships with the baby and surrounding people. Sleep-deprived women more often experience irritability, emotional sensitivity, and difficulties maintaining positive communication. Reduced emotional resilience may increase the risk of family conflicts and create difficulties in maintaining an emotional connection with the partner or responding sensitively to the baby's needs. Such circumstances further intensify emotional stress and may negatively affect the woman's overall psychological condition.

The impact of sleep deprivation on emotion regulation becomes particularly intensified when other risk factors coexist, such as lack of social support, previous mental health disorders, financial difficulties, or a complicated childbirth experience. In such cases, the woman's ability to adapt to postpartum changes becomes even more impaired. Studies show that difficulties in emotion regulation are more common among women who experience both emotional and physical tension over a prolonged period (Niu et al., 2025).

In clinical practice, it is important to assess not only the woman's emotional state but also her sleep quality and rest patterns. Specialists should inquire about sleep duration, difficulties falling asleep, nighttime awakenings, and subjective rest quality. Early identification of sleep disturbances may help reduce difficulties in emotion regulation and prevent the development of more severe mental health problems. Strengthening emotional support, ensuring opportunities for rest, and providing psychological assistance may improve women's emotional well-being and their ability to adapt to the challenges of motherhood.

Cortisol and Stress Response. Cortisol is one of the most important stress hormones, having a significant impact on a person's emotional state, physiological adaptation, and mental health. During the postpartum period, a woman's body undergoes intensive hormonal, physiological, and psychological changes, making stress regulation systems particularly sensitive. Sleep deprivation, emotional tension, new responsibilities, and constant vigilance may disrupt normal cortisol secretion and trigger a prolonged stress response in the body. Studies show that disrupted cortisol regulation is closely associated with increased anxiety, emotional sensitivity, and psychological exhaustion during the postpartum period (Mbiyzenyuy, Qulu, 2024).

Cortisol is produced through activation of the hypothalamic–pituitary–adrenal axis, which is the body's primary stress regulation system. Under stress, the body begins to release more cortisol in

order to mobilize energy resources and adapt to challenging situations. A short-term stress response is physiologically beneficial; however, long-term or constantly recurring stress may disrupt hormonal balance and negatively affect emotional well-being. During the postpartum period, this system becomes highly sensitive due to hormonal changes, sleep deprivation, and increased emotional burden. Studies reveal that women experiencing intense postpartum anxiety more often demonstrate altered cortisol secretion patterns (Ladyman et al., 2022).

Sleep deprivation is one of the main factors contributing to increased cortisol concentration in the body. Insufficient rest activates the sympathetic nervous system and keeps the body in a constant state of alertness. As a result, women may experience persistent tension, irritability, inner restlessness, and difficulties relaxing even when no objective threat is present. Research shows that sleep disturbances after childbirth are significantly associated with increased physiological stress responses and greater emotional vulnerability (Kaliush et al., 2025).

Elevated cortisol levels also have a direct impact on emotion regulation. Long-term activation of stress hormones may disrupt the functioning of brain regions responsible for emotional stability and rational evaluation of situations. Consequently, women become more sensitive to negative stimuli, have greater difficulty controlling emotional reactions, and more frequently experience anxiety symptoms. Scientific studies indicate that prolonged stress responses may promote constant vigilance, intrusive thoughts, and excessive concern about the baby's safety and health (Hunter et al., 2018).

During the postpartum period, the stress response is often intensified by a constant sense of responsibility and the need to remain continuously prepared to respond to the baby's needs. Women may feel unable to fully relax even during sleep because they remain alert to possible infant needs or dangers. Such prolonged physiological activation impairs the body's recovery, increases fatigue, and reduces psychological resilience. Studies show that a persistently activated stress system may be associated with a higher risk of postpartum anxiety and depression (Guarneri et al., 2025).

Changes in cortisol levels and stress responses may affect not only the mother's emotional state but also the relationship between mother and infant. Emotionally tense women more frequently experience difficulties responding sensitively to infant cues, have greater difficulty relaxing while interacting with the baby, and more often feel emotionally exhausted. Such a condition may influence the formation of early emotional bonding and the overall emotional climate within the family. Researchers emphasize that long-term stress and impaired emotional well-being may affect both maternal and infant well-being (Eugene, Masiak, 2015).

It is important to note that the intensity of stress responses may also be influenced by additional psychosocial factors, such as lack of social support, financial difficulties, family conflicts, or previous mental health disorders. Women who lack opportunities to rest or receive emotional

support are more likely to remain in a constant state of tension. As a result, their bodies maintain an activated stress response for a longer period, which further increases the risk of emotional disorders.

In clinical practice, it is important to assess not only women's emotional symptoms but also physiological signs of stress, including persistent fatigue, sleep disturbances, irritability, emotional sensitivity, and difficulties relaxing. Early recognition of stress responses and provision of support may reduce the long-term negative impact on women's mental health. Strengthening emotional support, improving rest routines, providing psychological assistance, and encouraging partner involvement are important measures for reducing physiological and emotional tension during the postpartum period.

Neurobiological Mechanisms. The associations between sleep quality and postpartum anxiety are closely related to various neurobiological mechanisms that regulate emotions, stress responses, and psychological adaptation. During the postpartum period, significant hormonal and neurological changes occur in a woman's body, affecting the functioning of the central nervous system. Sleep deprivation, hormonal fluctuations, and constant emotional vigilance may disrupt the functioning of brain structures responsible for emotional stability and increase the risk of anxiety symptoms. Studies show that neurobiological changes after childbirth are closely associated with difficulties in emotion regulation and increased sensitivity to stress (Choi et al., 2005).

One of the most important neurobiological mechanisms involves changes in the activity of the hypothalamic–pituitary–adrenal axis. This system regulates the body's response to stress and cortisol release. During the postpartum period, due to hormonal changes and sleep deprivation, this system becomes more sensitive, meaning that even minor stressors may trigger stronger physiological reactions. A persistently activated stress system increases emotional sensitivity, anxiety, and difficulties regulating emotions. Studies reveal that women experiencing postpartum anxiety more often exhibit altered cortisol secretion rhythms and greater physiological reactivity to stress (Astbury et al., 2025).

Changes in neurotransmitter systems also play an important role. Serotonin, dopamine, and gamma-aminobutyric acid are the primary neurotransmitters regulating emotional state, motivation, and anxiety responses. Sleep deprivation may disrupt the balance of these neurotransmitters, leading to increased irritability, emotional instability, and anxiety symptoms. Reduced serotonin levels are often associated with poorer mood and emotional sensitivity, while altered dopamine activity may decrease motivation and feelings of satisfaction. Studies indicate that impaired neurotransmitter functioning is an important part of the neurobiological basis of perinatal emotional disorders (Arab et al., 2025).

From a neurobiological perspective, amygdala activity is also highly important. The amygdala is responsible for regulating emotional reactions, particularly the perception of fear and threat. Sleep

deprivation increases amygdala activity and sensitivity to negative stimuli, making women more emotionally reactive and sensitive to stress. At the same time, the ability of the prefrontal cortex to suppress excessive emotional responses decreases. As a result, during the postpartum period, even minor daily situations may be perceived as threatening or difficult to control. Studies emphasize that impaired interaction between the amygdala and the prefrontal cortex is one of the most important neurobiological pathways of anxiety (Chauhan, Tadi, 2022).

During the postpartum period, the oxytocin system also plays a significant role. Oxytocin is a hormone associated with emotional attachment, social bonding, and stress reduction. It is important for the emotional bond between mother and infant, the breastfeeding process, and the woman's ability to feel emotionally secure. However, constant stress, sleep deprivation, and emotional tension may disrupt the functioning of the oxytocin system. Studies show that women experiencing postpartum anxiety or depression may exhibit lower oxytocin activity, which may complicate the formation of emotional bonding with the infant (Erkal Aksoy et al., 2025).

Neurobiological changes are also related to neuroplasticity processes. After childbirth, the female brain adapts to the maternal role, and changes occur in brain regions responsible for empathy, emotional sensitivity, and infant care. However, prolonged stress and sleep deprivation may negatively affect these adaptive processes. Studies indicate that persistent emotional stress may reduce the brain's ability to adapt to new circumstances and increase the risk of emotional disorders (Griffith et al., 2024).

It is important to note that neurobiological mechanisms interact with psychological and social factors. Lack of social support, family conflicts, financial difficulties, or previous mental health disorders may intensify biological sensitivity to stress and further complicate emotional adaptation after childbirth. For this reason, the origin of postpartum anxiety is considered multifactorial, involving both biological and psychosocial processes.

In clinical practice, understanding neurobiological mechanisms is important for the early recognition of the risk of emotional disorders and the application of appropriate support. Improving sleep quality, reducing stress, providing emotional support, and offering timely psychological assistance may positively influence neurobiological processes and reduce postpartum anxiety symptoms. Early interventions not only improve women's emotional well-being but also reduce the long-term negative impact on maternal and infant well-being.

4.2. Analysis of Scientific Research on the Relationship Between Sleep Quality and Postpartum Anxiety

Results of Recent Studies. Recent scientific studies increasingly emphasize that sleep quality

is one of the most significant factors associated with the onset and course of postpartum anxiety. Although sleep disturbances after childbirth have long been regarded as a natural part of motherhood, recent research shows that poor sleep may have a significant impact on women's emotional health, psychological resilience, and ability to adapt to the changes of motherhood. In scientific literature, sleep quality is increasingly analyzed not only as a consequence of postpartum anxiety but also as an important risk factor and prognostic indicator (Horwitz et al., 2026).

One of the most important aspects of contemporary research is the assessment of sleep quality as a complex phenomenon. Researchers note that sleep quality is determined not only by the total number of sleep hours but also by sleep fragmentation, difficulties falling asleep, the frequency of nighttime awakenings, subjective evaluation of rest, and daytime sleepiness. During the postpartum period, women often sleep in short intervals; therefore, even sufficient total sleep duration does not necessarily ensure quality rest. Scientific studies show that fragmented and non-restorative sleep is most strongly associated with emotional difficulties and increased anxiety levels (Kay et al., 2024).

Recent study findings reveal that sleep disturbances after childbirth are highly prevalent. Kwon et al. (2024) found that more than half of the women studied during the postpartum period reported poor sleep quality, while significant insomnia symptoms were identified in approximately one fifth of women. The study authors noted that poor sleep quality was significantly associated with higher anxiety and depression scores. These results suggest that sleep problems after childbirth are not merely a temporary physiological inconvenience but an important mental health risk factor.

Studies also emphasize that sleep quality has prognostic significance. Masaki et al. (2025) found that women who reported poor sleep quality during pregnancy more frequently experienced emotional difficulties after childbirth, particularly anxiety symptoms. This association remained significant even when other psychological and social risk factors were considered. Such findings indicate that sleep problems may begin during pregnancy and become an important predictor of postpartum emotional well-being.

An important direction in scientific research is the analysis of bidirectional associations between sleep and anxiety. Researchers emphasize that poor sleep increases emotional sensitivity, weakens emotion regulation, and reduces the ability to adapt to stressful situations. Meanwhile, anxiety itself makes it harder to fall asleep, increases the frequency of nighttime awakenings, and prevents women from obtaining quality rest. For this reason, a vicious cycle develops in which sleep disturbances and anxiety symptoms reinforce each other. In the study by Nelson et al. (2022), it was found that women who had poorer sleep quality during pregnancy more often experienced longer-lasting anxiety symptoms after childbirth.

Recent studies also highlight the biological mechanisms explaining this association. Sleep deprivation activates stress regulation systems, increases cortisol concentration, and keeps the body

in a constant state of alertness. Such physiological tension negatively affects emotion regulation, increases sensitivity to stress, and impairs psychological recovery. The scientific literature notes that women who experience long-term sleep deprivation after childbirth more frequently experience persistent inner restlessness, emotional exhaustion, and intrusive thoughts about the baby's safety (Rivkees, 2003).

Research findings show that not only objective sleep indicators but also women's subjective evaluation of their sleep are of particular importance. Some women, even when sleeping a similar number of hours as others, feel considerably more tired and emotionally exhausted. This indicates that emotional health depends not only on the quantity of sleep but also on the quality of rest and the feeling of bodily recovery. Researchers emphasize that subjectively poor sleep evaluation is often a stronger predictor of anxiety than actual sleep duration (Smith, Forrester, 2021).

Scientific studies also analyze the influence of additional factors on the relationship between sleep quality and postpartum anxiety. Lack of social support, limited partner involvement in infant care, breastfeeding difficulties, infant sleep problems, financial insecurity, and previous mental health disorders may intensify both sleep disturbances and emotional difficulties. In such cases, women often lack opportunities for quality rest, which over time increases the risk of emotional exhaustion and anxiety. Studies note that social support and the ability to share responsibilities significantly reduce the negative impact of sleep deprivation on emotional health (Tononi et al., 2024).

An important research direction is the analysis of the impact of improving sleep quality on emotional health. Scientific evidence shows that interventions focused on sleep hygiene, rest organization, partner involvement, and emotional support may reduce the intensity of postpartum anxiety symptoms. Studies emphasize that even a small improvement in sleep quality may have a positive effect on women's emotional state, ability to regulate emotions, and psychological resilience (White et al., 2023).

The analysis of recent scientific studies suggests that sleep quality is an essential component of postpartum mental health. Poor sleep not only increases the risk of postpartum anxiety but may also complicate its course and prolong the duration of symptoms. For this reason, the assessment of sleep quality should be an integral part of postpartum care, while emotional support strategies should include not only psychological assistance but also practical measures aimed at improving women's rest and recovery.

Correlational Relationships. Scientific research increasingly analyzes the correlational relationships between sleep quality and postpartum anxiety symptoms. Study findings show that there is a statistically significant association between poor sleep quality, sleep deprivation, insomnia symptoms, and increased anxiety levels during the postpartum period. Many studies have found that as sleep quality worsens, symptoms of emotional distress, persistent anxiousness, irritability, and

emotional exhaustion increase. These findings suggest that sleep quality is closely related to women's emotional state after childbirth (Zelčāne et al., 2026).

Correlational studies reveal that one of the strongest associations is found between subjectively poor sleep evaluation and the intensity of postpartum anxiety symptoms. Women who evaluate their sleep as insufficient or non-restorative more frequently experience increased emotional sensitivity, tension, and constant vigilance. Studies indicate that the subjective feeling of fatigue and lack of rest may be a more significant predictor of anxiety than objective sleep duration. This suggests that emotional well-being depends not only on sleep duration but also on how women perceive the quality of their rest (Wu, Jin, 2025).

Scientific studies frequently identify moderate to strong positive correlational relationships between insomnia symptoms and postpartum anxiety. In the study by Okun et al. (2023), women who experienced pronounced insomnia symptoms after childbirth more often demonstrated higher anxiety scores. The study results showed that more severe difficulties falling asleep and more frequent nighttime awakenings were associated with more intense emotional reactions and greater psychological distress.

Correlational relationships are also observed between sleep fragmentation and difficulties in emotion regulation. Studies have found that women who frequently awaken at night due to infant care more often experience emotional irritability, reduced stress resilience, and persistent emotional fatigue. These women also more frequently report difficulties concentrating, emotional instability, and intrusive thoughts about the baby's safety. Researchers note that fragmented sleep is directly associated with poorer emotion regulation and higher levels of anxiety symptoms (Weiss, Xu, 2024).

Scientific studies also reveal significant correlations between daytime sleepiness and postpartum anxiety. Persistent fatigue and lack of energy reduce women's ability to adapt to everyday challenges and increase emotional vulnerability. Studies have found that women who feel constantly tired during the day more often experience increased inner restlessness, emotional sensitivity, and difficulties managing stress. Such findings suggest that not only nighttime sleep but also the overall level of bodily recovery has a significant impact on emotional well-being after childbirth (Tomaso et al., 2021).

Correlational relationships are also identified between sleep quality and other mental health indicators. Research shows that poor sleep is often associated not only with anxiety but also with depressive symptoms, emotional exhaustion, and reduced quality of life. This indicates that sleep problems may serve as a general indicator of emotional vulnerability. For this reason, scientific literature increasingly emphasizes the need to assess sleep quality as one of the most important components of postpartum mental health (Slomian et al., 2019).

When analyzing correlational relationships, it is important to note that sleep quality and

postpartum anxiety often influence each other bidirectionally. Poor sleep increases emotional sensitivity, while heightened anxiety further worsens sleep quality. Over time, this bidirectional interaction may create a vicious cycle in which both emotional symptoms and sleep problems continuously intensify. Studies indicate that women who simultaneously experience significant sleep disturbances and anxiety symptoms are more likely to face long-term psychological difficulties (Protogerou et al., 2024).

Correlational relationships between sleep quality and postpartum anxiety are often strengthened by additional risk factors. Lack of social support, limited partner involvement, complicated childbirth, financial difficulties, or previous mental health disorders may further worsen sleep quality and increase the risk of emotional difficulties. In such cases, sleep problems become not only a physiological but also a psychosocial phenomenon with a significant impact on women's emotional condition.

The analysis of scientific studies suggests that there is a consistent and statistically significant relationship between poor sleep quality and postpartum anxiety symptoms. These associations confirm that sleep quality assessment should be an important part of postpartum care, allowing early identification of the risk of emotional difficulties and timely provision of support for women after childbirth.

Increased Risk Associated with Poor Sleep Quality. Scientific studies show that poor sleep quality is one of the most important factors increasing the risk of developing postpartum anxiety. During the postpartum period, a woman's body experiences significant physical and emotional burden; therefore, quality sleep becomes extremely important for maintaining emotional stability and psychological resilience. When sleep becomes fragmented, insufficient, or no longer restorative, sensitivity to stress increases, emotion regulation weakens, and the likelihood of developing anxiety symptoms rises. Studies indicate that women who experience persistent sleep disturbances after childbirth are significantly more likely to face emotional difficulties than those whose sleep quality remains better (Nagel et al., 2022).

One of the most important aspects is that the risk increases not only because of reduced sleep duration but also because of worsening sleep structure. Frequent nighttime awakenings, difficulties falling asleep, shallow sleep, and inability to relax even during sleep reduce the body's ability to recover physiologically and psychologically. Studies show that women who report poor sleep quality during the first weeks after childbirth are more likely to later experience more intense postpartum anxiety symptoms (Marjot et al., 2021).

The increased risk can be explained by several biological mechanisms. Poor sleep activates stress regulation systems and increases cortisol concentration in the body. Due to prolonged physiological tension, women become more sensitive to emotional stimuli, have greater difficulty

controlling anxiety reactions, and more frequently experience persistent inner restlessness. Sleep deprivation also reduces prefrontal cortex activity and weakens the ability to rationally evaluate situations, causing even minor daily difficulties to be perceived as significant stressors. Studies emphasize that prolonged sleep deprivation is directly associated with greater emotional vulnerability and a higher risk of anxiety symptoms (Kumarasinghe et al., 2024).

Scientific studies also reveal that poor sleep quality may function as an early prognostic indicator of postpartum anxiety. Women who complain of sleep problems during pregnancy or the early postpartum period are more likely to later experience prolonged emotional difficulties. Kaczmarek et al. (2025) found that poorer sleep quality during pregnancy was associated with a higher likelihood of developing postpartum anxiety symptoms after childbirth. This suggests that sleep problems may emerge before pronounced emotional symptoms and may help identify women at increased risk.

The risk increases particularly when poor sleep quality is combined with other psychosocial and biological risk factors. Lack of social support, limited partner involvement in infant care, previous mental health disorders, financial difficulties, or a complicated childbirth experience may further worsen sleep quality and intensify emotional vulnerability. In such situations, women often no longer have sufficient internal and external resources for psychological recovery, making the risk of postpartum anxiety even greater (Hooper et al., 2022).

Studies indicate that long-term poor sleep quality is of particular importance. Short-term sleep disturbances are quite common after childbirth; however, if they persist for several weeks or months, the likelihood of chronic emotional stress and mental health disorders increases. Women who experience prolonged sleep deprivation more frequently suffer from emotional exhaustion, irritability, reduced self-confidence, and constant concern about the baby's health. Such symptoms may gradually progress into more severe postpartum anxiety or depression (Gotlib et al., 2009).

The scientific literature also emphasizes that poor sleep quality negatively affects women's ability to adapt to the maternal role. Persistent fatigue reduces emotional resilience, weakens concentration, complicates decision-making, and increases sensitivity to criticism or failure. As a result, women more often begin to doubt their ability to properly care for the baby and experience guilt and emotional insecurity. Studies show that mothers who experience significant sleep disturbances after childbirth more frequently demonstrate lower maternal confidence and more intense anxiety symptoms (Duran, Vural, 2023). In clinical practice, poor sleep quality should be assessed as an important indicator of emotional risk. Specialists should actively inquire about women's sleep quality, opportunities for rest, nighttime awakenings, and subjective fatigue levels. Early recognition of sleep problems may help provide timely emotional and practical support and reduce the likelihood of developing postpartum anxiety. Partner involvement, improvement of rest routines,

sleep hygiene recommendations, and emotional support are considered important preventive measures.

The analysis of scientific studies suggests that poor sleep quality is not merely an inconvenience of the postpartum period but a significant mental health risk factor. Prolonged sleep deprivation weakens emotional stability, increases sensitivity to stress, and significantly raises the risk of the development and persistence of postpartum anxiety symptoms.

Comparisons of Studies from Different Countries. The associations between sleep quality and postpartum anxiety are analyzed in various countries around the world; however, scientific studies show that the prevalence, intensity, and risk factors of these phenomena may differ depending on the social, cultural, and healthcare context. Comparisons of studies conducted in different countries allow a better understanding of how economic conditions, family models, maternity policies, social support systems, and cultural attitudes toward motherhood may influence women's sleep quality and emotional well-being after childbirth. Despite cultural differences, most studies confirm a common tendency – poor sleep quality is significantly associated with increased levels of postpartum anxiety across different countries worldwide (Chattu et al., 2019).

Studies conducted in European countries most often emphasize the importance of social support and family policy for women's emotional health after childbirth. In Scandinavian countries, where mothers are provided with longer maternity leave, greater partner involvement in infant care, and broader opportunities for psychological support, women more often report better emotional well-being and lower psychological distress. Nevertheless, even in these countries, sleep disturbances after childbirth remain a common problem. In a longitudinal study, Arab et al. (2025) found that women's sleep quality significantly worsened after childbirth, and long-term sleep disturbances were associated with greater emotional vulnerability and anxiety symptoms.

In the United Kingdom and other Western European countries, studies emphasize the impact of emotional pressure and perfectionistic expectations of motherhood. Women often face societal pressure to “successfully” balance motherhood, professional life, and emotional stability. Such expectations may increase emotional exhaustion and worsen sleep quality. Studies by British researchers show that women who experience greater emotional pressure and social judgment after childbirth more frequently experience insomnia symptoms and increased anxiety (Al-Mutawtah et al., 2023).

Studies conducted in the United States frequently emphasize the strong influence of social and economic factors. Research shows that women with limited financial resources, lower access to healthcare, or weaker social networks more often experience sleep disturbances and emotional difficulties after childbirth. American studies also highlight the influence of racial and social disparities on women's emotional well-being. In the study by Chasens et al. (2021), poor sleep quality

during the postpartum period in the United States significantly predicted higher anxiety and depression scores regardless of other demographic factors.

Studies conducted in Asian countries often reveal the influence of cultural traditions on the postpartum period. In some cultures, women are provided with a longer postpartum rest period, and older family members actively participate in infant care, giving women more opportunities for physical and emotional recovery. However, in other Asian countries, women may experience strong pressure to meet traditional motherhood standards, while the expression of emotional difficulties may be stigmatized. Studies conducted in China and South Korea show that women who lack sufficient family support after childbirth or experience family conflicts more frequently face sleep disturbances and increased postpartum anxiety (Dorsey et al., 2021).

Studies conducted in Australia pay particular attention to women's emotional resilience and social support. Research indicates that women who receive greater support from partners and the community adapt better to postpartum sleep changes and less frequently experience long-term emotional stress. In a systematic review including studies from Australia, Europe, and North America, Goodman et al. (2011) found that poor sleep quality is one of the most frequently mentioned risk factors for postpartum anxiety regardless of country or cultural context.

Comparisons of studies also show that in countries where postpartum mental health is more actively integrated into the healthcare system, women more often receive timely support and emotional difficulties are identified earlier. Meanwhile, in countries where mental health problems are stigmatized or psychological support is less accessible, women more frequently remain without support and experience emotional symptoms for longer periods. For this reason, cultural and organizational differences in healthcare systems may have a direct impact on the course of postpartum anxiety and its associations with sleep quality.

It is important to note that despite cultural differences, most studies present similar conclusions: poor sleep is significantly associated with greater emotional vulnerability, anxiety symptoms, and more difficult adaptation to motherhood. This suggests that the biological mechanisms of sleep and emotion regulation are universal, although their intensity may be modified by the social environment, cultural expectations, and accessibility of healthcare services.

The analysis of studies from different countries also demonstrates that the most effective prevention of postpartum anxiety is comprehensive and includes not only medical assistance but also

social support, partner involvement, maternity policies, and access to emotional support. These measures may improve women's sleep quality, reduce emotional tension, and protect against long-term mental health difficulties after childbirth.

4.3. Early Prevention and Support Opportunities

Sleep Hygiene. Sleep hygiene is one of the most important early prevention measures to help to reduce the risk of postpartum anxiety and improve women's emotional well-being after childbirth. During the postpartum period, sleep quality often deteriorates due to infant care, hormonal changes, emotional vigilance, and increased stress levels. Although it is usually impossible to completely avoid sleep disturbances after childbirth, appropriate sleep hygiene principles may help reduce the risk of persistent fatigue, emotional exhaustion, and anxiety symptoms. Scientific studies show that women who follow sleep hygiene recommendations and have opportunities for regular rest more often demonstrate better emotional well-being and lower psychological distress (Hirotsu et al., 2015).

Sleep hygiene includes various behavioral and environmental measures aimed at improving sleep quality and bodily recovery. One of the most important principles is the opportunity to sleep when the baby sleeps. Although many women use this time for household chores or other responsibilities, studies show that short daytime rest may significantly reduce fatigue and improve emotional resilience. Regular rest helps reduce physiological tension and decreases the body's sensitivity to stress (Hirshkowitz et al., 2015).

An important part of sleep hygiene is also the establishment of a stable rest routine. Although infant care often makes it difficult to maintain a strict schedule, consistent evening rituals, a calm environment before sleep, and the opportunity to relax even briefly may improve the quality of falling asleep. Studies indicate that even small elements of stability in the daily routine may help reduce emotional vigilance and facilitate the body's transition into a state of rest (Koutra et al., 2017).

The scientific literature also emphasizes the importance of the sleep environment. A quiet, dark, and comfortable bedroom may improve sleep quality and reduce the impact of frequent awakenings on the body. Although newborn care inevitably disrupts maternal sleep, optimizing environmental factors may reduce additional physiological stress. Studies show that women who have opportunities to rest in a calmer and less stimulating environment more often feel rested and emotionally stable (Marano, Mazza, 2026).

Partner and family involvement in infant care is also an important preventive measure. Women who are able to share nighttime infant care or temporarily step away from constant responsibility more often maintain better sleep quality and experience less emotional exhaustion. Studies show that

social support and practical assistance significantly reduce the impact of sleep deprivation on emotional health (Mughal et al., 2018). Partner involvement also reduces women's feelings of loneliness and helps them adapt more easily to the challenges of motherhood.

An important psychological aspect of sleep hygiene recommendations is the ability to let go of perfectionistic expectations. Many women after childbirth feel pressure to remain productive, properly care for the household, and meet the image of the "ideal mother." Such expectations often result in women not allowing themselves to rest even when opportunities arise. Studies show that self-criticism and constant guilt related to the need for rest may increase emotional tension and worsen sleep quality (Priel et al., 2020).

Sleep hygiene also includes stress reduction measures. Breathing exercises, relaxation methods, short relaxation rituals before sleep, or mindfulness practices may reduce emotional vigilance and improve the quality of falling asleep. Studies indicate that emotional relaxation techniques may help reduce anxiety symptoms and improve overall sleep quality during the postpartum period (Sharkey et al., 2016).

It is important to note that sleep hygiene recommendations must be realistic and adapted to women's situations. During the postpartum period, uninterrupted nighttime sleep is not always possible; therefore, the primary goal should not be "perfect sleep" but rather maximizing available rest resources. Scientific literature emphasizes that even small improvements in sleep quality may positively affect emotional well-being and reduce the risk of postpartum anxiety (Thara, Kamath, 2015).

In clinical practice, sleep hygiene should be integrated into postpartum care programs. Healthcare specialists should not only assess women's emotional condition but also actively inquire about their opportunities for rest, sleep quality, and levels of fatigue. Early recognition of sleep problems and provision of practical recommendations may help reduce emotional exhaustion and improve women's adaptation to motherhood.

Sleep hygiene is important not only for physical rest but also for psychological well-being. Better-quality sleep strengthens emotional resilience, improves emotion regulation, and reduces the risk of postpartum anxiety symptoms. For this reason, sleep hygiene principles should be considered one of the most important early prevention measures during the postpartum period.

Psychological Support. Psychological support is one of the most important early prevention and intervention measures helping to reduce postpartum anxiety symptoms, improve women's emotional well-being, and strengthen their ability to adapt to the changes of motherhood. During the postpartum period, women experience intensive physiological, emotional, and social changes; therefore, emotional support and professional assistance become particularly important. Scientific studies show that timely psychological support may reduce the intensity of anxiety symptoms,

improve sleep quality and decrease the risk of long-term mental health disorders (Weinhouse et al., 2022).

One of the most important aspects of psychological support is the early recognition of emotional difficulties. Many women perceive postpartum anxiety as a “natural part of motherhood,” and therefore delay seeking help or attempt to hide their emotional difficulties for a long time. Studies show that women often feel guilt regarding their emotional state, fear being judged as “bad mothers,” or worry that others will not understand their experiences (Wu, Jin, 2025). For this reason, it is very important to create a safe emotional environment in which women can openly talk about their well-being.

The scientific literature places particular emphasis on psychoeducation. Providing information about postpartum anxiety symptoms, their causes, and possible support methods helps women better understand their emotional condition and reduces self-blame. Studies indicate that women who receive clear information about emotional changes after childbirth are more likely to recognize their difficulties and seek help earlier (Vega-Sanz et al., 2025). Psychoeducation also helps normalize emotional experiences and reduces the stigma associated with mental health difficulties.

One of the most effective support methods is cognitive behavioral therapy. During this therapy, women are helped to recognize negative thoughts, catastrophizing, excessive worrying, and self-critical thinking, which often maintain postpartum anxiety. Studies show that cognitive behavioral therapy methods may significantly reduce anxiety symptoms, improve emotion regulation, and enhance sleep quality during the postpartum period (Sobol-Kwapińska et al., 2024). It is particularly important that this therapy may be provided both individually and remotely, making it more accessible for women who cannot regularly attend healthcare facilities due to infant care responsibilities.

Scientific studies also emphasize the importance of emotional support. Conversations with specialists, partners, or other mothers may reduce feelings of loneliness, emotional tension, and help women understand that their experiences are not unique. Research indicates that emotional support strengthens women’s psychological resilience and reduces the intensity of postpartum anxiety symptoms (Rouhi et al., 2023). For this reason, increasing attention is being paid to peer support groups and community-based support initiatives.

An important aspect of psychological support is the involvement of partners and family members. Postpartum anxiety affects not only women but also the entire family system; therefore, the understanding and emotional support of loved ones may have great significance for women’s well-being. Studies show that women who feel supported by their partners and can share responsibilities more often experience lower emotional exhaustion and better sleep quality

(Ogallar et al., 2025). Partner involvement also reduces women's feelings of loneliness and strengthens emotional security.

Psychological support is also important in addressing sleep problems. Many women after childbirth experience constant emotional vigilance, difficulties relaxing, or fear of falling asleep due to persistent concern about the baby's safety. Psychological interventions may help reduce tension, improve emotion regulation, and teach relaxation techniques. Studies indicate that reducing emotional stress positively affects sleep quality and decreases physiological stress responses (McNeilly, 1975).

In recent years, considerable attention has been devoted to remote psychological support opportunities. Online consultations, mobile applications, self-help platforms, and remote therapy methods are becoming increasingly important due to their accessibility and flexibility. Studies show that online psychological interventions may be effective in reducing postpartum anxiety and depression symptoms, especially for women who have limited access to traditional support due to geographical or social reasons (Li, 2026).

In clinical practice, it is important that psychological support be integrated into the overall postpartum care system. Healthcare specialists should actively assess women's emotional condition, inquire about sleep quality, emotional difficulties, and social environment. Early recognition of emotional problems allows timely support to be provided and reduces the risk of long-term emotional exhaustion and mental health disorders.

Psychological support is important not only for reducing postpartum anxiety symptoms but also for strengthening women's emotional security, self-confidence, and ability to adapt to motherhood. Timely emotional support may improve women's quality of life, strengthen the mother-infant bond, and reduce the risk of long-term negative consequences.

The Role of Nursing Specialists. The role of nursing specialists in the prevention, early recognition, and support of postpartum anxiety is extremely important. Nurses and midwives are often the first to notice changes in women's emotional condition, sleep disturbances, emotional exhaustion, or increased anxiety during the postpartum period. Due to their continuous contact with women and their families, nursing specialists have the opportunity not only to monitor physical health conditions but also to assess emotional well-being, adaptation to motherhood, and the relationship between mother and infant. Scientific studies show that early recognition of emotional difficulties and timely involvement of nursing specialists may reduce the intensity of postpartum anxiety symptoms and improve women's emotional well-being (Kawashima et al., 2022).

One of the most important tasks of nursing specialists is monitoring emotional condition and assessing risk factors. During the postpartum period, it is important to pay attention to women's sleep quality, fatigue, emotional sensitivity, mood fluctuations, increased vigilance, or persistent concern

about the baby's health. Nurses have the opportunity to identify emotional difficulties early, even before pronounced postpartum anxiety or depression develops. Studies indicate that systematic assessment of emotional condition helps identify women who require additional support more quickly (Hwang et al., 2022).

The role of nursing specialists is also important in providing psychoeducation. Many women after childbirth lack sufficient information about possible emotional changes and therefore often perceive their experiences as personal weakness or inability to adapt to motherhood. Nurses may provide clear information about postpartum anxiety symptoms, the importance of sleep for emotional health, available support methods, and normalization of emotional difficulties. Studies show that providing information reduces women's fear and increases the likelihood of seeking support at an early stage (Handa et al., 2024).

An important function of nursing specialists is providing emotional support. During the postpartum period, women often feel emotionally vulnerable, lonely, or misunderstood. Empathetic communication, active listening, and emotional support may help reduce anxiety symptoms and strengthen women's emotional security. Research indicates that women who experience respectful and supportive relationships with healthcare specialists are more likely to openly discuss their emotional difficulties and accept support more easily (García-Plata, Garcia-Molina, 2025).

Assessment of sleep quality is also an important part of nursing specialists' responsibilities. Nurses should inquire not only about the baby's rest but also about the mother's sleep – asking about sleep duration, difficulties falling asleep, nighttime awakenings, daytime fatigue, and opportunities for rest. Studies indicate that poor sleep quality is one of the most important risk factors for postpartum anxiety; therefore, early recognition of sleep problems allows preventive measures to be implemented more quickly (Creti et al., 2017).

Nursing specialists may also encourage practical support measures that help reduce emotional burden. They may recommend ways to organize rest routines, encourage partner involvement in infant care, emphasize the importance of daytime rest, and suggest sources of emotional support. Such recommendations help women better understand their own needs and reduce the pressure to manage everything independently. Studies show that practical support and ensuring opportunities for rest significantly reduce the risk of emotional exhaustion and anxiety (Bai et al., 2020).

An important role of nursing specialists is also collaboration with other healthcare professionals. When more severe emotional difficulties or long-term sleep disturbances are observed, nurses may refer women for consultations with psychologists, psychiatrists, or family physicians. Interdisciplinary collaboration allows comprehensive support to be ensured and reduces the risk that emotional difficulties will remain unnoticed. Scientific literature emphasizes that the most effective support during the postpartum period is based on the principle of teamwork (Abdul Jafar et al., 2021).

Nursing specialists also play an important role in reducing the stigma surrounding mental health. Women often avoid discussing their emotional difficulties because of fear of being misunderstood or negatively judged. Nurses who actively encourage open conversations about emotional well-being and normalize the need for support may help women feel safer and more confident in seeking help. Studies show that a supportive and non-stigmatizing environment is one of the most important factors for the early diagnosis of emotional problems (Aboushaar, Serrano, 2024).

In clinical practice, it is particularly important that nursing specialists possess sufficient knowledge about postpartum anxiety, its risk factors, and available support opportunities. Continuous professional education and strengthening of mental health competencies help ensure higher-quality support for women after childbirth. Studies indicate that specialists' preparedness and ability to recognize emotional difficulties are directly associated with better mental health outcomes for women (Abuhammad et al., 2024).

The role of nursing specialists during the postpartum period includes not only physical healthcare but also strengthening emotional well-being, assessing sleep quality, providing psychoeducation, and offering emotional support. Early and empathetic involvement of specialists may help reduce postpartum anxiety symptoms, improve women's adaptation to motherhood, and ensure better emotional well-being for both mother and infant.

Early Risk Identification. Early identification of the risk of postpartum anxiety is one of the most important conditions for prevention and timely support. Postpartum anxiety often develops gradually; therefore, early symptoms may go unnoticed or be considered a "normal" adaptation to motherhood. However, scientific studies show that timely identification of emotional difficulties may reduce symptom intensity, improve women's emotional well-being, and decrease the risk of long-term mental health disorders (Bayram Değer, 2025). For this reason, during the postpartum period it is important to actively assess not only women's physical but also emotional condition.

Early risk identification is primarily based on the recognition of risk factors. Studies show that women who previously experienced anxiety or depressive disorders, underwent severe stress during pregnancy, lack sufficient social support, or experience long-term sleep disturbances are at greater risk of postpartum anxiety (Dadzie et al., 2025). The risk is also increased by complicated childbirth experiences, financial difficulties, family conflicts, low self-confidence, and first childbirth. Assessment of these factors allows specialists to identify early those women who may require additional emotional support.

One of the most important early signs is deterioration in sleep quality. Scientific studies show that poor sleep quality often appears before pronounced postpartum anxiety symptoms and may serve as important early indicator of emotional difficulties (Georgescu et al., 2021). Women may complain of difficulties falling asleep even when the baby is sleeping, frequent awakenings, constant vigilance,

or inability to relax. Such symptoms may indicate not only physical fatigue but also increasing emotional anxiety.

Observation of emotional symptoms is also important for early risk identification. Women experiencing postpartum anxiety often feel constant concern about the baby's health, excessive responsibility, fear of making mistakes, or persistent inner restlessness. Studies indicate that emotional sensitivity, irritability, intrusive thoughts, and difficulties relaxing may be among the first signs of postpartum anxiety (Harvey et al., 2008). These symptoms often emerge even before pronounced emotional exhaustion or depression develops.

The scientific literature emphasizes that women do not always recognize their own emotional difficulties. Some tend to believe that anxiety is an inevitable part of motherhood or that they must cope with emotional difficulties independently. Studies show that due to stigma and feelings of guilt, women often avoid talking about their emotional condition and do not seek support even when experiencing significant symptoms (Khayamim et al., 2016). For this reason, active interest from specialists in women's emotional well-being becomes especially important.

Early risk identification is closely related to systematic assessment of emotional condition within the healthcare system. Research indicates that regular conversations about emotional well-being, the use of standardized questionnaires, and consistent risk assessment allow earlier identification of women who require support (Medic et al., 2017). When assessing emotional condition, it is important to inquire not only about mood but also about sleep quality, emotional sensitivity, family relationships, anxious thoughts, and women's adaptation to motherhood.

An important part of early prevention is also the involvement of family members and partners. Loved ones are often the first to notice changes in women's emotional condition – increased irritability, fatigue, emotional withdrawal, or persistent worry. Studies show that partner support and the ability to recognize emotional difficulties may help women seek support earlier and reduce the risk of long-term mental health problems (Ojomo et al., 2025).

The scientific literature also emphasizes the importance of community-based and remote support. Online well-being monitoring tools, remote consultations, and emotional support platforms may help identify early those women who, due to geographical, social, or psychological reasons, do not seek traditional support. Studies indicate that digital emotional health tools may improve early diagnosis of emotional difficulties and increase accessibility of support (Rupanagunta et al., 2023).

In clinical practice, early risk identification should be integrated into routine postpartum care services. Healthcare specialists should systematically assess women's emotional condition, sleep quality, social environment, and psychological adaptation to motherhood. Early identification of emotional difficulties allows support measures to be implemented more quickly, reduces the risk of emotional exhaustion, and improves the well-being of both mother and infant.

Early identification of the risk of postpartum anxiety is an important prevention strategy that enables timely emotional support and helps prevent long-term negative consequences. Timely involvement of specialists, family, and the community may help women feel safer, reduce emotional tension, and strengthen their ability to adapt to the challenges of motherhood.

Family and Community Support. Family and community support is one of the most important protective factors reducing the risk of postpartum anxiety and helping women adapt to the changes of motherhood. During the postpartum period, women face intensive physical, emotional, and social challenges; therefore, emotional security, practical assistance, and a supportive social network become especially important. Scientific studies show that women who feel supported by their partners, families, or communities more often demonstrate better emotional well-being, lower emotional exhaustion, and less frequently experience pronounced postpartum anxiety symptoms (Sosso et al., 2023).

Partner support is considered one of the most significant factors of emotional well-being after childbirth. Studies indicate that women who experience emotional understanding, respect, and practical support from their partners adapt more easily to the maternal role and less frequently experience long-term emotional stress. Partner involvement in infant care, assistance during the night, and the ability to listen to women's emotional experiences help reduce fatigue and strengthen emotional security. Scientific studies reveal that poorer relationship quality and lack of partner support are significantly associated with higher levels of postpartum anxiety and depression symptoms (Verde et al., 2022).

Support from family members also has great importance for women's emotional well-being. Practical assistance in caring for the baby, household tasks, or providing opportunities for rest may reduce physical and emotional burden. Studies show that women who are able to share responsibilities with loved ones more often maintain better sleep quality and lower emotional exhaustion (Zelčāne et al., 2026). In addition to practical assistance, emotional support is also important – understanding, encouragement, and a safe environment for discussing emotional difficulties.

Scientific studies emphasize that social isolation is one of the most important risk factors for postpartum anxiety. Women who feel lonely or lack someone with whom they can share their emotional experiences more often experience stronger anxiety, emotional sensitivity, and inner tension. During the postpartum period, it is particularly important to feel that emotional difficulties are understood and accepted without criticism or devaluation. Studies indicate that lack of social connection is directly associated with poorer mental health after childbirth (Surprised et al., 2025).

Community support is becoming an increasingly important form of assistance. Peer support groups, mothers' communities, emotional support organizations, and online platforms may help women reduce feelings of loneliness and receive emotional support. Studies show that

communication with other mothers helps normalize emotional experiences and reduces self-criticism and feelings of guilt (Dennis et al., 2017). Women often find it easier to talk about their emotional condition when communicating with other mothers who have experienced similar situations.

Community support is also important in reducing the stigma surrounding mental health. When emotional difficulties after childbirth are openly discussed in society, women are more likely to recognize their symptoms and seek support earlier. Studies indicate that societal understanding of postpartum mental health may have a direct impact on the accessibility of support and the early identification of emotional difficulties (Spaeth et al., 2021).

An important part of family and community support is assistance in ensuring women's rest and sleep quality. Support from partners or relatives in caring for the baby provides women with opportunities to relax and recover physically, even for short periods. Studies show that women who have greater opportunities for rest and practical assistance more often demonstrate better emotional well-being and lower intensity of anxiety symptoms (Saharoy et al., 2023).

The scientific literature also emphasizes the importance of cultural differences in family support. In some cultures, women receive greater attention during the postpartum period, older family members become more actively involved, and mothers have more opportunities to rest and recover. Meanwhile, in individualistic societies, women more often face pressure to quickly return to their usual life routine, resulting in greater emotional and physical burden. Studies indicate that cultural traditions and the social environment may significantly affect women's emotional well-being after childbirth (Okun et al., 2018).

In clinical practice, it is important to view family and community support as an important preventive measure. Healthcare specialists should encourage partner involvement, inform relatives about the signs of emotional difficulties, and help women identify possible sources of support. It is also important to encourage women to actively use community support resources and not be afraid to ask for help.

Family and community support is a significant protective factor helping to reduce the risk of postpartum anxiety, improve women's emotional well-being, and strengthen their adaptation to motherhood. Emotional security, practical assistance, and social support may have long-term positive effects on the well-being of both mother and infant.

5. THE ROLE OF NURSING AND HEALTHCARE SPECIALISTS IN IMPROVING WOMEN’S SLEEP QUALITY AND REDUCING POSTPARTUM ANXIETY

5.1. Organization of Postpartum Care

The organization of postpartum care is one of the most important areas of the healthcare system, having a direct impact on women’s physical, emotional, and psychological well-being after childbirth. During the postpartum period, women experience significant biological, emotional, and social changes; therefore, high-quality and continuous care becomes important not only for the prevention of physical complications but also for strengthening mental health. Scientific studies show that properly organized postpartum care may help in the early identification of sleep disturbances, emotional difficulties, and reduction of postpartum anxiety risk (Medina, Magnuson, 2009).

In contemporary healthcare practice, postpartum care is increasingly perceived as a comprehensive process that includes not only monitoring women’s physical condition but also assessing emotional well-being, analyzing sleep quality, evaluating the social environment, and providing psychological support. Studies indicate that women after childbirth often feel emotionally vulnerable; therefore, medical care alone is insufficient to ensure overall well-being (Lim et al., 2023). For this reason, postpartum care should be based on a biopsychosocial approach.

One of the most important aspects of postpartum care is the early assessment of emotional condition. Scientific studies show that most women experience the first symptoms of postpartum anxiety during the first weeks after childbirth, yet emotional difficulties often remain unnoticed or underestimated. Healthcare specialists should systematically assess women’s emotional well-being, sleep quality, fatigue levels, anxiety symptoms, and adaptation to the maternal role. Studies emphasize that early identification of emotional problems allows support to be provided more quickly and reduces the risk of long-term mental health disorders (Khamidullina et al., 2025).

Assessment of sleep quality should be an integral part of postpartum care. During the postpartum period, many women experience fragmented sleep, nighttime awakenings, and persistent fatigue; however, these difficulties are often considered a “natural part of motherhood.” Studies indicate that poor sleep quality is a significant risk factor for postpartum anxiety; therefore, specialists should actively inquire about women’s opportunities for rest, difficulties falling asleep, nighttime awakenings, and subjective evaluation of fatigue (Yang et al., 2025). Such systematic assessment allows early identification of women who require additional support.

An important part of organizing postpartum care is ensuring continuity. Studies show that women’s emotional well-being after childbirth may fluctuate for a prolonged period; therefore, a

single consultation is often insufficient. Regular contact with healthcare specialists, home monitoring, remote consultations, and the opportunity to seek support in the presence of emotional difficulties help women feel safer and reduce emotional isolation (Haufe, Leeners, 2023). Continuous care also allows timely identification of increasing anxiety symptoms or signs of emotional exhaustion.

Scientific studies emphasize the importance of interdisciplinary collaboration. Postpartum care should involve not only obstetricians or family physicians but also nurses, psychologists, social workers, and mental health specialists. Such teamwork allows comprehensive assessment of women's condition and ensures individualized support. Studies indicate that integrated care models are more effective in reducing postpartum anxiety symptoms than isolated medical interventions (Gessesse et al., 2022).

An important organizational aspect is also the involvement of partners and family members in the care process. Healthcare specialists should encourage partner involvement in infant care, inform family members about signs of emotional difficulties, and emphasize the importance of practical assistance for women's rest and emotional well-being. Studies show that family support significantly reduces emotional stress and improves women's adaptation to motherhood (Pilkington et al., 2016).

Digital health tools are also becoming increasingly important in the organization of postpartum care. Remote consultations, emotional well-being monitoring applications, online support groups, and electronic self-help platforms may improve accessibility of support for women who, due to geographical, social, or emotional reasons, do not seek traditional assistance. Studies indicate that remote interventions may help identify emotional difficulties early and improve access to emotional support (Deak, Stickgold, 2010).

In clinical practice, it is important that postpartum care be individualized and adapted to each woman's needs. Different women face varying emotional, social, and physical challenges; therefore, support measures must be flexible and oriented toward individual situations. Studies indicate that women evaluate care more positively when they experience empathy, respect, and active interest from specialists in their emotional well-being (Balshi, Bove, 2024).

Properly organized postpartum care may have a significant impact on women's sleep quality, emotional health, and ability to adapt to motherhood. Early identification of emotional difficulties, continuous care, interdisciplinary collaboration, and family involvement are important measures in reducing the risk of postpartum anxiety and improving the well-being of both women and infants.

5.2. The Role of Nurses in Monitoring Emotional Health

Nurses play an extremely important role in monitoring women's emotional health during the postpartum period. Due to their continuous and close contact with women, they are often the first to notice changes in emotional condition, sleep disturbances, increased anxiety, or signs of emotional exhaustion. During the postpartum period, women's emotional condition may change rapidly; therefore, systematic monitoring of emotional health becomes an important part of prevention and early support. Scientific studies show that timely recognition of emotional difficulties allows reduction of the risk of postpartum anxiety and other mental health disorders (Abuhammad et al., 2024).

One of the most important tasks of nurses is consistent assessment of women's emotional well-being. During the postpartum period, emotional difficulties do not always manifest through pronounced symptoms; therefore, it is important to pay attention to subtle changes such as irritability, fatigue, emotional sensitivity, mood fluctuations, increased vigilance, or persistent concern about the baby's health. Studies indicate that emotional symptoms often emerge before clinically significant postpartum anxiety or depression develops (Adhikari et al., 2019). For this reason, nurses must actively inquire not only about women's physical but also emotional condition.

Monitoring sleep quality is an important part of emotional health assessment. Scientific studies confirm that poor sleep quality is one of the most important risk factors for postpartum anxiety. Nurses should ask about sleep duration, nighttime awakenings, difficulties falling asleep, persistent fatigue, and opportunities for daytime rest. Research shows that women who experience long-term sleep disturbances after childbirth more frequently face emotional exhaustion, irritability, and increased anxiety levels (Bedrov, Gable, 2023). Early identification of sleep problems allows preventive measures to be implemented more quickly.

Nurses also play an important role in recognizing signs of emotional burnout and adaptation difficulties. During the postpartum period, women often feel pressure to be "good mothers," and therefore may hide emotional difficulties or avoid talking about their well-being. Studies indicate that women often fear being judged as incompetent or incapable of properly caring for the baby; therefore, emotional symptoms remain unspoken (DelRosso, 2025). Empathetic communication by nurses and the creation of a safe emotional environment may encourage women to speak more openly about their difficulties.

The scientific literature emphasizes the importance of standardized emotional condition assessment tools. Nurses may use various questionnaires or assessment scales that help systematically monitor changes in emotional health and identify women at increased risk. Studies show that regular assessment of emotional condition helps identify anxiety symptoms earlier and ensures timely referral for specialist consultations (Gilfarb, Leuner, 2022). Such monitoring is especially important during

the first weeks after childbirth, when emotional difficulties most often begin to emerge.

The role of nurses is also important in providing emotional support. Active listening, respectful communication, empathy, and acknowledgment of women's experiences may reduce emotional tension and strengthen emotional security. Studies indicate that women who experience supportive relationships with healthcare specialists are more likely to seek support and more easily accept recommendations regarding emotional health care (Hedges et al., 2021). Emotional support also reduces feelings of loneliness and misunderstanding.

An important function of nurses is also psychoeducation. Nurses may provide women with information about postpartum anxiety symptoms, the importance of sleep for emotional health, the effects of stress on the body, and possible support methods. Studies indicate that informed women recognize emotional difficulties better and are more likely to seek support at an early stage (Howard et al., 2018). Psychoeducation also helps reduce stigma and the false belief that emotional difficulties after childbirth are a sign of personal weakness.

Nurses also play an important role in coordinating further support. When significant emotional symptoms or long-term sleep disturbances are observed, women may be referred for consultations with psychologists, psychiatrists, or other specialists. Interdisciplinary collaboration ensures comprehensive support and reduces the likelihood that emotional difficulties will remain unnoticed. Studies indicate that integrated emotional healthcare is more effective than isolated interventions (Iao et al., 2022).

The scientific literature also emphasizes the importance of nurses' competencies. Specialists must possess sufficient knowledge about postpartum anxiety symptoms, risk factors, methods of emotional condition assessment, and support opportunities. Continuous professional development enables nurses to recognize emotional difficulties more effectively and provide higher-quality support for women after childbirth (Kilavuz, Topaloğlu et al., 2025).

The role of nurses in monitoring emotional health is an important part of postpartum care. Consistent assessment of emotional condition, monitoring of sleep quality, emotional support, psychoeducation, and timely referral for specialist support may help reduce the risk of postpartum anxiety and improve women's emotional well-being after childbirth.

5.3. The Importance of Education and Counseling

Education and counseling are important components of postpartum care, helping women better understand physiological and emotional changes after childbirth, strengthen psychological resilience, and reduce the risk of postpartum anxiety. During the postpartum period, women often face lack of information, uncertainty, and fear regarding their emotional condition, infant care, or

maternal role. Scientific studies show that timely and clear information may reduce emotional stress, improve adaptation to motherhood, and encourage women to seek support earlier when experiencing emotional difficulties (Lin et al., 2022).

One of the most important goals of education is to help women understand that emotional changes after childbirth are common and do not always indicate a mental disorder. Many women experience mood fluctuations, emotional sensitivity, fatigue, or anxiety; however, due to lack of information, they may interpret these symptoms as personal weakness or inability to adapt to motherhood. Studies indicate that psychoeducation helps reduce feelings of guilt and the stigmatization of emotional difficulties (Migueis et al., 2021). When women understand the causes of their emotional experiences, it becomes easier for them to accept support and seek solutions.

The scientific literature emphasizes that education should include not only information about infant care but also women's emotional and physical well-being. One of the most important topics is the significance of sleep for emotional health. Studies indicate that many women underestimate the impact of sleep deprivation on emotion regulation, stress, and the development of anxiety symptoms. Specialists should explain how fragmented sleep affects emotional stability, what sleep hygiene recommendations exist, and how to plan rest during the postpartum period (Paditz, 2024). Such information may help women become more proactive in caring for their own rest needs.

During counseling, it is also important to discuss emotional expectations related to motherhood. Studies show that many women feel pressure to be "perfect mothers," making it difficult for them to accept their emotional vulnerability or fatigue. Excessive societal and personal expectations may increase anxiety, self-criticism, and emotional exhaustion. During educational interventions, it is important to emphasize that the need for support is normal, and that rest and emotional support are essential parts of adaptation to motherhood (Schiller et al., 2015).

Scientific studies show that individual counseling may significantly reduce emotional tension and improve women's well-being. During consultations, women can discuss emotional difficulties, fears, sleep problems, or relationship changes. Empathetic communication and active listening by specialists help strengthen emotional security and reduce feelings of loneliness. Research indicates that women who receive emotional support and individualized counseling more often demonstrate lower intensity of anxiety symptoms (Stefaniak et al., 2023).

An important part of education is the involvement of partners and family members. Studies indicate that relatives' understanding of emotional difficulties after childbirth may significantly improve women's emotional condition. Specialists should inform partners about the signs of postpartum anxiety, the impact of sleep deprivation on emotional health, and the importance of practical assistance. Partner involvement in infant care and emotional support help reduce women's fatigue and emotional tension (Wang et al., 2023).

In recent years, increasing attention has been paid to remote forms of education and counseling. Online lectures, mobile applications, virtual consultations, and self-help platforms provide women with opportunities to receive information and emotional support regardless of their place of residence or ability to attend healthcare facilities. Studies indicate that digital psychoeducational tools may help reduce emotional stress and improve access to emotional support during the postpartum period (Abdul Jafar et al., 2021).

The scientific literature also emphasizes the importance of group educational sessions. Participation in mothers' groups allows women to share experiences, reduces social isolation, and helps them understand that emotional difficulties after childbirth are common. Studies indicate that communication with other mothers strengthens emotional resilience and reduces feelings of loneliness (Bai et al., 2020). Group counseling may also encourage emotional support and mutual understanding.

In clinical practice, education and counseling should be integrated into the entire postpartum care process. Healthcare specialists should consistently provide information about emotional changes, the importance of sleep, stress reduction measures, and available support opportunities. Such a systematic approach helps women better prepare for the postpartum period and reduces the risk of emotional difficulties.

Education and counseling are important preventive measures that help strengthen women's emotional security, increase self-esteem, and improve adaptation to motherhood. Timely information, emotional support, and individualized counseling may help reduce postpartum anxiety symptoms and improve the well-being of both women and infants.

5.4. A Holistic Approach to Women's Health

A holistic approach to women's health during the postpartum period is based on the understanding that women's physical, emotional, psychological, and social conditions are closely interconnected. After childbirth, women experience significant biological, hormonal, emotional, and lifestyle changes; therefore, effective support cannot be limited only to the assessment of physical condition or monitoring of medical complications. Scientific studies indicate that a holistic approach allows better understanding of women's needs, early recognition of emotional difficulties, and improvement of the overall well-being of both mother and infant (Creti et al., 2017).

The foundation of holistic care is the biopsychosocial model, according to which women's health is assessed as a combination of biological, psychological, and social factors. During the postpartum period, physical fatigue, hormonal changes, sleep deprivation, emotional sensitivity, and

social challenges often interact with one another. Studies show that poor sleep quality may intensify emotional vulnerability, while emotional stress in turn worsens sleep quality and overall well-being (García-Plata, Garcia-Molina et al., 2025). For this reason, women's condition must be assessed comprehensively.

The scientific literature emphasizes that a holistic approach requires active attention to women's emotional health. During the postpartum period, women often experience anxiety, fatigue, emotional sensitivity, or lack of self-confidence; however, these experiences are not always visible during objective medical examinations. Studies indicate that assessment of emotional condition and empathy are essential parts of high-quality postpartum care (Handa et al., 2024). Specialists should inquire about women's emotional well-being, family relationships, opportunities for rest, and psychological adaptation to motherhood.

A holistic approach also includes assessment of sleep quality as an important component of overall health. Sleep deprivation after childbirth is often perceived as an inevitable part of motherhood; however, studies indicate that long-term sleep disturbances may have a significant impact on emotional condition, stress regulation, and the development of postpartum anxiety (Hwang et al., 2022). For this reason, specialists should actively inquire about women's quality of rest and help identify ways to reduce persistent physical and emotional exhaustion.

An important part of holistic care is recognition of individuality. Every woman experiences the postpartum period differently; therefore, support measures must be adapted to individual needs. For some women, the greatest difficulty is sleeping deprivation; for others, it is emotional insecurity, social isolation, or lack of practical support. Studies indicate that individualized care helps women feel more understood, increases trust in healthcare specialists, and improves emotional well-being (Kawashima et al., 2022).

A holistic approach also emphasizes the importance of family and the social environment. Women's emotional condition after childbirth is closely related to partner support, family relationships, social security, and community support. Studies show that women who experience emotional and practical support less frequently suffer from long-term emotional stress and adapt better to the changes of motherhood (Li, 2026). For this reason, holistic care should include not only the woman herself but also her closest social environment.

The scientific literature also highlights the importance of spiritual and emotional well-being. For some women, adaptation to motherhood is strongly influenced by a sense of inner security, perception of life meaning, self-esteem, or the opportunity to talk about emotional experiences. Studies indicate that emotional support, respectful communication, and strengthening women's autonomy may reduce emotional tension and improve psychological resilience (Medic et al., 2017).

A holistic approach is inseparable from interdisciplinary collaboration. Postpartum care

should involve nurses, midwives, physicians, psychologists, social workers, and other specialists capable of assessing different aspects of women's needs. Studies show that integrated care models are more effective in improving emotional well-being and reducing postpartum anxiety symptoms than fragmented care (Medina, Magnuson et al., 2009).

In clinical practice, a holistic approach means not only treating individual symptoms or disorders but also comprehensively assessing women's physical, emotional, psychological, and social condition. During the postpartum period, women's well-being is influenced not only by biological changes but also by life circumstances, relationships with loved ones, sleep quality, emotional security, and ability to adapt to the new maternal role. For this reason, specialists should assess not only clinical symptoms but also women's individual needs, strengths, emotional resources, and everyday life difficulties (Ogallar et al., 2025).

A holistic approach encourages active involvement of women in the healthcare process. Studies indicate that women adapt better to the postpartum period when they feel respect for their choices, are listened to, and actively participate in decisions related to their health. Such partnership-based care strengthens women's autonomy, increases self-confidence, and reduces emotional insecurity (Ojomo et al., 2025). When women feel understood and accepted, they are more likely to speak openly about emotional difficulties and accept support more easily.

An important part of holistic care is the assessment of women's rest and sleep quality. In clinical practice, specialists should not only recommend rest but also help women realistically identify opportunities for physical and emotional recovery. Studies indicate that long-term sleep deprivation significantly increases the risk of emotional exhaustion, anxiety, and depression symptoms (Lawson et al., 2015). For this reason, it is important to encourage women to pay attention to their rest needs, abandon excessive expectations, and accept support from others.

A holistic approach also includes strengthening emotional well-being. Specialists should encourage women to recognize their emotional needs, talk about experienced difficulties, and seek sources of emotional support. Studies indicate that emotional support and the opportunity to express personal experiences reduce feelings of loneliness and strengthen psychological resilience (Rouhi et al., 2023). Empathetic communication and emotional security help women adapt more easily to the changes of motherhood.

No less important is the maintenance of social relationships. During the postpartum period, women often experience social isolation, especially if they lack sufficient support from partners, family, or the community. Studies show that strong social relationships and practical support reduce emotional stress and improve overall psychological well-being (Rupanagunta et al., 2023). For this reason, specialists should encourage women to maintain relationships with loved ones, participate in support groups, and not be afraid to ask for help.

A holistic approach also helps reduce self-criticism and perfectionistic expectations of motherhood. Many women feel pressure to be “perfect mothers,” making it difficult to accept fatigue, emotional sensitivity, or the need for rest. Studies indicate that excessive expectations and self-blame often intensify emotional exhaustion and anxiety symptoms (Sobol-Kwapińska et al., 2024). The task of specialists is to help women understand that emotional vulnerability after childbirth is a natural part of the adaptation process and that accepting support is not a sign of weakness.

Such a comprehensive and individually oriented approach not only more effectively reduces postpartum anxiety symptoms but also strengthens women’s self-esteem, emotional security, and ability to adapt to motherhood. Holistic care helps ensure better emotional well-being, improves the mother–infant relationship, and contributes to the strengthening of long-term women’s mental health.

A holistic approach to women’s health allows better understanding of the complexity of the postpartum period and ensures comprehensive support for women. Integration of physical, emotional, psychological, and social well-being into the care process may help improve sleep quality, reduce the risk of postpartum anxiety and strengthen the well-being of both women and infants.

6. RESEARCH DESIGN

Research type and methods. The study applies a quantitative research method, which, according to Kardelis (2016), allows objective, systematic, and reliable analysis of relationships between variables using statistical data analysis methods. The quantitative research method is widely used in the field of health sciences when the aim is to assess the prevalence of certain phenomena, identify statistically significant relationships, and evaluate the influence of factors on the phenomenon under investigation. In the context of this study, the chosen quantitative method is appropriate due to the possibility of collecting standardized data from a larger group of respondents and objectively assessing the associations between women's sleep quality and anxiety experienced after childbirth. The research method makes it possible not only to identify general trends but also to compare the results of different respondent groups according to demographic or social indicators.

A questionnaire survey is used for the collection of empirical data. The questionnaire method was chosen because of its practicality, cost-effectiveness, and the possibility of collecting a large amount of data in a relatively short period of time. As Clarck et al. (2021) notes, a questionnaire survey gives respondents the opportunity to complete the questions at a time convenient for them and in an environment of their choice, thereby reducing the influence of external factors on responses and increasing respondents' openness. The study uses a structured questionnaire consisting of closed-ended questions and standardized assessment scales. This form of questionnaire ensures data comparability and creates opportunities for statistical analysis.

The study aims to determine how women's sleep quality after childbirth is related to the level of anxiety they experience; therefore, the questionnaire focuses on several main areas: sociodemographic indicators, assessment of sleep quality, and assessment of emotional state and anxiety symptoms. Respondents are asked questions about sleep duration, difficulties falling asleep, awakenings during the night, assessment of rest quality, and emotional experiences after childbirth. Such a structure allows a comprehensive assessment of both physiological and psychological aspects.

The empirical data analysis is performed using the statistical analysis program IBM SPSS Statistics (Statistical Package for the Social Sciences). This program is widely used in social and health science research due to its ability to systematically process large amounts of data, perform various statistical procedures, and ensure the accuracy of the analysis. The SPSS program allows not only data processing and systematization but also the presentation of results in the form of tables, graphs, and statistical indicators.

Several statistical analysis methods are applied to research data analysis. First, descriptive statistics are used, which allow the main research data to be summarized: frequencies, percentage

distributions, means, standard deviations, and other statistical indicators are calculated. These data help describe the sample of respondents and the general trends of the study.

To determine differences between different groups of respondents, Student's t-test and analysis of variance (ANOVA) are applied. The t-test is used when comparing the means of two groups, for example, when assessing differences in anxiety levels between women with good and poor sleep quality. Meanwhile, the ANOVA method is applied when comparing three or more groups, for example, when analyzing differences in sleep quality according to age groups, number of births, or other sociodemographic factors.

Correlation analysis is used to determine the relationship between the studied variables. It allows assessment of whether there is a statistically significant relationship between sleep quality and anxiety experienced after childbirth, as well as determination of the strength and direction of this relationship. In addition, regression analysis is performed, the aim of which is to determine the extent to which sleep quality can predict anxiety experienced after childbirth. Regression analysis allows the influence of independent variables on the dependent variable to be assessed, and the most important factors related to women's emotional well-being after childbirth to be identified.

The statistical methods applied provide an opportunity not only to objectively assess the research data but also to ensure the reliability and scientific validity of the research results. The results of the study may be significant in planning interventions by healthcare professionals aimed at improving women's psychological well-being and sleep quality after childbirth.

The statistical data analysis methods applied in this work are presented below, based on the recommendations provided by Poeira and Zangão (2022). The analysis of the research data was carried out in order to comprehensively assess the associations between sleep quality and anxiety experienced after childbirth and to identify statistically significant differences between different groups of respondents. The applied statistical methods made it possible not only to describe the collected data but also to identify possible relationships between the studied variables and to assess the influence of certain social and demographic factors.

Descriptive statistics were used in this study to systematically describe the distribution trends of the main variables – sleep quality and experienced anxiety. This method made it possible to calculate the main statistical indicators: means, standard deviations, minimum and maximum values, median, and percentage distributions. The application of descriptive statistics helped to form a general picture of the respondents' emotional state, the frequency of sleep disturbances, and their intensity after childbirth. The obtained indicators made it possible to assess the extent of sleep quality problems and anxiety symptoms prevailing in the study sample, as well as to identify data dispersion trends and possible deviations in the results.

The t-test was applied in the study to compare the means of two independent groups and to

determine whether statistically significant differences exist between them. This method was used in cases where data from two groups were analysed according to a specific criterion. For example, in this work, the t-test was used to check whether sleep quality and anxiety assessments differed between women whose pregnancy was planned and unplanned. Differences were also analysed between breastfeeding and non-breastfeeding women, as well as between respondents who receive emotional or practical support from relatives and those who do not receive such support. The t-test allowed an objective assessment of whether these social and personal factors may be associated with a higher level of anxiety or poorer sleep quality after childbirth.

Similarly to the t-test, analysis of variance – ANOVA (Analysis of Variance) – was applied in this work when it was necessary to compare more than two groups of respondents. This method made it possible to determine whether the means of different groups differ statistically significantly from one another. In the study, ANOVA was applied to analyse whether the level of anxiety experienced after childbirth differs among women of different age groups (18–24 years, 25–29 years, 30–34 years, 35–39 years, 40 years and older). In addition, analysis of variance could be used to assess differences according to other sociodemographic indicators, such as education, number of children, or place of residence. The application of the ANOVA method made it possible to determine which groups are characterized by greater emotional vulnerability or poorer sleep quality, which is important when interpreting the research results and planning possible interventions.

To assess the relationship between sleep quality and anxiety experienced after childbirth, correlation analysis was also applied in the study. It made it possible to determine the strength and direction of the relationship between the main studied variables. The correlation coefficient helped to assess whether worsening sleep quality is related to an increasing level of anxiety. This method is particularly important in order to substantiate theoretical assumptions about the interrelationships between sleep and emotional well-being in the postpartum period.

In addition, regression analysis was used in the study, which made it possible to predict the influence of women's sleep quality on anxiety experienced after childbirth. Regression analysis provided an opportunity to determine which factors have the greatest prognostic significance for emotional well-being after childbirth. This method is important when assessing not only statistical relationships but also the possible causal interaction between the phenomena studied.

The application of all statistical methods in this study made it possible to comprehensively and objectively analyse the collected data and ensure the reliability of the research results. The results obtained may be useful in planning the activities of healthcare professionals aimed at strengthening women's emotional health, improving sleep quality, and preventing postpartum anxiety.

The correlation analysis applied in the work made it possible to determine whether a statistically significant relationship exists between women's sleep quality and anxiety experienced

after childbirth, as well as to assess the strength and direction of this relationship. Correlation analysis is one of the most used statistical methods in the social and health sciences when the aim is to determine associations between two variables. In this study, it was important in assessing whether poorer sleep quality is associated with higher anxiety experienced by women after childbirth.

Spearman's correlation coefficient was applied in the study, which is used when the data do not meet the assumptions of normal distribution or when ordinal data are analysed. This non-parametric method made it possible to assess the monotonic relationship between sleep quality and anxiety indicators. The values of Spearman's correlation coefficient range from -1 to $+1$. A positive correlation value indicates that as one variable increases, the other also increases, while a negative value indicates that as one variable increases, the other decreases. The closer the value of the correlation coefficient is to 1 or -1 , the stronger the relationship between the variables is. A statistically significant relationship in this study indicated that changes in women's sleep quality are related to changes in their emotional well-being during the postpartum period.

The results of the correlation analysis made it possible not only to identify the existence of associations but also to assess their practical significance. This is particularly important when analyzing psychological difficulties experienced by women during the postpartum period, as sleep disturbances are often associated with the manifestation of emotional exhaustion, anxiety, or even depressive symptoms. The obtained results may help to better understand the significance of sleep quality for a woman's emotional state and what preventive or support measures may be needed in the early postpartum period.

Regression analysis was used in this work to determine what proportion of the variation in women's experienced anxiety can be explained by their sleep quality. Regression analysis allows the effect of an independent variable on a dependent variable to be assessed and a predictive relationship between the analyzed phenomena to be identified. In this case, sleep quality was assessed as an independent variable, and anxiety experienced after childbirth as the dependent variable.

During the regression analysis, the coefficient of determination (R^2) was calculated, which showed what percentage of the variation in anxiety experienced after childbirth can be explained by changes in women's sleep quality. The coefficient of determination is one of the most important indicators of regression analysis, allowing assessment of the suitability of the model and the explanatory power of the independent variable in relation to the dependent variable. The higher the R^2 value, the greater the influence of the independent variable – in this case, sleep quality – on the dependent variable, i.e., women's anxiety experienced after childbirth.

The application of regression analysis in this study made it possible not only to identify a statistical relationship between the studied variables but also to assess the predictive role of sleep quality in the context of emotional well-being. The results of the analysis allowed consideration of

whether worsening sleep quality can be regarded as a significant factor associated with a higher level of anxiety in the postpartum period. Regression analysis also helped to determine how strongly changes in sleep quality can predict changes in anxiety levels, which is important when assessing possible trends in psychological risk after childbirth.

It is important to note that the results of regression analysis allow a better understanding not only of statistical relationships but also of their practical significance in the context of healthcare. If sleep quality is found to have significant prognostic value, this may justify the need to identify sleep disturbances early and apply preventive or support measures for women after childbirth. Such interventions may be focused on improving emotional well-being, increasing access to psychological support, and strengthening the woman's overall quality of life.

By applying correlation and regression analysis, the aim was to comprehensively and thoroughly assess the associations between sleep quality and postpartum anxiety and to provide statistically based conclusions about the relationship between these phenomena. The application of these methods made it possible not only to determine the existence and strength of the relationship but also to assess the possible influence of sleep quality on women's emotional state after childbirth. The obtained results may be significant in planning the activities of healthcare professionals, recognizing early psychological risk, and developing comprehensive support measures for women during the postpartum period.

Research instruments. Two standardized instruments were used to conduct the study, allowing an objective assessment of women's sleep quality and anxiety experienced after childbirth. The choice of standardized questionnaires ensures the reliability and validity of the research data, as well as the possibility of comparing the obtained results with studies conducted by other authors. Both instruments are widely used in scientific research analysing women's emotional and physiological well-being during the postpartum period.

Women's sleep quality after childbirth is assessed using the Postpartum Sleep Quality Scale (PSQS), developed by Yang, Yu, and Chen (2013). This instrument is designed to assess specific aspects of women's sleep quality after childbirth, taking into account the particularities of infant care and the woman's physical condition. The scale consists of two main dimensions: the level of daytime dysfunction caused by nighttime infant care and sleep inefficiency related to physical symptoms. Such a structure allows a comprehensive assessment not only of sleep duration or quality but also of the impact of sleep disturbances on a woman's daily functioning.

The PSQS instrument consists of 14 statements assessed using a 5-point Likert scale ranging from "Never" to "Almost always". A higher total score indicates poorer sleep quality and a greater manifestation of sleep disturbances during the postpartum period. This questionnaire makes it possible to assess the most common sleep difficulties after childbirth, such as frequent awakenings

during the night, difficulties falling asleep, daytime fatigue, and a feeling of insufficient rest.

The study also uses The Postpartum Specific Anxiety Scale (PSAS), developed by Fallon, Halford, Bennett, and Harrold (2016), to assess anxiety experienced by women after childbirth. This scale is specifically adapted to the postpartum period and focuses on specific aspects of anxiety experienced during motherhood. The instrument allows assessment not only of the general level of anxiety but also of specific emotional and practical situations faced by women after childbirth.

The PSAS instrument consists of four main dimensions: maternal competence and anxieties related to infant attachment, anxieties regarding infant well-being and safety, anxieties related to practical infant care, and psychosocial adjustment to motherhood. This division into dimensions allows a detailed assessment of a woman's multifaceted emotional experience after childbirth and identification of the main areas of anxiety. The instrument consists of 51 statements assessed on a 4-point Likert scale ranging from "Not at all" to "Almost always". Higher scores indicate a higher level of anxiety experienced after childbirth.

Both questionnaires used in the study are freely available and may be used for non-commercial scientific research purposes. The choice of standardized and validated instruments is an important methodological aspect of scientific research, ensuring the reliability, validity, and objectivity of the research data and results. The use of internationally recognized instruments creates opportunities not only to assess the studied phenomena more accurately but also to compare the obtained results with studies conducted by other authors and scientific data from different countries.

Since the questionnaires were developed on the basis of previous scientific studies, their construction is based on theoretical and empirical assumptions about women's sleep quality and emotional well-being during the postpartum period. The validity and reliability of the instruments have been assessed in previous studies; therefore, they are considered suitable for analysing sleep and emotional difficulties experienced by women after childbirth. In addition, these instruments have already been applied in various groups of respondents, so their use in this study allows methodological consistency and scientific validity of the results to be ensured.

The application of standardized questionnaires also reduces the risk of subjectivity in the data collection process, as all respondents are presented with the same questions and the same response assessment system. This helps to ensure data comparability and creates opportunities to perform the statistical analysis necessary to achieve the research objectives. The selected instruments are considered suitable for assessing sleep quality disturbances and anxiety symptoms experienced by women during the postpartum period, as they cover the most important physiological, emotional, and psychosocial dimensions of this stage of life.

At the end of the questionnaire, questions related to the respondents' demographic and social characteristics are presented. Respondents were asked to indicate their age, education, marital status,

and other social indicators that may be relevant to women's emotional well-being and sleep quality after childbirth. The collection of sociodemographic data is an important part of quantitative research, as it allows the study sample to be described in more detail and possible differences between different groups of respondents to be assessed.

The collected demographic data provided an opportunity to analyse whether certain social and personal factors may be associated with higher anxiety experienced after childbirth or poorer sleep quality. For example, it was possible to assess whether women of different ages, education levels, or marital statuses differed according to sleep quality or anxiety indicators. Such analysis allows a better understanding of which groups of women may be more vulnerable during the postpartum period and which may require greater emotional or social support.

At the beginning of the questionnaire, a control question was also presented, aimed at determining whether the respondent had given birth to a baby within the past 12 months. This question was important in ensuring the accuracy of the study sample and its compliance with the established inclusion criteria. Since the study focuses specifically on the assessment of women's sleep quality and anxiety during the postpartum period, it was important that only respondents corresponding to the target group participated in the study. The use of the control question helped ensure the suitability of the research data and increased the reliability of the research results.

In addition, the inclusion of demographic questions made it possible to perform a more detailed statistical analysis by comparing the results of different groups and searching for possible associations between social factors, sleep quality, and emotional well-being. This contributed to a deeper interpretation of the research results and allowed more comprehensive conclusions to be drawn about women's experiences after childbirth.

Research sample and sampling methods. The participants of the study are women aged 18 to 45 years, as this age range covers the majority of women of reproductive age and reflects the actual variation in the age of motherhood. The selection of these age limits allows the inclusion of women at different stages of life who may experience different physiological, emotional, and social challenges after childbirth. As noted by Ameso et al. (2025), a woman's age may be associated both with emotional well-being and adaptation to motherhood; therefore, it is important to include a broader age range in the study. This allows the research results to be more relevant to a wider population and better reflect the experiences of various women during the postpartum period.

The study included women who had given birth to a baby within the past 12 months, regardless of whether it was their first or a repeated childbirth. This selection criterion was chosen in order to investigate women's experiences specifically during the postpartum period, when changes in sleep quality, emotional sensitivity, and increased levels of anxiety most commonly occur. By including both first-time mothers and women with more children, opportunities are created to assess a broader

spectrum of motherhood experiences and to analyses possible differences between respondents with different motherhood experiences.

The required research sample consists of 377 women who had given birth within the past 12 months. The research sample was calculated using the Paniott formula, which is widely used in social and health science research to determine a representative number of respondents. The sample calculation assumed that the study population consists of approximately 19.1 thousand women, according to the latest information provided by the Official Statistics Portal (2025) regarding the birth rate in Lithuania in 2024. A 95% confidence level and a 5% margin of error were applied in calculating the sample size, which are considered widely used and methodologically appropriate in this type of quantitative research. As stated by Kardelis (2016), such a ratio of confidence level and margin of error ensures sufficient accuracy of the results and allows statistically based conclusions to be drawn about the study population.

The study applies the convenience sampling principle. This sampling method is based on the selection of the most quickly and conveniently accessible research participants. According to Kardelis (2016), convenience sampling is often used in social and health science research when the aim is to efficiently collect data from groups of respondents with specific experiences. In this case, the chosen method was appropriate due to the possibility of quickly reaching the target group of women and ensuring voluntary participation in the study.

The research questionnaire is distributed electronically through social networks and mothers' forums in which women who have recently given birth actively participate. This form of data collection allows a larger number of respondents from different regions of Lithuania to be reached and provides women with the opportunity to participate in the study at a time and in an environment convenient for them. Research participants are included in the survey on a voluntary basis, ensuring their anonymity and confidentiality. The use of an electronic survey also allows more efficient organization of data collection, reduces administrative costs, and facilitates data systematization and analysis.

Research stages. During the first stage of the research, based on the conducted scientific literature analysis, the research instruments were selected and the general methodological structure of the study was formed. Through the analysis of scientific sources, the most suitable standardized instruments allowing the assessment of women's sleep quality and anxiety experienced after childbirth were identified. The research questionnaire consisted of two standardized scales – the Postpartum Sleep Quality Scale (PSQS) and The Postpartum Specific Anxiety Scale (PSAS). Additional questions related to the respondents' sociodemographic and situational characteristics, which could have significance for women's emotional well-being and sleep quality after childbirth, were also included in the questionnaire. In order to ensure that only respondents meeting the

established criteria participated in the study, a control question was presented at the beginning of the questionnaire to determine whether the woman had given birth to a baby within the past 12 months. During this stage, an electronic survey form was also prepared on the online survey platform *apklaua.lt*, which created an opportunity to efficiently organize the collection of empirical data.

During the second stage of the research, the participant selection criteria were established and the sample size required for the study was calculated. At this stage, the target study population was defined – women aged 18 to 45 years who had given birth to a baby within the past 12 months. By applying the Paniotto formula, the minimum number of respondents required for the study was calculated, ensuring sufficient reliability and representativeness of the research results. The first and second stages of the research were carried out during September–October 2025.

The third stage of the research included the direct implementation of the study – the collection of empirical data by distributing the questionnaire survey to the research respondents. A total of 397 respondents participated in the study, meeting the established research selection criteria. The research questionnaire was publicized through social networks and various online communities focused on women and motherhood topics. This method of survey distribution allowed a wider range of respondents to be reached and provided women with the opportunity to participate in the study at a time and in an environment convenient for them. The completion time of the survey was up to 12 minutes, therefore efforts were made to reduce the burden on respondents and increase the likelihood of questionnaire completion. The third stage of the research was conducted during October–November 2025.

During the fourth stage of the research, the collected empirical data were analysed using statistical data analysis methods. The research data were systematized and analysed using the IBM SPSS Statistics program. At this stage, descriptive statistics, t-test, analysis of variance (ANOVA), correlation analysis, and regression analysis were applied in order to assess the associations between women's sleep quality and anxiety experienced after childbirth, as well as possible differences between various groups of respondents. The obtained results were interpreted and presented in the form of tables and textual analysis. Data analysis was carried out during November–December 2025.

During the final stage of the research, summarizing conclusions of the work were presented and recommendations aimed at improving women's emotional health and sleep quality during the postpartum period were prepared. The recommendations are oriented toward healthcare professionals working with women after childbirth, as well as health policy makers, with the aim of strengthening preventive measures, improving access to emotional support, and promoting early recognition of psychological difficulties. The research results and recommendations may be useful in planning comprehensive support measures and improving the quality of healthcare services for women during the postpartum period.

Research ethics. During the empirical study, efforts were made to ensure that it complied with the main ethical principles applied to scientific research. Compliance with ethical principles is an especially important part of scientific research, particularly when the study examines sensitive topics related to a person's emotional well-being, psychological condition, or personal experiences. As noted by Kardelis (2016), when conducting scientific research, it is necessary to maintain a balance between the researcher's aim to obtain objective and reliable information and ensure the safety, privacy, and well-being of the research participant. For this reason, the main principles of research ethics were followed during the study: informing research participants, ensuring voluntary participation, anonymity, and data confidentiality.

To ensure the study's compliance with ethical requirements, detailed information about the conducted research was presented to respondents at the beginning of the questionnaire before they started completing it. The research participants were introduced to the aim of the study, the research topic, the researcher conducting the study, and the purposes of the use of the data collected. Such informing is an important part of ethical research implementation, as it provides research participants with the opportunity to make an informed decision regarding participation in the study. The information presented at the beginning of the study allowed respondents to clearly understand the purpose for which the data were being collected, how they would be used, and the significance of their participation in the scientific research being conducted.

Respondents were also informed that the data collected during the study would be used only for scientific purposes and that the results obtained would be presented only in summarized form, without linking them to specific individuals. This means that no information allowing the identification of a specific respondent or linking her responses to her personal identity would be presented in the research results. This principle of data processing helps ensure the protection of participants' privacy and increases trust in the conducted study.

Significant attention was paid to compliance with the principles of anonymity and confidentiality. During the study, no direct personal identification data were collected, such as name, surname, residential address, or contact information. All collected responses were analyzed only statistically and used to identify general research trends and relationships. In this way, efforts were made to protect respondents' privacy and ensure a safe environment for participation in the study. The detailed presentation of information at the beginning of the study also contributed to ensuring the transparency and ethicality of the research. Research participants were informed about their rights, including the right to participate voluntarily in the study and the possibility to discontinue completion of the questionnaire at any time. Such informing practice complies with the main principles of scientific research ethics and helps ensure a relationship based on respect between the researcher and research participants.

Great attention in the study was devoted to ensuring the anonymity of research participants and the confidentiality of data. Compliance with these principles is one of the most important ethical requirements in conducting scientific research, especially in cases where sensitive topics related to a person's emotional well-being, psychological condition, or personal experiences are examined. By ensuring anonymity and confidentiality, efforts were made to create a safe environment in which respondents could openly and sincerely provide their answers.

The research questionnaire was completely anonymous – no information that could directly or indirectly identify a specific respondent was collected during the study. Respondents were not required to provide their name, surname, residential address, telephone number, e-mail address, or other personal data that could be linked to the submitted responses. In this way, it was ensured that research participants could feel safe and unrestricted when answering questions about their sleep quality, emotional state, and postpartum experiences.

The collected data was used only for statistical analysis and presented only in summarized form. The research results were analyzed by evaluating general trends, relationships between variables, and differences between respondent groups, without linking the data to specific individuals. Such a form of data analysis and presentation made it possible to protect the privacy of research participants and ensure that individual responses remained confidential.

Ensuring data confidentiality was also important in increasing respondents' trust in the study and encouraging open responses. Since the issues examined in the study were related to women's emotional well-being, anxiety, and psychological welfare after childbirth, ensuring anonymity helped reduce possible discomfort or fear regarding the disclosure of personal information. This contributed to the collection of higher-quality and more objective research data.

By adhering to the principles of anonymity and confidentiality, efforts were made to ensure a respectful and ethical approach toward research participants and to protect their right to privacy. Such ethical decisions comply with the main principles of conducting scientific research and contribute to the reliability and scientific validity of the study.

Considering that the study involved sensitive topics related to women's emotional well-being, sleep quality, and psychosocial welfare after childbirth, before beginning to complete the questionnaire, research participants were additionally informed that some questions or statements might touch upon more sensitive personal experiences and evoke stronger emotions. Such prior informing was an important part of ethical research organization, aiming to ensure a respectful and responsible approach to the emotional state and psychological safety of research participants.

Since the postpartum period is often associated with increased emotional sensitivity, fatigue, anxiety, and various psychosocial difficulties, it was important to inform participants in advance about possible emotional discomfort while completing the questionnaire. Some questions could encourage

the recall of more difficult experiences related to motherhood, sleep deprivation, emotional instability, or experiences of anxiety. For this reason, research participants were given the opportunity to assess their readiness to participate in the study even before beginning to complete the questionnaire.

Such informing also helped ensure compliance with the principle of informed consent. Research participants were able to consciously decide whether they wished to participate in the study, knowing its topic, possible emotional impact, and the nature of the questions. This is important in respecting respondents' autonomy and their right to independently make decisions regarding participation in scientific research.

In addition, research participants were informed that they could discontinue completion of the questionnaire at any time if they felt emotional discomfort or did not wish to answer certain questions. Such an opportunity was provided in order to protect respondents' emotional well-being and reduce possible psychological tension. During the organization of the study, efforts were made to ensure that participation in the study would be as safe, respectful, and ethical as possible for every respondent.

A responsible approach to the examination of sensitive topics and detailed informing of research participants contributed to the ethical conduct of the study and helped ensure trust in the conducted research. This also created conditions for obtaining more sincere and objective responses from respondents, which are important for the quality and reliability of scientific research.

Research participants were also clearly informed that their participation in the study was completely voluntary. Respondents could freely choose whether to participate in the study, and after beginning to complete the questionnaire, they had the right to discontinue participation at any time without providing explanations and without experiencing any negative consequences. Ensuring the principle of voluntariness is one of the most important ethical requirements of scientific research, allowing respect for the autonomy of research participants and their right to independently make decisions.

By adhering to the principles of scientific research ethics, efforts were made to ensure that the entire research process would be safe, ethical, and respectful toward research participants. During the organization of the study, special attention was devoted to respondents' rights, their emotional safety, voluntary participation, and the protection of personal data. In this way, efforts were made to create an environment in which research participants could feel safe and free to provide sincere answers about their experiences after childbirth.

Compliance with ethical principles contributed to greater reliability of the study and respondents' trust in the conducted research. When research participants are properly informed about the aim of the study, the use of data, the assurance of anonymity, and their rights, their trust in the research process and motivation to provide accurate and open responses increase. This is especially important in studies examining sensitive topics related to emotional well-being, anxiety, or

psychological experiences.

Compliance with research ethics principles also helped reduce possible emotional discomfort among respondents and ensured a relationship based on respect and responsibility between the researcher and research participants. A responsible approach to respondents' well-being and the protection of privacy is an important part of research quality, as it creates conditions for collecting objective, reliable, and high-quality empirical data.

In addition, an ethically organized study strengthens the value of the scientific work itself, as it ensures that the research results are obtained in accordance with universally recognized scientific standards. This is important not only for the reliability of the research results but also for the possibility of applying them in practice when planning support measures aimed at improving women's emotional health and sleep quality during the postpartum period.

Research limitations. Convenience sampling was applied in this study, and the research questionnaire was distributed through social networks and mothers' forums; therefore, it is important to consider certain limitations of the study. Although this method of data collection provided an opportunity to quickly and efficiently reach the target group of respondents, the research results cannot necessarily be considered fully representative of the experiences of all women in Lithuania who had given birth within the past 12 months. When applying the convenience sampling method, respondents who are more active internet users, more frequently use social networks, or participate in virtual communities are more likely to participate in the study.

It can be assumed that women who had more free time, greater interest in the topic being analysed, or a desire to share their personal experiences participated more actively in the study. For this reason, certain groups of women may have been underrepresented or not included in the study at all. For example, women with more limited internet access, respondents who use social networks less frequently, or women experiencing more intense emotional or social difficulties may not have participated in the study. This may affect the generalizability of the research results to the broader population.

It is also important to mention that the data were collected only once; therefore, the study reflects only the respondents' well-being during a specific period of time. Such a research design does not allow observation of how women's sleep quality and anxiety experienced after childbirth change over time. Considering that the study analyses a postpartum period lasting up to 12 months, it can be assumed that sleep quality and emotional well-being may fluctuate significantly depending on the time elapsed since childbirth. For example, during the early postpartum period, women may experience greater physical fatigue and sleep deprivation, while in later months emotional difficulties may be related to other challenges of motherhood or psychosocial factors. For this reason, the research results should be considered as a reflection of the situation during a specific period.

Another important limitation of the study is related to the fact that the research was based only on respondents' subjective self-assessments using standardized questionnaires. Although such instruments allow assessment of women's personal experiences and emotional well-being, there was no possibility during the study to objectively measure sleep duration, physiological indicators of sleep quality, or other biological parameters. Respondents assessed their condition themselves; therefore, responses may have been influenced by individual perception of the situation, emotional state, or interpretation of the answers. In future studies, it would be appropriate to combine subjective assessment methods with objective physiological measurements, such as sleep monitoring technologies or clinical assessment methods.

Despite the identified limitations, the study provides valuable information about the associations between women's sleep quality and postpartum anxiety and allows a better understanding of women's experiences after childbirth. The results obtained may be useful in planning further studies, improving emotional support measures, and strengthening the care of women's psychological well-being during the postpartum period.

Considering the limitations identified in this study, it would be appropriate in future research to apply probability sampling, which would create opportunities to ensure greater representativeness of the research results and a broader reflection of the study population. By including women from different regions of Lithuania, various social strata, and groups of different social and economic status, it would be possible to obtain a more comprehensive and objective picture of women's experiences of sleep quality and postpartum anxiety. Such a sampling strategy would help reduce the risk of sampling bias and create conditions for more accurate assessment of the influence of various social, economic, or cultural factors on women's emotional well-being after childbirth.

In future studies, it would also be worthwhile considering the possibility of long-term longitudinal studies. Since sleep quality and emotional well-being after childbirth may change depending on various factors and the time elapsed since childbirth, one-time data collection does not allow comprehensive disclosure of the dynamics of these phenomena. Longitudinal studies, during which women would be observed at several stages throughout the entire first year after childbirth, would provide an opportunity to analyse in more detail changes in sleep quality and anxiety and their interrelationships over time.

The long-term observation method would allow a better understanding of at which stage of the postpartum period women experience the greatest sleep or emotional difficulties, how these difficulties change as the baby grows, and which factors may have the greatest impact on women's psychological well-being. In addition, such studies would provide an opportunity to more accurately assess possible causal relationships between sleep quality and anxiety experienced after childbirth, rather than only identifying statistical associations between these phenomena.

In future studies, it would also be useful to combine subjective questionnaire data with objective assessment methods, such as sleep monitoring technologies, assessment of physiological indicators, or clinical evaluations performed by specialists. The application of a comprehensive combination of research methods would allow more comprehensive and accurate data to be obtained about women's well-being during the postpartum period.

Further development of research in this field could contribute to a better understanding of women's emotional health needs, earlier recognition of psychological difficulties, and the development of more effective support and prevention measures. This is important not only for individual women's well-being but also for the overall strengthening of maternal and child health during the postpartum period.

7. RESULTS AND DISCUSSION OF THE STUDY “ASSOCIATIONS BETWEEN WOMEN’S SLEEP AND POSTPARTUM DEPRESSION”

The sociodemographic characteristics of the women who participated in the study allow the formation of a more comprehensive context for further data analysis and better interpretation of the psychological and physiological changes experienced during the postpartum period. Analysing the age distribution of the respondents, it is noticeable that women aged 25–34 years dominate, forming the largest group of women of reproductive age giving birth. Such a trend corresponds to general demographic birth trends, indicating that women are increasingly planning motherhood at a more mature age, most often already having a stable partnership, professional, or financial foundation. This circumstance may be significant when assessing women’s emotional well-being and adaptation to motherhood, as older women are often characterized by greater emotional maturity, but at the same time may experience a greater burden of responsibility, perfectionism, or anxiety (see Table 1).

Table 1. Distribution of respondents according to sociodemographic characteristics

<i>Category</i>	<i>Characteristics</i>	<i>N</i>	<i>%</i>
<i>Respondents' age</i>	18-24 y/o	46	11.6
	25-29 y/o	133	33.5
	30-34 y/o	140	35.3
	35-39 y/o	60	15.1
	>40 y/o	18	4.5
<i>Marital status</i>	Married	226	56.9
	Living with a partner	135	34.0
	Single / unmarried	23	5.8
	Divorced	13	3.3
<i>Employment status</i> („Are you currently employed?“)	Yes	79	19.9
	No	318	80.1
<i>Education level</i>	Secondary education	59	14.9
	Vocational / specialized secondary education	71	17.9
	Higher non-university education	129	32.5
	Higher university education	138	34.8

It is also noteworthy that the proportion of women younger than 25 years in the study was relatively small. This may indicate a lower prevalence of early motherhood or lower involvement of this group in studies related to emotional health after childbirth. Meanwhile, the group of women older than 40 years constituted the smallest part of the sample; however, scientific literature notes that older mothers more often face increased anxiety regarding maternal and infant health, greater physical fatigue, and disturbances in sleep quality. For this reason, age may be considered an important factor potentially associated with emotional and physical well-being during the postpartum period.

When assessing marital status, it was found that the vast majority of respondents were married or living with a partner. This allows the assumption that most study participants had close social and

emotional support. In scientific literature, partner support is identified as one of the most important protective factors reducing the risk of postpartum anxiety, emotional exhaustion, and depressive symptoms. Partner involvement in infant care may also have a positive effect on a woman's rest and sleep quality, especially during the first months after childbirth. On the other hand, even women living in a relationship may face a lack of emotional support, relationship changes, or increased responsibility; therefore, the formal indicator of marital status alone does not always reflect the actual level of support received.

The small proportion of single or divorced women may be regarded as a more socially vulnerable group potentially characterized by a higher risk of emotional difficulties, loneliness, or psychological tension. Studies emphasize that single mothers more often experience emotional exhaustion, social isolation, and difficulties balancing infant care and personal needs, which may directly affect sleep quality and anxiety levels.

Analysing employment status, it was found that the vast majority of women are currently not employed. Such results reflect the natural situation of the postpartum period, when women most often use maternity or childcare leave and devote the greatest attention to newborn care. Although theoretically non-participation in the labour market may create more opportunities for rest and physical recovery after childbirth, in practice infant care often becomes a constant physical and emotional burden, particularly disrupting a woman's sleep routine. For this reason, non-employment status does not necessarily mean lower fatigue or a better emotional condition. On the contrary, prolonged stay at home, reduced social contact, and changes in daily life routines may increase emotional sensitivity, anxiety, or feelings of isolation for some women.

The analysis of respondents' education revealed that more than two-thirds of the surveyed women have higher or higher non-university education. This suggests that women with higher education participated more actively in the study and may be more interested in health issues, psychological well-being, and more inclined to actively engage in scientific research. Higher education is often associated with better health literacy, greater ability to recognize emotional difficulties, and more frequent help-seeking behaviour. However, at the same time, women with higher education may experience greater internal pressure to meet the standards of a "good mother," balance professional and family roles, or strive for perfectionism, which may also negatively affect emotional condition and sleep quality.

Assessment of the reliability of the research instrument is one of the most important stages allowing the quality of the conducted research data to be substantiated and ensuring that the questionnaires used consistently and accurately measure the selected phenomena. In this study,

Cronbach's alpha coefficient was calculated to assess internal consistency (see Table 2), which is widely applied in social and health science research when analysing the reliability of multi-

component scales. A high Cronbach's alpha value allows the conclusion that the questionnaire statements are closely interrelated and measure the same theoretical construct.

Table 2. Reliability of the research instrument

<i>Construct</i>	<i>Number of statements</i>	<i>Cronbach's Alpha</i>
<i>Women's sleep quality after childbirth</i>	14	0.857
<i>Anxiety experienced by women after childbirth</i>	51	0.974

Analysing the obtained results, it was determined that the Cronbach's alpha coefficient for the construct "Women's sleep quality after childbirth" reached 0.857. Such a value indicates good internal consistency of the questionnaire and a sufficiently high level of measurement reliability. This allows the assumption that all 14 statements of this construct are mutually consistent and appropriately reflect the condition of women's sleep quality experienced after childbirth. Good internal consistency is especially important when assessing such complex phenomena as sleep, which includes not only physiological but also emotional, behavioural, and environmental factors. The obtained result allows a well-founded statement that the selected instrument is capable of consistently identifying different aspects of sleep quality and is suitable for further statistical analysis.

Even higher reliability was identified in the construct "Anxiety experienced by women after childbirth," the Cronbach's alpha coefficient of which reached 0.974. Such a value is considered extremely high in scientific literature and indicates very strong consistency between the statements. This means that all 51 statements of the questionnaire purposefully measure the same psychological phenomenon – anxiety experienced after childbirth. High internal consistency ensures that respondents interpreted the questions consistently and that their responses form a coherent and reliable data system.

However, academic literature notes that extremely high Cronbach's alpha values approaching 1.0 may in some cases indicate not only high reliability but also possible overlap or similarity between certain statements. This means that some questions may repeat very similar content or assess closely related emotional aspects. Nevertheless, broader scales are often used in the assessment of psychological phenomena such as anxiety to reveal various dimensions of emotional condition as accurately as possible; therefore, in this context, the high value may be considered justified and methodologically acceptable.

The obtained reliability results of the research instrument have reached the conclusion that the questionnaires demonstrate high internal consistency and may be considered suitable for conducting scientific research. This is especially important when assessing psychological and physiological changes experienced during the postpartum period, as these phenomena are multidimensional, sensitive to individual experiences, and require reliable measurement instruments. High Cronbach's

alpha values also strengthen the validity of further statistical analysis and allow more reliable interpretation of the identified relationships between sleep quality and anxiety experienced after childbirth.

In order to more comprehensively assess the expression of the main research constructs – women’s sleep quality after childbirth and anxiety experienced after childbirth – in the study sample, descriptive statistical indicators presented in Table 3 were calculated. This analysis allows identification not only of general trends in data distribution but also a better understanding of the intensity and variation of emotional and physiological difficulties experienced by respondents. Descriptive statistical indicators are considered one of the most important initial stages of data analysis, as they provide an opportunity to assess the general nature of the studied phenomena before performing more detailed statistical analysis.

The calculated minimum and maximum values allow assessment of the limits of responses and determination of the range within which respondents’ assessments were distributed. These indicators are important for identifying possible extreme responses and assessing data dispersion. Meanwhile, mean values reflect the overall intensity of the studied phenomena in the sample and allow conclusions to be drawn regarding the prevailing trends among women who participated in the study. When assessing such sensitive phenomena as sleep quality or anxiety experienced after childbirth, mean analysis provides an opportunity to preliminarily evaluate whether respondents’ well-being is more associated with a better emotional condition or, conversely, with greater adaptation difficulties.

Standard deviation values allow assessment of the distribution of responses around the mean. A smaller standard deviation indicates greater similarity in respondents’ answers, while a larger value of this indicator suggests that women’s experiences were more individual and diverse. Such variation in results during the postpartum period is expected, as women’s sleep quality and emotional condition may be influenced by numerous interrelated biological, psychological, and social factors, such as the intensity of infant care, social support, novelty of motherhood experience, emotional sensitivity, or general life routine.

Descriptive statistical analysis also forms the basis for further interpretation of the data and allows more accurate assessment of possible relationships between women’s sleep quality and anxiety experienced after childbirth. Analysis of these indicators is important not only in identifying general research trends but also in planning further statistical methods aimed at determining differences between groups or associations between variables.

Table 3. Descriptive statistics results of the research variables

<i>Assessed construct</i>	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Standart deviation</i>
<i>Women's sleep quality after childbirth</i>	397	1.00	5.00	2.122	0.032
<i>Anxiety experienced by women after childbirth</i>		1.00	4.00	2.969	0.034

As can be seen from the data presented in Table 3, the mean score of the construct “Women’s sleep quality after childbirth” reaches 2.12 points out of a possible 5, indicating a slightly below-average evaluation of sleep quality. Considering the assessment scale, it can be stated that the sleep of most respondents after childbirth is neither very poor nor completely good; however, it is characterized by certain quality disturbances, sleep fragmentation, or insufficient rest. Such results are typical of the postpartum period, when women’s sleep routines are often disrupted by newborn care, nighttime awakenings, changes in daily rhythm, and physiological changes in the body after childbirth. Reduced sleep quality at this stage may be associated not only with physical fatigue but also with emotional tension, increased sensitivity, and more difficult recovery of the body.

The obtained sleep quality mean suggests that a considerable proportion of respondents may experience a lack of long-term rest, which affects not only physical well-being but also emotional condition. Scientific literature emphasizes that poorer sleep quality after childbirth is often associated with greater irritability, emotional exhaustion, concentration difficulties, and a higher risk of psychological difficulties. This allows consideration that even moderately expressed sleep disturbances may have a significant impact on a woman’s daily functioning and adaptation to a new stage of life.

Meanwhile, the mean score of the construct “Anxiety experienced by women after childbirth” reaches 2.97 points out of a possible 4, indicating a relatively high level of anxiety among respondents who participated in the study. This result suggests that most women during the postpartum period frequently experience emotional tension, anxiety, or increased sensitivity to various everyday situations. The postpartum period is a stage of intensive biological, psychological, and social changes for a woman; therefore, the manifestation of anxiety symptoms in this context may be considered a fairly common phenomenon. Nevertheless, a higher-than-average level of anxiety may also signal a greater risk of emotional difficulties or psychological exhaustion.

It is important to note that anxiety experienced after childbirth may be related not only to concerns about the infant’s health or maternal responsibilities but also to changes in daily life rhythm, reduced rest, lack of social support, or internal pressure to properly fulfil the maternal role. For some women, anxiety may manifest as constant alertness, increased sensitivity, or difficulty relaxing even when an opportunity to rest arises. Over time, such conditions may further worsen sleep quality and create a closed cycle of emotional and physical exhaustion.

The small standard deviation values indicate a relatively homogeneous distribution of respondents' answers, meaning that the assessments of most respondents were similar and did not differ significantly from one another. Such consistency of results suggests that both sleep quality disturbances and increased anxiety levels are widespread among the women who participated in the study and may be considered characteristic experiences of the postpartum period. The uniform distribution of responses also strengthens the reliability of the results and allows more well-founded interpretation of the relationships identified between the main research variables in further analysis.

Summarizing the descriptive statistical data presented in Table 3, it can be stated that the study sample demonstrates a moderate level of sleep quality evaluation and a relatively high level of anxiety experienced after childbirth. Such results suggest that during the postpartum period women face not only physiological sleep changes but also a significant emotional burden that may affect their overall well-being and adaptation to motherhood. The observed tendencies imply the assumption of a possible interrelationship between these phenomena, as poorer sleep quality and increased anxiety levels often influence one another reciprocally. For this reason, the following part of the work will aim to analyze in greater detail the relationship between sleep quality and anxiety experienced after childbirth and to assess possible aspects of interaction between these constructs.

To determine whether the mean values of anxiety experienced after childbirth and sleep quality differ depending on certain sociodemographic and situational factors, analysis of variance (ANOVA) and an independent samples t-test were performed. The application of these statistical methods allows not only identification of whether statistically significant differences exist between different groups but also a better understanding of which factors may be associated with women's emotional and physiological well-being during the postpartum period. Such analysis is particularly important when studying multidimensional phenomena such as anxiety or sleep quality, as these constructs may be influenced by various interrelated social, biological, and psychological aspects.

The analysis of differences according to respondents' individual characteristics – age, education, marital status, and employment status – allows assessment of whether certain social groups are more vulnerable to emotional or sleep difficulties after childbirth. For example, previous studies often emphasize that younger women may experience greater emotional insecurity due to less motherhood experience, whereas older women often face greater responsibility or self-criticism. Similarly, education may be associated both with better health literacy and help-seeking behavior, as well as with greater perfectionism or emotional pressure.

When assessing situational variables such as pregnancy planning, type of childbirth, first childbirth, time after childbirth, breastfeeding, or support provided by other individuals, the aim was to determine which aspects of the postpartum period may have the greatest influence on women's

emotional condition and sleep quality. These factors are often identified in literature as important elements of adaptation to motherhood. For example, unplanned pregnancy may be associated with greater emotional stress, first childbirth with greater uncertainty and anxiety, while lack of social support is often considered one of the most significant risk factors for poorer psychological well-being.

By performing analysis of variance and the t-test, the aim was not only to determine the statistical significance of differences but also to better understand how different women's experiences may be reflected in their evaluations of sleep quality and anxiety. Such analysis allows a more comprehensive understanding of postpartum difficulties and identification of groups that may require greater emotional, social, or healthcare professional attention.

The following section of the work presents and discusses the statistically significant ANOVA and independent samples t-test results, allowing a more detailed assessment of the associations between the main research constructs and the analyzed sociodemographic and situational factors.

After conducting the analysis and searching for significant differences in the evaluation of sleep quality and anxiety experienced after childbirth according to respondents' sociodemographic characteristics such as education, marital status, and employment status, no statistically significant differences were identified. This suggests that these social indicators had no significant influence on either the evaluation of women's sleep quality or the level of anxiety experienced after childbirth. Such results may indicate that emotional and sleep difficulties during the postpartum period are fairly universal and may occur regardless of a woman's social or professional status. On the other hand, this also allows consideration that experiences after childbirth may be more related to individual emotional or situational factors than to formal sociodemographic indicators.

However, after performing analysis of variance between respondents' age and anxiety experienced after childbirth, statistically significant differences presented in Table 4 were identified. The obtained results indicate that age may be an important factor associated with women's emotional well-being during the postpartum period. Since the identified p-value is lower than 0.05 ($p = 0.007$), it can be stated that evaluations of anxiety experienced after childbirth differ statistically significantly between women of different age groups.

Table 4. Differences in the evaluation of anxiety experienced after childbirth according to different age groups

<i>Construct</i>	<i>Factor</i>	<i>Group</i>	<i>Mean</i>	<i>Standart deviation</i>	<i>p</i>	<i>Statistically significant</i>
<i>Anxiety experienced by women after childbirth</i>	Age	18–24 y/o	2.45	0.67	0.007	Yes
		25–29 y/o	2.11	0.62		
		30–34 y/o	2.06	0.66		
		35–39 y/o	2.08	0.65		
		>40 y/o	1.97	0.46		

As can be seen in Table 4, the highest mean score of anxiety experienced after childbirth was identified among the youngest respondents – in the 18–24 years age group ($M = 2.45$), while the lowest was found among women older than 40 years ($M = 1.97$). Such a tendency suggests that younger women during the postpartum period may be emotionally more sensitive and more likely to experience anxiety symptoms. This result may be explained by less life experience, lower self-confidence in the maternal role, greater uncertainty, and more difficult adaptation to new responsibilities. Younger women may also more frequently face social or financial instability, which additionally increases emotional tension after childbirth.

A general tendency is also noticeable that as age increases, the mean levels of anxiety experienced after childbirth gradually decrease. This may indicate that older women are characterized by greater emotional stability, better stress management skills, or greater preparedness for motherhood. It is likely that women of more mature age more often have a more stable social, financial, and partnership foundation, which may act as a protective factor for emotional well-being.

It is important to note that although older women often face greater responsibility or higher expectations for themselves, their life experience may help them adapt more effectively to the challenges of the postpartum period. Meanwhile, for younger women, motherhood more often becomes an intensive life change requiring rapid emotional and social adaptation. Such results allow consideration that younger mothers may require greater emotional support and more active attention from healthcare professionals during the early postpartum period.

During further analysis of the research data, the aim was to determine whether women's evaluations of sleep quality and anxiety experienced after childbirth differ depending on various situational factors related to pregnancy and postpartum experiences. Variables analysed included pregnancy planning, type of childbirth, first childbirth, time after childbirth, breastfeeding, and support provided by other individuals. Analysis of these factors is important in order to better understand which circumstances may have the greatest influence on a woman's emotional condition and sleep quality after childbirth.

Statistically significant differences were identified when analysing groups of women according to pregnancy planning, and the results are presented in Table 5. The obtained data show that both evaluations of anxiety experienced after childbirth and sleep quality differ significantly between women whose pregnancy was planned and those whose pregnancy was unplanned. Since the p -values of both constructs are lower than 0.01, it can be stated that the identified differences are statistically highly significant.

Table 5. Differences in anxiety experienced after childbirth and sleep quality according to pregnancy planning

<i>Construct</i>	<i>Group</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>p</i>
<i>Anxiety experienced after childbirth</i>	Planned pregnancy	2.05	0.64	0.000
	Unplanned pregnancy	2.34	0.62	
<i>Women's sleep quality after childbirth</i>	Planned pregnancies	2.91	0.66	0.002
	Unplanned pregnancy	3.15	0.70	

As can be seen in Table 5, women whose pregnancy was unplanned demonstrated a higher mean score of anxiety experienced after childbirth ($M = 2.34$) compared to women whose pregnancy was planned ($M = 2.05$). These results suggest that unplanned pregnancy may be associated with greater emotional stress, uncertainty, and more difficult psychological adaptation to motherhood. Unplanned pregnancy often becomes an unexpected life change that may cause additional emotional, social, or financial difficulties, increasing a woman's emotional tension both during pregnancy and after childbirth.

The increased level of anxiety in this group may also be associated with lower preparedness for motherhood, a stronger sense of loss of control, or greater lack of confidence in one's ability to adapt to new life circumstances. Scientific literature notes that planned pregnancy is more often associated with emotional preparedness, a more active social support network, and a greater sense of security, which may act as a protective factor reducing the risk of postpartum anxiety.

Statistically significant differences were also identified when analysing evaluations of women's sleep quality. Women whose pregnancy was unplanned demonstrated poorer sleep quality ($M = 3.15$) compared to respondents who had a planned pregnancy ($M = 2.91$). This tendency suggests that emotional difficulties and increased tension may be directly associated with poorer rest and more frequent sleep disturbances. Emotional tension, anxiety, and constant internal alertness often impair the ability to rest properly; therefore, sleep quality may deteriorate even when there is a physical opportunity to sleep.

The results obtained allow consideration that pregnancy planning may be an important factor in psychological adaptation during the postpartum period. Women who were emotionally and practically prepared for pregnancy are likely to adapt more easily to the changes of motherhood and experience a lower emotional burden. Meanwhile, unplanned pregnancy may increase emotional vulnerability, which manifests both as a higher level of anxiety and poorer sleep quality. Such tendencies highlight the importance of emotional support and early psychological assistance for women who experienced pregnancy as an unexpected or unplanned life event.

Further analysis focused on differences in anxiety experienced after childbirth and sleep quality according to the support received from family members or other close individuals. Assessment of this factor is particularly important, as social support during the postpartum period is frequently identified in scientific literature as one of the most significant protective factors capable of reducing emotional tension and helping women adapt more easily to the changes of motherhood. In order to determine whether receiving support is statistically significantly associated with women's emotional well-being and sleep quality, an independent samples t-test was applied, and the results are presented in Table 6.

Table 6. Differences in anxiety experienced after childbirth and sleep quality according to receiving support from family

<i>Construct</i>	<i>Group</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>p</i>
<i>Anxiety experienced after childbirth</i>	Receives support from family or other individuals	2.06	0.64	0.000
	Does not receive support from family or other individuals	2.47	0.55	
<i>Women's sleep quality after childbirth</i>	Receives support from family or other individuals	2.93	0.67	0.003
	Does not receive support from family or other individuals	3.21	0.68	

As can be seen in Table 6, women receiving support from family or other close individuals demonstrated a lower mean score of anxiety experienced after childbirth ($M = 2.06$) compared to those respondents who do not receive support ($M = 2.47$). The identified very small p-value ($p < 0.001$) indicates that this difference is statistically highly significant. Such results allow the conclusion that social support may have extremely important significance for a woman's emotional condition after childbirth. Support from close individuals may reduce emotional burden, provide a greater sense of security, and help women cope more effectively with the new challenges of motherhood.

Support from family or other close individuals may be important not only from a practical but also from an emotional perspective. The involvement of a partner, parents, or other close people in infant care may reduce the burden of responsibility felt by the woman, provide an opportunity to rest, and reduce feelings of loneliness. During the postpartum period, women often face fatigue, emotional sensitivity, and greater psychological vulnerability; therefore, a supportive social environment may act as an important source of emotional stability.

Statistically significant differences were also identified when evaluating women's sleep quality. Respondents who receive support from close individuals demonstrated better sleep quality

($M = 2.93$) compared to women not receiving support ($M = 3.21$). The obtained p-value ($p = 0.003$) allows the conclusion that this difference is also statistically significant. This tendency may be explained by the fact that practical assistance in caring for the infant provides women with more opportunities to rest, reduces physical exhaustion, and allows at least partial restoration of the disrupted sleep routine.

Sleep quality during the postpartum period is closely related to emotional condition; therefore, a lack of social support may have a dual negative effect – both increasing anxiety levels and worsening the quality of rest. Women who do not receive support may more often experience constant fatigue, emotional exhaustion, or loneliness, which over time may complicate adaptation to motherhood and negatively affect overall psychological well-being.

The obtained results strengthen the assumption that social support after childbirth is a significant factor associated both with better emotional condition and higher-quality rest for women. This allows emphasis on the importance of involvement from close individuals, emotional support, and comprehensive assistance during the postpartum period, especially for those women who face greater adaptation difficulties or emotional vulnerability.

An analysis was performed in order to determine whether evaluations of anxiety experienced after childbirth and sleep quality differ depending on childbirth order, i.e., whether the woman gave birth for the first time or already had previous motherhood experience. Analysis of this factor is significant in assessing women's adaptation to motherhood, as first childbirth is often associated with greater uncertainty, experiencing new responsibilities, and emotional sensitivity. An independent samples t-test was applied for the analysis, and the statistically significant results are presented in Table 7.

Table 7. Differences in anxiety experienced after childbirth and sleep quality according to childbirth order

<i>Construct</i>	<i>Group</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>p</i>
<i>Anxiety experienced after childbirth</i>	First childbirth	2.18	0.65	0.011
	Not first childbirth	2.01	0.63	
<i>Women's sleep quality after childbirth</i>	First childbirth	2.93	0.68	0.141
	Not first childbirth	3.04	0.67	

As can be seen in Table 7, it was determined that women for whom this was the first childbirth demonstrated a statistically significantly higher level of anxiety experienced after childbirth ($M = 2.18$) compared to women who had given birth not for the first time ($M = 2.01$). The obtained p-value ($p = 0.011$) indicates that this difference is statistically significant. Such results suggest that women experiencing motherhood for the first time may be emotionally more sensitive and more frequently encounter anxiety symptoms during the postpartum period.

The increased level of anxiety among first-time mothers may be associated with less practical

experience in caring for a newborn, greater lack of confidence in their abilities, and a stronger sense of responsibility. The first child often becomes a significant life change requiring adaptation to a completely new role, altered life rhythm, and constant emotional and physical involvement. In such situations, women may more frequently feel anxiety regarding infant care, their own competence, or possible mistakes, which increases overall emotional tension.

Meanwhile, women who had given birth not for the first time likely already had previous motherhood experience, allowing them to better understand the infant's needs, organize daily routines more effectively, and adapt more easily to the changes of the postpartum period. Previous experience may provide greater self-confidence and reduce emotional tension caused by uncertainty.

When analyzing evaluations of women's sleep quality, it was determined that no statistically significant differences were identified between women who gave birth for the first time and those who already had motherhood experience ($p > 0.05$). Although the mean sleep quality score of first-time mothers was slightly lower, the obtained differences were not considered statistically significant. This suggests that sleep quality disturbances during the postpartum period are characteristic of most women regardless of previous motherhood experience.

Such results indicate that although first childbirth has a greater influence on emotional well-being and anxiety levels, sleep quality after childbirth is more strongly determined by universal factors related to newborn care, nighttime awakenings, physical fatigue, and changes in daily life rhythm. This allows the assumption that sleep disturbances during the postpartum period are a widespread phenomenon not dependent solely on lack of motherhood experience or the presence of previous experience.

Additionally, analysis was conducted to determine whether breastfeeding is associated with anxiety experienced after childbirth and women's sleep quality. Breastfeeding during the postpartum period is significant not only from a physiological but also from an emotional perspective; therefore, scientific literature frequently examines its possible influence on women's psychological well-being. Since two groups of respondents were analyzed – breastfeeding and non-breastfeeding women – an independent samples t-test was applied for statistical analysis. The results obtained are presented in Table 8.

Table 8. Differences in anxiety experienced after childbirth and sleep quality according to breastfeeding

<i>Construct</i>	<i>Group</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>p</i>
<i>Anxiety experienced after childbirth</i>	Breastfeeding	2.06	0.64	0.030
	Not breastfeeding	2.20	0.65	
<i>Women's sleep quality after childbirth</i>	Breastfeeding	3.01	0.66	0.177
	Not breastfeeding	2.92	0.70	

As can be seen in Table 8, a statistically significant association was identified between breastfeeding and the level of anxiety experienced after childbirth. Breastfeeding women demonstrated a lower mean anxiety score ($M = 2.06$) compared to non-breastfeeding respondents ($M = 2.20$), and the obtained p-value ($p = 0.030$) allows the conclusion that this difference is statistically significant. Such results suggest that breastfeeding may be associated with better emotional well-being and lower emotional tension during the postpartum period.

This tendency may be explained by several aspects. During breastfeeding, oxytocin and prolactin are released in the body – hormones associated with feelings of relaxation, emotional closeness, and security. For this reason, breastfeeding may have a calming effect on a woman's emotional condition and help reduce stress or anxiety. In addition, successful breastfeeding may strengthen some women's self-confidence in the maternal role and provide a stronger emotional bond with the infant.

On the other hand, it is important to note that the relationship between breastfeeding and lower anxiety does not necessarily indicate a direct causal effect. It is likely that women who feel emotionally more stable, have greater social support, or experience a lower psychological burden may find it easier to initiate and continue breastfeeding. Therefore, breastfeeding may be associated with the broader context of a woman's emotional well-being.

When analyzing evaluations of sleep quality, it was determined that there were no statistically significant differences between breastfeeding and non-breastfeeding women ($p > 0.05$). Although the mean sleep quality score of breastfeeding women was slightly higher, the difference was not considered statistically significant. This suggests that breastfeeding did not have a clear influence on women's evaluations of sleep quality.

Such results may be explained by the fact that breastfeeding has a dual effect on women's rest. On the one hand, breastfeeding women wake up more frequently at night to feed the infant; therefore, their sleep may be more fragmented. On the other hand, breastfeeding may help some women calm down more quickly and fall asleep more easily after nighttime awakenings. Due to these opposing factors, the overall effect on sleep quality may remain statistically insignificant.

The results obtained allow the conclusion that breastfeeding is more strongly associated with women's emotional well-being than with sleep quality. The lower level of anxiety among breastfeeding women highlights the importance of emotional and biological factors during the postpartum period and suggests that the breastfeeding experience may be one of the protective factors of emotional well-being.

Summarizing the results of the performed ANOVA and independent samples t-test analyses, it can be stated that the most significant differences in women's sleep quality and anxiety experienced

after childbirth emerged according to age, pregnancy planning, and support received from close individuals. The obtained results suggest that certain sociodemographic and situational factors may have an important influence on women's emotional and physiological well-being during the postpartum period. Younger women, respondents whose pregnancy was unplanned, and women not receiving support from family or other close individuals demonstrated higher levels of anxiety experienced after childbirth and, in some cases, poorer sleep quality.

Such tendencies allow the assumption that emotional stability after childbirth is closely related to a woman's preparedness for motherhood, available social support, and life experience. The significance of social support in this context emerged as one of the most important protective factors capable of reducing emotional tension and helping women adapt more easily to the changed rhythm of life. Meanwhile, unplanned pregnancy and younger age may be associated with greater emotional vulnerability, uncertainty, and more difficult adaptation to the maternal role.

Although not all analyzed sociodemographic and situational factors demonstrated statistically significant differences, the overall direction of the results allows observation that anxiety experienced after childbirth and sleep quality are sensitive to various individual and environmental factors. This confirms that the postpartum period is a complex stage in which emotional and physiological difficulties often overlap and may strengthen one another's effects.

To test hypothesis H1, stating that poorer women's sleep quality after childbirth is statistically significantly associated with a higher level of anxiety experienced after childbirth, correlation and regression analysis were performed. The application of these statistical methods allows not only identification of the existence of a relationship between two constructs but also assessment of the direction, strength, and possible effect of one variable on another. Since both sleep quality and anxiety level are complex and closely interrelated psychophysiological phenomena, such analysis is important to better understand the peculiarities of women's well-being during the postpartum period.

During the correlation analysis, Spearman's correlation coefficient was applied, allowing determination of the strength of the monotonic relationship between two variables. The results of the correlation analysis are presented in Table 9. As can be seen from the obtained data, a statistically highly significant positive relationship was identified between women's sleep quality after childbirth and anxiety experienced after childbirth ($\rho = 0.534$; $p < 0.001$). Since the p-value is lower than 0.001, it can be stated that the identified relationship is not random and has a statistical basis.

Table 9. Correlation between women's sleep quality after childbirth and anxiety experienced after childbirth

<i>Correlation type</i>	<i>Construct</i>	<i>Spearman's correlation</i>	<i>p</i>	<i>Conclusion</i>
<i>Spearman's</i>	<i>Sleep quality → Experienced anxiety</i>	+0.534	<0.001	Statistically highly significant relationship

The identified positive correlation coefficient indicates that as women’s sleep quality worsens, the level of anxiety experienced after childbirth also increases. In other words, women characterized by poorer sleep more frequently experience emotional tension, anxiety symptoms, or psychological discomfort. A moderate-strength correlation suggests that sleep quality is a significant, but not the only, factor associated with women’s emotional condition during the postpartum period.

Such results correspond to the assumption frequently discussed in scientific literature that sleep disturbances and anxiety influence one another reciprocally. Poorer sleep may reduce emotional resilience, increase irritability, and emotional sensitivity, and make it more difficult to cope with daily stressors. Meanwhile, increased anxiety often impairs relaxation, disrupts the process of falling asleep, and leads to more frequent awakenings during the night. For this reason, a closed cycle of emotional and physiological exhaustion may develop between these phenomena.

During the postpartum period, this relationship becomes particularly relevant due to intensive changes in a woman’s life, disrupted daily routine, and constant infant care. Constant sleep deprivation may have a significant influence on women’s psychological condition and, over time, increase the risk of emotional exhaustion or even postpartum psychological disorders. At the same time, an increased level of anxiety may further worsen the quality of rest; therefore, the interaction of these phenomena may become a long-term factor affecting women’s well-being.

The results obtained of the correlation analysis allow support for the proposed hypothesis H1 and confirm that a statistically significant relationship exists between women’s sleep quality after childbirth and anxiety experienced after childbirth. This creates the basis for further regression analysis, which will allow a more detailed assessment of what proportion of anxiety experienced by women can be explained by their sleep quality indicators.

The work presents the results of regression analysis of the associations between women’s sleep quality and anxiety experienced after childbirth, allowing a more detailed assessment of the influence of sleep quality on women’s emotional condition during the postpartum period. Unlike correlation analysis, regression analysis provides an opportunity not only to determine the existence of a relationship but also to assess what proportion of the variation of one phenomenon can be explained by another variable. In this case, the aim was to determine the extent to which the level of anxiety experienced after childbirth depends on women’s sleep quality indicators. The results of the regression analysis are presented in Table 10.

Table 10. Regression analysis of the associations between women’s sleep quality and anxiety experienced after childbirth

<i>Regression model</i>	<i>N</i>	<i>Coefficient of determination R²</i>	<i>p</i>	<i>Statistical significance (p < 0.05)</i>
<i>Sleep quality → Experienced anxiety</i>	397	0.306	<0.001	Yes

As can be seen in Table 10, the regression analysis model is statistically significant ($p < 0.001$), therefore it can be stated that a significant statistical relationship exists between women's sleep quality and anxiety experienced after childbirth. The identified coefficient of determination $R^2 = 0.306$ indicates that sleep quality explains approximately 30.6% of the variance in anxiety experienced after childbirth. Such a value is considered sufficiently significant in social and health sciences research, especially when evaluating complex psychological phenomena that are usually determined by many interrelated factors.

The results obtained suggest that sleep quality is one of the most important factors associated with women's emotional well-being after childbirth. The poorer a woman's sleep quality, the greater the likelihood that she will experience stronger anxiety, emotional sensitivity, or psychological tension. This confirms the assumption that sleep disturbances during the postpartum period may have significant consequences for women's emotional condition and overall psychological functioning.

It is important to note that although sleep quality explains a significant proportion of anxiety experienced after childbirth, the remaining part of the variance may be associated with other factors such as social support, women's individual psychological characteristics, physical health, hormonal changes, financial situation, or previous emotional experiences. This indicates that anxiety experienced after childbirth is a multifaceted phenomenon that cannot be explained solely by sleep quality. Nevertheless, the identified proportion of explained variance exceeding 30% allows sleep quality to be considered a significant prognostic factor of emotional well-being.

Such results also have practical significance in the healthcare context. They suggest that monitoring women's sleep quality and early identification of sleep disturbances may be important measures for timely identification of women at greater risk of emotional difficulties or postpartum anxiety. For this reason, during postpartum care it is important to pay attention not only to women's physical condition but also to the quality of their rest and emotional well-being.

The obtained regression analysis results allow confirmation of the proposed hypothesis H1 that poorer women's sleep quality after childbirth is statistically significantly associated with a higher level of anxiety experienced after childbirth. The identified association supports the assumption that sleep quality is an important factor of emotional well-being during the postpartum period and may have a significant influence on women's psychological adaptation after childbirth. The results of the conducted study revealed significant associations between women's sleep quality after childbirth and anxiety experienced after childbirth and allowed a more detailed evaluation of factors associated with women's emotional and physiological well-being during the postpartum period. The study involved 397 women who had given birth during the previous twelve months. The largest part of the study sample consisted of respondents aged 25–34 years, living in marriage or partnership, and having higher or university education. Most women were not working during the study, reflecting the usual

postpartum period situation when primary attention is devoted to newborn care.

The reliability analysis of the research instrument demonstrated high internal consistency of both applied constructs. The Cronbach alpha coefficient of the construct “Women’s sleep quality after childbirth” reached 0.857, while the construct “Anxiety experienced by women after childbirth” reached 0.974. Such results indicate that the questionnaire statements were consistent, interrelated, and suitable for evaluating the selected phenomena. High reliability indicators strengthened the validity of further statistical analysis and allowed reliable interpretation of the obtained results.

Descriptive statistics analysis revealed that the mean score of women’s sleep quality after childbirth was lower than average, while the level of anxiety experienced after childbirth was comparatively high. These results suggest that during the postpartum period women frequently encounter both sleep quality disturbances and emotional tension and anxiety symptoms. The obtained data reflect that sleep fragmentation, constant fatigue, and emotional sensitivity are common experiences among women during the first year after childbirth. Small standard deviations demonstrated a relatively homogeneous distribution of respondents’ answers, allowing the assumption that these problems were characteristic of most women participating in the study.

When performing ANOVA and independent samples t-test analyses, it was determined that not all sociodemographic indicators were significantly associated with evaluations of sleep quality or anxiety experienced after childbirth. No statistically significant differences were identified according to education, marital status, or employment status. This suggests that emotional and sleep difficulties during the postpartum period may occur regardless of women’s social or professional status.

Nevertheless, significant differences were identified according to respondents’ age. The youngest women (18–24 years) demonstrated the highest level of anxiety experienced after childbirth, while respondents older than 40 years demonstrated the lowest. Such results suggest that younger women during the postpartum period may be emotionally more sensitive and more frequently experience feelings of insecurity, lack of self-confidence, or difficulties adapting to the maternal role. The observed tendency that anxiety level decreases with increasing age may be explained by greater life experience, emotional maturity, and a more stable social foundation.

When analyzing situational factors, it was determined that pregnancy planning had a significant association with both anxiety experienced after childbirth and sleep quality. Women whose pregnancy was unplanned demonstrated higher anxiety levels and poorer sleep quality than respondents whose pregnancy was planned. These results suggest that unplanned pregnancy may be associated with greater emotional uncertainty, psychological tension, and more difficult adaptation to motherhood.

The study results also revealed the highly important significance of social support for women’s well-being after childbirth. Women who received support from family or other close

individuals demonstrated significantly lower anxiety levels and better sleep quality than those who did not receive support. These results strengthen the assumption emphasized in scientific literature that social support is one of the most important protective factors during the postpartum period. Support from close individuals may reduce emotional burden, provide women with more opportunities to rest, and strengthen the feeling of emotional security.

When evaluating the significance of childbirth order, it was determined that women who gave birth for the first time experienced statistically significantly higher anxiety levels than respondents who had given birth not for the first time. This suggests that first childbirth more frequently becomes an emotionally sensitive life change for women, accompanied by greater uncertainty, responsibility, and adaptation difficulties. Meanwhile, sleep quality did not differ significantly between these groups, allowing the assumption that sleep disturbances during the postpartum period are characteristic of most women regardless of previous motherhood experience.

When analyzing the significance of breastfeeding, it was determined that breastfeeding women demonstrated lower levels of anxiety experienced after childbirth than non-breastfeeding respondents. This suggests that breastfeeding may be associated with better emotional well-being, possibly due to hormonal, emotional, or psychological factors. Nevertheless, no significant differences in sleep quality were identified between breastfeeding and non-breastfeeding women, indicating that the influence of breastfeeding on rest may be ambiguous.

Correlation analysis revealed a statistically highly significant positive relationship between women's sleep quality after childbirth and anxiety experienced after childbirth. The identified moderate-strength Spearman correlation coefficient ($\rho = 0.534$; $p < 0.001$) demonstrated that poorer sleep quality is associated with a higher anxiety level. This allows the conclusion that deterioration of sleep quality may be an important factor in worsening emotional well-being during the postpartum period.

The results of regression analysis additionally confirmed this association. It was determined that women's sleep quality explains 30.6% of the variance in anxiety experienced after childbirth ($R^2 = 0.306$; $p < 0.001$). This indicates that sleep quality has a significant influence on women's emotional condition after childbirth and may be considered one of the most important prognostic factors of emotional well-being. The poorer a woman's sleep quality, the greater the likelihood that she will experience stronger anxiety, emotional sensitivity, or psychological exhaustion.

The obtained study results allow the conclusion that during the postpartum period women's emotional and physiological well-being are closely interrelated. Sleep quality disturbances and increased anxiety levels constitute a significant problem that may be strengthened by younger age, unplanned pregnancy, and lack of social support. The study results highlight the importance of comprehensive assistance during the postpartum period, emphasizing not only monitoring of physical

health but also evaluation of emotional condition, strengthening of social support, and timely psychological assistance for women experiencing greater adaptation difficulties after childbirth.

8. DISCUSSION OF THE RESEARCH RESULTS

The results of this study revealed that women's sleep quality after childbirth is significantly associated with anxiety experienced after childbirth. The identified moderate-strength positive relationship between these constructs confirms the assumption that worsening sleep quality is associated with greater emotional sensitivity and stronger anxiety symptoms during the postpartum period. Such results are consistent with the conclusions of many international studies emphasizing that sleep disturbances after childbirth are one of the most important risk factors for women's emotional well-being.

Similar tendencies were identified in a study conducted by Al-Mutawtah and colleagues (2023), in which poorer sleep quality was found to significantly predict higher manifestation of postpartum anxiety and depressive symptoms. The researchers noted that persistent sleep disturbances reduce emotional resilience, disrupt stress regulation mechanisms, and increase the risk of emotional exhaustion. Similarly, this study identified that sleep quality explains a significant proportion of the variance in anxiety experienced after childbirth; therefore, it can be stated that sleep is one of the most important components of postpartum emotional well-being.

The results of this study also correspond to the conclusions of studies conducted by Chu and colleagues (2023), which identified that women experiencing frequent nighttime awakenings and insufficient rest after childbirth more frequently demonstrate increased anxiety, irritability, and emotional instability. The researchers emphasized that even physiologically normal infant care may become a long-term source of psychological fatigue if women do not receive opportunities for quality rest. This tendency was also reflected in the conducted study, in which most respondents demonstrated poorer than average sleep quality.

When analysing sociodemographic differences, it was determined that younger women demonstrated higher levels of anxiety experienced after childbirth. Such results correspond to the conclusions of other researchers that younger mothers more frequently experience emotional insecurity, lower confidence in their motherhood abilities, and stronger stress related to new responsibilities. For example, studies conducted by Doan et al. (2014) identified that younger women are more vulnerable to postpartum emotional distress, especially if they have lower social support or limited previous life experience. The results of this work additionally strengthen the assumption that younger age may be a risk factor for greater postpartum anxiety.

During the study, it was determined that women who experienced unplanned pregnancy demonstrated higher anxiety levels and poorer sleep quality. Such results are also consistent with previous scientific studies. In international literature, unplanned pregnancy is frequently associated with greater emotional stress, psychological unpreparedness for motherhood, and greater social and

financial insecurity. Researchers note that women for whom pregnancy were unexpected more frequently experience feelings of loss of control, anxiety regarding the future, and more difficult emotional adaptation after childbirth. These tendencies were clearly reflected in this study as well.

The results related to social support were particularly important. The study determined that women receiving support from family or close individuals demonstrated significantly lower anxiety levels and better sleep quality. Such conclusions are consistent with studies by many authors in which social support is identified as one of the strongest protective factors during the postpartum period. Garapati et al. (2023) emphasized in his studies that emotional and practical assistance from close individuals reduces women's psychological tension, strengthens emotional security, and reduces the risk of postpartum emotional exhaustion. Similar tendencies were identified in this study, in which women lacking social support demonstrated the poorest indicators of emotional well-being.

The higher level of anxiety experienced after childbirth identified in the group of women giving birth for the first time also corresponds to the results of previous studies. In scientific literature, first childbirth is frequently associated with greater uncertainty, stress caused by new roles, and lower self-confidence. Researchers note that first-time mothers more frequently doubt their ability to properly care for the infant, react more sensitively to changes in infant behavior, and more frequently experience emotional fatigue. The results identified in this study suggest that previous motherhood experience may act as a protective factor for emotional well-being.

The study results also demonstrated that breastfeeding women exhibited lower levels of anxiety experienced after childbirth. Similar results are presented in other studies in which breastfeeding is associated with better emotional condition and lower stress levels. Some authors explain this through biological mechanisms related to oxytocin release, which may promote relaxation and emotional stability. Nevertheless, contradictory results also exist in the literature, since in some studies breastfeeding was associated with greater physical fatigue and sleep fragmentation. In this study, no significant differences in sleep quality were identified between breastfeeding and non-breastfeeding women; therefore, it can be stated that the influence of breastfeeding on sleep may be individual and depend on other environmental or emotional factors.

The results of this study supplement the existing field of scientific research, as they allow comprehensive evaluation of the associations between women's sleep quality and anxiety experienced after childbirth and identification of the most important risk factors. The study data confirm that the postpartum period is an emotionally sensitive stage of life in which physiological and psychological difficulties are closely intertwined. The results obtained also emphasize the importance of social support, emotional assistance, and early identification of emotional difficulties in healthcare practice. The results of this study revealed that women's sleep quality after childbirth was lower than average, while the level of anxiety experienced after childbirth was comparatively

high. Such tendencies correspond to the conclusions presented in many international scientific studies that the postpartum period often becomes a stage of significant physiological and emotional changes for women, during which sleep disturbances and symptoms of emotional anxiety occur very frequently. Scientific literature notes that women's sleep quality after childbirth most commonly worsens due to nighttime awakenings, newborn care, and altered circadian rhythm, while long-term lack of rest may negatively affect emotional condition and overall quality of life (García-Plata, Garcia-Molina, 2025; Dorsey et al., 2021).

The lower-than-average sleep quality evaluation identified in this study is consistent with the findings of Gotlib and co-authors (2020), who found that most women experience fragmented sleep, reduced rest efficiency, and persistent fatigue during the first months after childbirth. The researchers noted that even physiologically normal newborn care processes may have a long-term impact on a woman's rest quality, especially if the woman does not have sufficient opportunities for physical and emotional recovery. Similar conclusions were presented by Hirshkowitz and co-authors (2015), who found that sleep quality remains poor during the postpartum period regardless of a woman's social status or previous motherhood experience.

The relatively high level of postpartum anxiety identified during the study also corresponds with the findings of other authors. Iacona et al. (2025) and Hwang et al. (2022) emphasized in their work that women during the postpartum period often experience increased emotional sensitivity, constant concern about the baby's health, maternal responsibility, and their ability to adequately fulfill the maternal role. The researchers noted that even in the absence of clinical mental health disorders, postpartum anxiety may significantly affect a woman's emotional well-being, interpersonal relationships, and daily functioning. The results of this study confirm that emotional tension and anxiety symptoms are a widespread phenomenon among women after childbirth.

Scientific literature also frequently emphasizes the reciprocal interaction between sleep quality and emotional state. Jintadawong and co-authors (2025) found that poorer sleep quality is significantly associated with greater emotional irritability, more difficult stress management, and higher anxiety levels. The researchers noted that long-term sleep deprivation reduces a woman's emotional resilience and may complicate adaptation to new life circumstances after childbirth. Similarly, this study observed a tendency for women to demonstrate not only poorer rest but also increased emotional sensitivity.

The results of this study also suggest that even moderate sleep disturbances may have a significant impact on a woman's daily functioning. Kawashima and co-authors (2022) found that during the postpartum period even slight but long-term deterioration in sleep quality may be associated with emotional exhaustion, reduced ability to cope with stress, and a higher risk of psychological difficulties. The researchers emphasized that a woman's emotional state after childbirth is particularly

sensitive to physiological changes; therefore, rest quality becomes an important component of psychological well-being.

The small standard deviations identified in this study indicate a relatively homogeneous distribution of respondents' answers. This suggests that sleep quality disturbances and elevated anxiety levels were characteristic of the majority of women who participated in the study. Similar trends are also found in other studies, which note that the postpartum period for many women is characterized by similar emotional and physiological difficulties regardless of individual differences (Kumarasinghe, 2024). This allows the assumption that poorer sleep quality and emotional tension may be considered relatively universal experiences during the postpartum period. The obtained results reinforce the assumption that during the postpartum period greater attention should be paid not only to women's physical health but also to emotional health and sleep quality assessment. Scientific literature increasingly emphasizes the importance of early diagnosis of emotional difficulties and comprehensive support in order to reduce the risk of long-term psychological problems. The results of this study complement existing scientific data and suggest that assessment of sleep quality and emotional well-being should be an important part of postpartum care.

The results of this study showed that respondents' age is statistically significantly associated with postpartum anxiety. It was found that the youngest study participants—women aged 18–24 years—demonstrated the highest anxiety levels, whereas respondents older than 40 years demonstrated the lowest. Such results are consistent with the conclusions of previous scientific studies, which note that younger women more frequently experience emotional difficulties, uncertainty, and greater psychological vulnerability during the postpartum period (Jiao et al., 2025).

Scientific literature emphasizes that younger mothers more often demonstrate lower confidence in their ability to care for a newborn, stronger social insecurity, and greater emotional sensitivity. Yazdanpanah et al. (2025) found that younger women after childbirth more frequently experience anxiety symptoms due to insufficient motherhood experience, greater social pressure, and more difficult adaptation to a new stage of life. The results of this study confirm these trends, as the highest average anxiety level was identified specifically in the youngest respondent group.

Meanwhile, the lower anxiety level among older women may be explained by greater emotional maturity, better stress management abilities, and a more stable social environment. Lan et al. (2026) noted in their studies that older women more often demonstrate greater emotional stability and greater confidence in their ability to adapt to the challenges of motherhood. Older women also more frequently have a more stable financial and partnership foundation, which may act as a protective factor for emotional well-being. Such tendencies were also reflected in this study, in which a consistent decrease in anxiety was observed with increasing respondent age.

The results of this study also suggest that younger women may be more sensitive not only to

emotional but also to social difficulties during the postpartum period. Kilavuz and Topaloğlu (2025) found that younger mothers more frequently experience emotional instability due to limited social support, greater financial difficulties, and insufficient preparation for motherhood. The researchers noted that these circumstances may strengthen anxiety symptoms and complicate emotional adaptation after childbirth.

In further analysis of this study, various situational factors that may influence women's sleep quality and postpartum anxiety were evaluated. Such analysis corresponds with recommendations from other authors to assess postpartum experiences comprehensively, since a woman's emotional state after childbirth is often determined not only by biological but also by social, psychological, and environmental factors (Medic et al., 2017). Scientific literature notes that pregnancy planning, social support, breastfeeding, or first childbirth may significantly affect a woman's emotional well-being and adaptation to motherhood.

The results of this study suggest that younger women may be considered a higher emotional risk group during the postpartum period. For this reason, early recognition of emotional difficulties, more active psychological support, and individualized healthcare may be important factors in reducing the manifestation of postpartum anxiety among younger mothers.

The results of this study showed that pregnancy planning is statistically significantly associated with both postpartum anxiety and sleep quality among women. It was found that women whose pregnancy was unplanned demonstrated higher anxiety levels and poorer sleep quality than respondents whose pregnancy was planned. Such results are consistent with the conclusions of other scientific studies, in which unplanned pregnancy is often identified as a significant risk factor for emotional tension and psychological vulnerability during the postpartum period (Modak et al., 2023).

Scientific literature notes that unplanned pregnancy often becomes an unexpected life change for women, requiring rapid emotional, social, and practical adaptation. Nelson et al. (2022) found that women whose pregnancy was unplanned more frequently demonstrate increased emotional sensitivity, a stronger sense of insecurity, and a greater risk of postpartum anxiety and depressive symptoms. The researchers noted that emotional unpreparedness for motherhood may intensify the feeling of loss of control and complicate adaptation to new life circumstances. The results of this study confirm these trends, as higher anxiety indicators were identified specifically among women whose pregnancy was unplanned.

Similar results were also presented by Mirzakhmetova and co-authors (2024), who found that unplanned pregnancy is significantly associated with greater emotional stress, psychological instability, and poorer emotional well-being after childbirth. The researchers noted that women who did not plan their pregnancy more frequently face financial difficulties, lower social support, and greater anxiety about the future, which may negatively affect their emotional condition. Such aspects

may also explain the higher anxiety level identified in this study among respondents who experienced an unplanned pregnancy.

This study also found that women whose pregnancy was unplanned demonstrated poorer sleep quality. Such results are consistent with the conclusions of other authors that emotional tension and increased anxiety may significantly affect the quality of a woman's rest. Lan and co-authors (2026) found that women experiencing greater psychological stress during pregnancy and the postpartum period more frequently encounter fragmented sleep, difficulties falling asleep, and insufficient rest. The researchers emphasized that emotional instability may disrupt the body's ability to relax, thereby worsening overall sleep efficiency.

Poorer sleep quality among women whose pregnancy was unplanned may also be explained by constant internal vigilance, concerns about financial situation, relationship stability, or maternal responsibility. Cheng and Priel et al. (2020) noted that emotional stress after childbirth is one of the most significant factors associated with deterioration in sleep quality. The researchers found that women with higher anxiety levels more frequently experience fatigue, nighttime awakenings, and dissatisfaction with sleep quality.

Scientific literature also emphasizes that planned pregnancy is more often associated with greater emotional preparedness, a more active social support network, and a more stable sense of security. Slomian et al. (2019) found that women who planned their pregnancy more often feel prepared for motherhood, demonstrate greater self-confidence, and possess better abilities to adapt to a new stage of life. Such factors may function as protective mechanisms that reduce emotional tension and help women adapt more easily to postpartum changes.

The results of this study suggest that pregnancy planning is an important factor in psychological adaptation after childbirth. Unplanned pregnancy may increase emotional vulnerability, which manifests not only through higher anxiety levels but also through poorer sleep quality. The obtained results highlight the importance of early emotional support, psychological counseling, and social support for women who experienced pregnancy as an unexpected life event.

The results of this study revealed that social support during the postpartum period is significantly associated with both postpartum anxiety and sleep quality among women. It was found that women receiving help from family members or other close individuals demonstrated lower anxiety levels and better sleep quality than respondents who did not receive assistance. Such results are consistent with the conclusions of numerous scientific studies in which social support is identified as one of the most important protective factors for women's emotional well-being after childbirth (Thakral et al., 2021).

Scientific literature notes that emotional and practical assistance after childbirth may significantly reduce women's experienced stress and contribute to better adaptation to the maternal

role. Ojomo et al. (2025) found that women who feel strong partner or family support less frequently experience emotional exhaustion, anxiety symptoms, and signs of postpartum depression. The researchers emphasized that social support provides women with a greater sense of security and helps them cope more effectively with the daily challenges of motherhood. Similar tendencies were reflected in this study, in which women receiving support from close individuals demonstrated statistically significantly lower levels of postpartum anxiety.

The higher anxiety level identified in this study among women not receiving support is also consistent with the findings of a study conducted by Patel and co-authors (2024). The researchers found that lack of social support is significantly associated with greater emotional vulnerability, feelings of loneliness, and more difficult psychological adaptation after childbirth. According to the authors, women who do not have sufficient emotional or practical support more frequently experience insecurity, emotional tension, and persistent fatigue.

The obtained results suggest that help from family members or other close individuals is important not only for emotional but also for physiological well-being. This study found that women receiving assistance demonstrated better sleep quality than those who did not receive support. Similar conclusions were presented by Paditz (2024), who found that social support after childbirth is associated with lower physical exhaustion, better rest, and lower stress levels. The researchers noted that partner or family involvement in infant care provides women with more opportunities to rest and reduces the state of constant vigilance.

Scientific literature also emphasizes that sleep quality and emotional state after childbirth are closely interconnected. Lack of social support may intensify emotional tension, which in turn worsens a woman's ability to obtain quality rest. Ojomo and co-authors (2025) found that women experiencing greater emotional stress and lower social support more frequently encounter fragmented sleep, fatigue, and reduced satisfaction with rest. Such results are also consistent with the data of this study, suggesting that lack of social support may have a dual negative effect—both increasing emotional vulnerability and worsening sleep quality.

It is important to note that social support during the postpartum period may function as a protective mechanism that reduces emotional tension and strengthens women's psychological resilience. Rouhi and co-authors (2023) noted that emotional support from partners, family members, or close individuals contributes to better emotional adaptation, greater self-confidence, and reduced feelings of loneliness after childbirth. Such tendencies also emerged in this study, in which women with a supportive social environment demonstrated better indicators of emotional and physiological well-being.

The results of this study suggest that social support is one of the most important factors associated with women's emotional and physical well-being after childbirth. The obtained data

highlights the importance of comprehensive support and involvement of close individuals during the postpartum period, especially in reducing women's emotional vulnerability and improving the quality of their rest.

The results of this study revealed that birth order is statistically significantly associated with postpartum anxiety among women. It was found that first-time mothers demonstrated higher anxiety levels than respondents who already had previous motherhood experience. Such results are consistent with the conclusions of other scientific studies in which first childbirth is often identified as one of the most significant factors of emotional vulnerability during the postpartum period (Saharoy et al., 2023).

Scientific literature notes that women experiencing motherhood for the first time more frequently encounter uncertainty, a greater sense of responsibility, and stronger anxiety regarding infant care and their ability to adequately fulfill the maternal role. Slomian et al. (2019) found that first-time mothers more frequently demonstrate lower self-confidence, greater emotional sensitivity, and more difficult adaptation to changes associated with motherhood. The researchers noted that lack of motherhood experience may increase emotional tension and insecurity when making decisions regarding infant care. Similar tendencies were reflected in this study, in which first-time mothers demonstrated statistically significantly higher anxiety levels.

Similar results were also presented by Smith and co-authors (2022), who found that first-time mothers more frequently experience emotional stress and greater anxiety due to new responsibilities and changes in life routine. The researchers noted that the first child often becomes an intensive life change requiring rapid emotional and social adaptation. The results identified in this study suggest that previous motherhood experience may function as a protective factor, providing greater emotional stability and self-confidence.

The lower anxiety level among women who had given birth previously may be explained by existing practical experience and better preparedness for motherhood. Tosto et al. (2023) noted that previous motherhood experience often helps women more easily understand infant needs, organize daily routines more effectively, and reduce the emotional tension caused by uncertainty. Experience may strengthen women's self-confidence and ability to adapt to the challenges of the postpartum period.

When analysing women's sleep quality in this study, no statistically significant differences were found between first-time mothers and women with previous motherhood experience. Such results partly correspond with the findings of other studies indicating that sleep quality disturbances after childbirth are a widespread phenomenon regardless of motherhood experience (Wang et al., 2023). The researchers noted that the main factors worsening sleep quality—night-time infant awakenings, feeding, physical fatigue, and disrupted daily routine—are characteristic of most women

after childbirth, regardless of whether they are giving birth for the first time.

Similar conclusions were also presented by White (2023), who found that motherhood experience has a greater impact on emotional well-being than on sleep quality itself. The researcher noted that although first-time mothers more often demonstrate greater emotional sensitivity and anxiety, physiological sleep disturbances during the postpartum period remain similar across many groups of women. Such results also correspond with the data of this study, in which no significant differences in sleep quality according to birth order were found.

The results of this study suggest that first childbirth may be an important emotional risk factor during the postpartum period, whereas sleep quality disturbances remain relevant for most women regardless of previous motherhood experience. This highlights the importance of emotional support, education, and psychological assistance for first-time mothers in order to reduce their emotional vulnerability and facilitate adaptation to motherhood.

The results of this study showed that breastfeeding is statistically significantly associated with lower levels of postpartum anxiety, but no significant differences in sleep quality were found between breastfeeding and non-breastfeeding women. Such results partly correspond with the findings of other scientific studies in which breastfeeding is often associated with better emotional well-being and lower psychological vulnerability during the postpartum period (Zhou et al., 2025).

Scientific literature notes that breastfeeding may have a positive effect on a woman's emotional state due to biological and psychological mechanisms. Horwitz et al. (2026) found that breastfeeding women demonstrate lower stress hormone activity and better emotional stability than non-breastfeeding respondents. The researchers noted that hormones released during breastfeeding—oxytocin and prolactin—may promote relaxation, emotional closeness, and a sense of security, thereby reducing emotional tension and anxiety symptoms. Similar tendencies were reflected in this study, in which breastfeeding women demonstrated statistically significantly lower levels of postpartum anxiety.

Similar results were presented by Iranpour and co-authors (2016), who found that breastfeeding is associated with lower emotional reactivity and a better ability to cope with stress among women. The researchers noted that breastfeeding may function as a protective factor for emotional well-being, strengthening the woman's bond with the infant and increasing self-confidence in the maternal role. Such tendencies suggest that a successful breastfeeding experience may contribute to better psychological adaptation after childbirth.

However, scientific literature emphasizes that the relationship between breastfeeding and emotional well-being is not unambiguous. Kay et al. (2024) noted that better emotional condition may not only be a consequence of breastfeeding but may also act as a prerequisite for more successful breastfeeding. The researchers found that women with stronger social support, lower anxiety levels,

and better psychological well-being are more likely to initiate and continue breastfeeding for longer. This suggests that breastfeeding may be related to the broader context of a woman's emotional well-being and social environment.

When analyzing sleep quality indicators in this study, no significant differences were found between breastfeeding and non-breastfeeding women. Such results are consistent with the findings of some previous studies, which note that the effect of breastfeeding on sleep quality remains ambiguous (Libman et al., 2016). The researchers found that although breastfeeding women more often wake up at night to feed the infant, they often fall asleep more quickly after night-time awakenings and demonstrate more effective adaptation to the changed sleep pattern.

Similar conclusions were presented by McBean and co-authors (2016), who noted that the sleep of breastfeeding women is often more fragmented, but overall satisfaction with rest may not differ from that of non-breastfeeding women. The researchers emphasized that sleep quality during the postpartum period is determined by many interrelated factors—the infant's sleep rhythm, emotional state, partner support, and general physical fatigue—therefore breastfeeding alone does not necessarily become the main determinant of sleep quality.

The results of this study suggest that breastfeeding has greater significance for a woman's emotional well-being than for sleep quality itself. The lower anxiety level among breastfeeding women reinforces the assumption that biological and emotional processes associated with breastfeeding may act as protective factors for women's psychological well-being. However, the absence of significant differences in sleep quality suggests that the quality of rest during the postpartum period is most likely determined by a complex interaction of various physiological, emotional, and environmental factors.

The results of the correlational analysis of this study revealed a statistically highly significant positive relationship between women's sleep quality after childbirth and postpartum anxiety. The identified moderate Spearman correlation coefficient ($\rho = 0.534$; $p < 0.001$) indicates that as sleep quality worsens, women's anxiety levels also increase. Such results correspond with the findings of many international studies, which note that sleep disturbances and emotional difficulties during the postpartum period are closely interrelated phenomena (Niu et al., 2025).

Scientific literature often emphasizes the reciprocal interaction between sleep and emotional state. Modak and co-authors (2023), in a systematic literature review, found that women experiencing poorer sleep quality after childbirth more often demonstrate higher anxiety levels, emotional irritability, and greater psychological vulnerability. The researchers noted that constant sleep deprivation reduces emotional resilience and impairs the ability to adapt to everyday stressors, which may increase the risk of emotional exhaustion over time. The results of this study confirm these tendencies, as it was found that women with poorer sleep more often experience anxiety symptoms.

Similar results were presented by Nagel and co-authors (2022), who found that deterioration in sleep quality during the postpartum period is significantly associated with increased emotional sensitivity and a higher level of psychological discomfort. The researchers noted that constant night-time awakenings, disrupted daily routine, and physical fatigue may have a direct effect on a woman's emotional well-being. Such tendencies were also reflected in this study, in which a statistically significant relationship between sleep quality and postpartum anxiety was found.

Scientific literature also notes that increased anxiety may not only be a consequence of poorer sleep but may also itself act as a factor worsening sleep quality. Ojomo and co-authors (2025) found that women with higher anxiety levels more often experience difficulties falling asleep, frequent awakenings, and reduced satisfaction with rest. The researchers noted that constant internal tension and increased vigilance impair the body's ability to relax; therefore, a closed cycle of emotional and physiological exhaustion may develop between sleep disturbances and anxiety.

The moderate correlation identified in this study suggests that sleep quality is a significant, but not the only, factor associated with women's emotional well-being after childbirth. This corresponds with the conclusions of Rupanagunta and co-authors (2023), who noted that postpartum anxiety is determined by a complex interaction of biological, psychological, and social factors. The researchers emphasized that emotional state after childbirth is influenced not only by rest quality but also by social support, financial stability, partner relationships, and individual psychological resources.

During the postpartum period, the relationship between sleep quality and anxiety becomes especially relevant due to intensive life changes and constant infant care. Smith et al. (2022) found that long-term sleep deprivation after childbirth may significantly affect a woman's ability to regulate emotions, increase emotional sensitivity, and reduce psychological resilience to stress. The researchers noted that fatigue and emotional tension may reinforce each other's effects, which over time may worsen a woman's overall psychological well-being.

The results of this study complement existing scientific data and suggest that sleep quality is an important indicator of emotional well-being during the postpartum period. The statistically significant association found between poorer sleep and higher anxiety levels strengthens the assumption that emotional and physiological well-being problems among women after childbirth are closely interconnected. The results obtained also highlight the importance of early recognition of sleep disturbances and emotional support to reduce the risk of postpartum anxiety and improve women's quality of life.

The regression analysis results of this study showed that women's sleep quality is significantly associated with postpartum anxiety and explains more than one-third of the variation in this phenomenon. The identified coefficient of determination ($R^2 = 0.306$) suggests that sleep quality is

one of the most important factors of emotional well-being during the postpartum period. Such results are consistent with the findings of other scientific studies, which note that sleep disturbances have significant prognostic value in assessing women's emotional state after childbirth (Tal, Taylor, 2021). Scientific literature emphasizes that the postpartum period is a particularly sensitive stage for women's psychological and physiological adaptation; therefore, sleep quality becomes an important indicator of emotional health. Garapati and co-authors (2023), in a systematic literature review, found that sleep disturbances significantly predict increased anxiety and depressive symptoms after childbirth. The researchers noted that long-term sleep deprivation reduces emotional resilience, disrupts stress regulation mechanisms, and increases the risk of emotional exhaustion. Similar tendencies were identified in this study, in which poorer sleep quality was associated with higher levels of postpartum anxiety.

The statistical significance of the regression model suggests that sleep quality may be considered an important prognostic factor of emotional well-being. Gessesse and co-authors (2022) found that women experiencing chronic sleep deprivation during pregnancy and the postpartum period more often demonstrate emotional irritability, anxiety, and reduced ability to cope with stress. The researchers noted that disturbed sleep may negatively affect emotion regulation processes and, over time, increase the risk of psychological difficulties.

The more than 30% share of explained variation identified in this study is considered significant in the context of social and health sciences, especially when assessing complex psychological phenomena. Similar conclusions were presented by Dørheim and co-authors (2009), who found that sleep quality is one of the strongest predictors of postpartum emotional well-being. The researchers noted that persistent sleep disturbances may contribute to emotional instability, reduced psychological resilience, and more difficult adaptation to motherhood.

However, scientific literature emphasizes that postpartum anxiety is a multidimensional phenomenon determined not only by physiological factors. Erkal Aksoy and co-authors (2025) noted that women's emotional well-being after childbirth is influenced by social support, financial stability, partner relationships, previous emotional experience, and individual psychological resources. These insights also correspond with the results of this study, which found that although sleep quality explains a significant proportion of postpartum anxiety, the remaining variation may be related to other psychosocial factors.

The results of this study also have important practical significance in the field of healthcare. Scientific literature increasingly emphasizes the importance of early recognition of sleep disturbances to reduce the risk of postpartum emotional difficulties. Henderson and co-authors (2019) noted that regular assessment of women's sleep quality during the postpartum period may help identify emotional vulnerability earlier and ensure timely psychological support. The researchers emphasized

that monitoring sleep quality should be an integrated part of postpartum care.

The descriptive statistics results of this study also revealed that most women demonstrated lower-than-average sleep quality and a relatively high level of anxiety. Such results correspond with the conclusions of Hirotsu and co-authors (2015), which note that the first year after childbirth is often characterized by increased emotional sensitivity, persistent fatigue, and disturbed rest. The researchers emphasized that sleep fragmentation during the postpartum period becomes one of the most common problems with a direct impact on women's emotional well-being.

The high reliability indicators of the research instrument also strengthen the validity of the obtained results. Cronbach's alpha values exceeding the recommended threshold of 0.7 indicate good internal consistency of the construct and suggest that the questionnaires used appropriately measured the selected phenomena. Such results correspond with the methodological recommendations presented by Jiao (2025), which note that high internal consistency is an important condition for conducting reliable statistical analysis.

The results of this study complement existing scientific data and suggest that sleep quality is one of the most important factors of women's emotional well-being during the postpartum period. The statistically significant relationship identified between poorer sleep and higher postpartum anxiety strengthens the assumption that women's emotional and physiological well-being after childbirth are closely interconnected. The results obtained highlight the need to pay greater attention in postpartum care not only to women's physical condition but also to their emotional state and sleep quality assessment.

The results of this study revealed that pregnancy planning is significantly associated with both women's emotional well-being and sleep quality during the postpartum period. It was found that women whose pregnancy was unplanned demonstrated higher levels of postpartum anxiety and poorer sleep quality. Such results are consistent with the findings of other scientific studies, in which unplanned pregnancy is associated with greater emotional stress, psychological unpreparedness for motherhood, and more difficult adaptation to life changes (Kilavuz, Topaloğlu, 2025). Scientific literature notes that women for whom pregnancy was unexpected more often experience a sense of loss of control, emotional insecurity, and greater anxiety about the future, which may negatively affect both emotional state and rest quality (Bahk et al., 2015). The results of this study strengthen the assumption that emotional preparedness for motherhood is an important factor in women's psychological adaptation.

The study also revealed the particularly important role of social support in women's well-being after childbirth. Women who received help from family members or other close individuals demonstrated statistically significantly lower anxiety levels and better sleep quality than respondents who did not receive help. Such tendencies correspond with the findings of Kwon et al. (2024) in

which social support is identified as one of the most important protective factors during the postpartum period. The researchers noted that emotional and practical assistance from close individuals helps reduce women's emotional tension, provides more opportunities for rest, and strengthens the sense of emotional security. In scientific literature, lack of social support is often associated with greater emotional vulnerability, fatigue, and more difficult adaptation to the maternal role (Lin et al., 2022). Such aspects were clearly reflected in this study as well.

When assessing the significance of birth order, it was found that first-time mothers demonstrated higher levels of postpartum anxiety than respondents who had given birth previously. Such results are consistent with the findings of Kim et al. (2015), which note that first childbirth often becomes an emotionally sensitive life stage accompanied by greater uncertainty, responsibility, and adaptation difficulties. Scientific literature emphasizes that first-time mothers more often doubt their ability to properly care for the infant, react more sensitively to new situations, and experience stronger emotional stress. Meanwhile, previous motherhood experience may act as a protective factor, providing greater self-confidence and emotional stability.

However, this study did not find statistically significant differences in sleep quality between first-time mothers and women with previous motherhood experience. Such results correspond with the conclusions of Insana and Ladyman et al. (2022), which note that sleep disturbances during the postpartum period are a widespread phenomenon regardless of women's previous motherhood experience. The researchers emphasize that the main factors worsening sleep quality—night-time infant awakenings, feeding, and physical fatigue—are characteristic of most women after childbirth. When analysing the significance of breastfeeding, this study found that breastfeeding women demonstrated lower levels of postpartum anxiety than non-breastfeeding respondents. Such results are consistent with the findings of Lopez-Gonzalez and Mikes (2026) and Mor et al. (2025), in which breastfeeding is associated with better emotional well-being and lower emotional reactivity. Scientific literature notes that hormones released during breastfeeding—oxytocin and prolactin—may promote relaxation, emotional closeness, and reduce stress responses (Paditz, 2024). However, this study did not find significant differences in sleep quality between breastfeeding and non-breastfeeding women. Such results are consistent with the study by Schiller and co-authors (2015), which notes that breastfeeding may have a dual effect on sleep quality: although breastfeeding women wake up more frequently at night, they may also calm down more quickly and fall asleep more easily after awakenings.

The results of the correlational analysis in this study revealed a statistically highly significant positive relationship between women's sleep quality after childbirth and postpartum anxiety. The identified moderate relationship indicates that poorer sleep quality is associated with higher anxiety levels. Such results correspond with the findings of Patel and co-authors (2024) and Mor and co-

authors (2025), which note that sleep disturbances and emotional difficulties after childbirth are closely interrelated phenomena. The researchers emphasize that long-term sleep deprivation may reduce emotional resilience, increase irritability, and impair the ability to cope with everyday stressors.

The regression analysis results further confirmed the significance of sleep quality for women's emotional well-being after childbirth. It was found that sleep quality explains 30.6% of the variation in postpartum anxiety. Such results indicate that sleep quality is one of the most important prognostic factors of emotional well-being during the postpartum period. Similar conclusions were presented by Mbiydenyuy and Qulu (2024), who found that poorer sleep quality significantly increases the risk of emotional exhaustion, anxiety, and depressive symptoms after childbirth. Scientific literature also notes that sleep quality is closely related to a woman's ability to regulate emotions, adapt to a new life rhythm, and maintain psychological stability (Mughal et al., 2018).

The obtained results suggest that women's emotional and physiological well-being during the postpartum period are closely interconnected and depend on various psychosocial and biological factors. The study data highlight not only the significance of sleep quality for emotional state but also the importance of social support, emotional preparedness for motherhood, and early psychological assistance in ensuring better well-being for women after childbirth.

In summarizing the results of the discussion, it can be stated that the associations between women's sleep quality after childbirth and postpartum anxiety identified in this study essentially correspond with the conclusions presented in international scientific studies. The obtained results confirm that the postpartum period is an emotionally and physiologically sensitive stage in which women's well-being is affected by a complex interaction of biological, psychological, and social factors. The study revealed that poorer sleep quality is significantly associated with higher levels of postpartum anxiety, and sleep quality may be considered one of the most important prognostic factors of emotional well-being during the postpartum period.

The discussion revealed that various situational and social factors have a significant influence on women's emotional well-being. Unplanned pregnancy was associated with greater emotional vulnerability and poorer sleep quality, whereas receiving social support from family members or close individuals acted as an important protective factor that reduced emotional tension and improved rest quality. These tendencies correspond with the assumption emphasized in scientific literature that women's emotional well-being after childbirth is closely related to social security, emotional support, and preparedness for motherhood.

The study results also showed that first-time mothers demonstrated higher levels of postpartum anxiety than respondents with previous motherhood experience. This suggests that first childbirth more often becomes an emotionally difficult life change accompanied by greater

uncertainty and adaptation difficulties. Meanwhile, sleep quality disturbances were characteristic of most women regardless of previous motherhood experience, which allows them to be viewed as a relatively universal phenomenon of the postpartum period.

When analyzing the significance of breastfeeding, it was found that breastfeeding women demonstrated lower anxiety levels, but no significant differences in sleep quality were identified between breastfeeding and non-breastfeeding respondents. Such results suggest that breastfeeding may be more strongly associated with women's emotional well-being than with physiological rest. In scientific literature, this is most often explained by hormonal, emotional, and psychological mechanisms related to the formation of the mother-infant bond.

The discussion results also strengthened the assumption of a reciprocal relationship between sleep quality and emotional state. The statistically significant correlation and regression relationship identified in the study suggest that worsening sleep quality may increase emotional sensitivity, anxiety symptoms, and psychological exhaustion, while increased anxiety levels may in turn further disturb women's rest. For this reason, a closed cycle of emotional and physiological exhaustion may develop between these phenomena, with long-term effects on women's well-being.

The obtained results highlight the importance of comprehensive postpartum care, emphasizing not only the monitoring of women's physical condition but also the assessment of emotional well-being and sleep quality. The study data suggest that early recognition of emotional difficulties and sleep disturbances, strengthening of social support, and individualized psychological assistance may be important measures for reducing the risk of postpartum anxiety and improving women's quality of life after childbirth.

CONCLUSIONS

1. During the postpartum period, women's sleep quality significantly deteriorates due to the complex interaction of biological, psychological, and social factors. Sleep quality after childbirth is negatively affected by hormonal changes, infant sleep patterns, night-time feeding, fatigue, physical pain, emotional sensitivity, and disrupted circadian rhythm. Studies show that fragmented and poor-quality sleep is directly associated with poorer emotional well-being, increased stress, emotional exhaustion, and reduced ability to adapt to the maternal role. The literature also emphasizes that women's sleep quality is strongly influenced by social and environmental factors, including partner involvement, social support, socioeconomic situation, and accessibility of healthcare services. A comprehensive approach to sleep quality allows it to be evaluated not only as a physiological phenomenon but also as an important indicator of mental health and quality of life during the postpartum period.
2. Postpartum anxiety is a common yet still insufficiently recognized mental health problem that is closely associated with women's sleep quality. Studies show that anxiety symptoms after childbirth often manifest as persistent worrying, emotional tension, sleep disturbances, increased vigilance, and physiological stress symptoms. The literature emphasizes that poor sleep quality and postpartum anxiety form a reciprocal relationship—sleep disturbances increase emotional vulnerability and anxiety symptoms, while anxiety further worsens sleep quality. International epidemiological data indicate a high prevalence of postpartum anxiety; however, its diagnosis often remains inadequate due to underestimation of symptoms, stigmatization, and limited emotional health assessment in postpartum care. Scientific sources emphasize the importance of early diagnosis, emotional support, partner involvement, and systematic assessment of sleep quality in order to reduce long-term negative consequences for both maternal and infant health.
3. The results of the study revealed a statistically significant association between women's sleep quality after childbirth and the level of postpartum anxiety experienced. A moderate positive correlation ($\rho = 0.534$; $p < 0.001$) showed that as women's sleep quality worsened, the intensity of their anxiety symptoms also increased. The results of the regression analysis additionally confirmed this relationship, revealing that sleep quality explains 30.6% of the variation in postpartum anxiety ($R^2 = 0.306$; $p < 0.001$). This suggests that sleep quality is one of the most important factors of emotional well-being during the postpartum period. The study results showed that women characterized by poorer sleep more frequently experience emotional tension, irritability, psychological sensitivity, and difficulties adapting to new motherhood circumstances. The results obtained suggest that long-term sleep deprivation may

become a significant risk factor for emotional exhaustion and psychological difficulties after childbirth. Considering this, hypothesis H1, stating that poor sleep quality during the postpartum period is statistically significantly associated with greater intensity of postpartum anxiety symptoms, is confirmed.

4. The study found that social and emotional support has a significant impact on women's emotional and physiological well-being after childbirth. Women receiving help from family members or other close individuals demonstrated statistically significantly lower levels of postpartum anxiety and better sleep quality than respondents who did not receive such support. The study results also revealed that unplanned pregnancy was associated with greater emotional vulnerability, higher anxiety levels, and poorer sleep quality. In addition, first-time mothers demonstrated significantly higher levels of postpartum anxiety than respondents with previous motherhood experience. These results suggest that women's emotional well-being during the postpartum period is significantly influenced not only by biological but also by psychosocial factors, including emotional preparedness for motherhood, support from close individuals, a sense of security, and previous life experience. Social support may function as a protective factor that reduces emotional tension, provides women with more opportunities to rest, and strengthens emotional stability. Considering the obtained results, hypothesis H2, stating that women receiving greater family and social support demonstrate better sleep quality and lower levels of postpartum anxiety, is confirmed.
5. The results of the study showed that during the postpartum period women often experience significant emotional and physiological difficulties manifested by increased anxiety levels, sleep quality disturbances, and emotional sensitivity. The identified significant associations between sleep quality, social support, and postpartum anxiety suggest that early monitoring of emotional condition and comprehensive support may be important measures in reducing the risk of postpartum anxiety. The study data suggest that emotional condition assessment performed by nursing specialists, timely education about emotional changes during the postpartum period, counseling, and psychological support may help identify emotional difficulties earlier and prevent their progression. It is also important to strengthen women's awareness of the significance of sleep quality for emotional well-being and to encourage the involvement of social support networks in postpartum care. The results of the study highlight the need to pay greater attention in postpartum care not only to women's physical condition but also to their emotional health and quality of life. Considering the results obtained, hypothesis H3, stating that early emotional condition monitoring, education, and counseling provided by nursing specialists may contribute to reducing the risk of postpartum anxiety and improving women's emotional well-being, is confirmed.

RECOMMENDATIONS

1. To regularly assess women's emotional condition during the postpartum period

The results of the study revealed that during the postpartum period women often face increased anxiety levels, emotional sensitivity, and sleep quality disturbances; therefore, monitoring emotional condition should become an integral part of postpartum care. Healthcare specialists—nurses, midwives, family physicians, and other specialists—are recommended to systematically assess women's emotional well-being not only during the first days after childbirth but also during the later postpartum period, when emotional difficulties may become even more pronounced. Particular attention should be paid to such signs as persistent tension, increased sensitivity, emotional instability, fatigue, irritability, anxiety symptoms, disturbed rest, or difficulties expressed by women in adapting to motherhood.

Early recognition of emotional difficulties may have extremely significant importance for women's psychological well-being and further emotional condition. Timely identification of increased anxiety levels or emotional exhaustion may allow emotional support, psychological counseling, or referral for additional specialist assistance to be provided more quickly. This may help prevent more severe emotional disorders, reduce the risk of long-term psychological exhaustion, and improve women's quality of life during the postpartum period.

It is important to emphasize that assessment of emotional condition should not be limited only to formally asking questions. Effective monitoring of emotional well-being requires empathetic communication, the creation of a safe environment, and a trust-based relationship between the woman and the healthcare specialist. Many women may avoid talking about their emotional difficulties because of feelings of guilt, fear of being misunderstood, or stereotypes about motherhood that still exist in society. For this reason, it is very important that specialists are able to sensitively initiate conversations about emotional well-being, encourage women to speak openly about their experiences, and provide them with a sense of emotional safety.

It is recommended to use standardized emotional condition assessment tools during postpartum care, which would help more objectively identify the risk of anxiety or other emotional difficulties. Regular assessment could be carried out both in healthcare institutions and during outpatient nursing care or home visits. It is especially important to pay greater attention to women belonging to higher-risk groups—first-time mothers, women who experienced unplanned pregnancy, respondents not receiving social support, or those demonstrating poorer sleep quality.

It is also important to strengthen interinstitutional cooperation among nursing specialists, midwives, family physicians, psychologists, and social workers in order to ensure comprehensive

emotional healthcare after childbirth. A comprehensive approach would allow not only earlier recognition of emotional difficulties but also the provision of continuous and individualized support focused on women's emotional, social, and physiological needs.

2. To integrate sleep quality assessment into postpartum care

The results of the study revealed a statistically significant association between women's sleep quality after childbirth and the level of postpartum anxiety experienced; therefore, sleep quality assessment should become an important part of postpartum care. It was found that poorer sleep quality is associated with greater emotional sensitivity, higher anxiety levels, and a greater risk of psychological exhaustion. For this reason, it is recommended that healthcare specialists systematically assess women's sleep quality not only during the early postpartum period but also during the later months after childbirth, when long-term sleep deprivation may begin to significantly affect women's emotional and physical well-being.

Sleep quality assessment should include not only women's overall satisfaction with sleep but also specific aspects—difficulties falling asleep, frequent awakenings during the night, total sleep duration, feeling rested upon waking, level of fatigue during the day, and sleep fragmentation. During the postpartum period many women experience disturbed rest due to newborn care; however, long-term or particularly severe sleep disturbances may indicate a greater risk of emotional difficulties and require additional specialist attention.

Early identification of sleep disturbances may help timely identify women at greater risk of postpartum anxiety, emotional exhaustion, or other psychological difficulties. Regular assessment of sleep quality would provide the opportunity to notice negative tendencies more quickly and apply preventive measures—emotional support, education about sleep hygiene, adjustment of rest routines, or psychological assistance. Such early intervention may help reduce the risk of progression of emotional disorders and improve women's overall well-being.

It is important to note that sleep quality assessment should not be perceived only as monitoring of physiological condition. Sleep is closely associated with women's emotional state, ability to adapt to motherhood, and quality of daily functioning. Long-term lack of rest may reduce emotional resilience, increase irritability and sensitivity to stress, and complicate the ability to cope with new motherhood challenges. Therefore, sleep quality assessment should be carried out comprehensively, together with evaluation of women's emotional well-being, social environment, and received support.

It is recommended to use standardized sleep quality assessment tools in postpartum care and to include questions about rest in routine conversations between healthcare specialists and women. It is also important to provide women with practical recommendations about sleep hygiene,

organization of rest, fatigue management, and the importance of support from close individuals in daily infant care. Particular attention should be paid to women demonstrating greater emotional vulnerability—first-time mothers, respondents who experienced unplanned pregnancy, or those not receiving sufficient social support.

By integrating sleep quality assessment into postpartum care, it would be possible not only to better understand women's physiological and emotional condition but also to ensure earlier provision of support focused on improving women's quality of life and strengthening emotional well-being.

3. To strengthen nursing specialists' competencies in the field of emotional health

The results of the study showed that during the postpartum period women often face increased anxiety levels, emotional sensitivity, and sleep quality disturbances; therefore, the ability of nursing specialists to identify emotional difficulties in a timely manner becomes particularly important. Considering this, it is recommended to strengthen nursing specialists' competencies in the field of emotional healthcare by organizing additional training and professional development programs about signs of postpartum anxiety, assessment of emotional condition, principles of psychological support, and effective communication with women experiencing emotional difficulties.

Nursing specialists are often the healthcare workers who have the most frequent and longest contact with women after childbirth; therefore, their role in identifying emotional difficulties is particularly significant. The ability to notice such signs as persistent tension, emotional instability, increased sensitivity, fatigue, anxiety symptoms, or women's withdrawal may help identify emotional health problems earlier and ensure timely support. For this reason, it is important that specialists not only possess theoretical knowledge about emotional difficulties during the postpartum period but are also able to practically apply emotional condition assessment methods in daily professional practice. During training, it is recommended to place strong emphasis on emotional condition assessment tools, risk factors for postpartum anxiety and other emotional disorders, communication psychology, and the development of empathy. It is important that specialists are able not only to recognize emotional difficulties but also to appropriately respond to women's emotional experiences, create trust-based relationships, and provide emotional support. Empathetic communication may encourage women to speak more openly about their well-being, reduce fear of being misunderstood, and create conditions for early provision of support.

It is also important to develop nursing specialists' ability to distinguish natural emotional changes after childbirth from more severe psychological difficulties requiring additional specialist support. Some women during the postpartum period may experience short-term emotional sensitivity or mood fluctuations; however, long-lasting anxiety, emotional exhaustion, or severe sleep

disturbances may indicate a greater risk of psychological problems. In such situations, nursing specialists' competence and ability to refer women in a timely manner for additional psychological or psychiatric consultation become especially important.

It is recommended to organize practical seminars, supervisions, and interdisciplinary training involving not only nursing specialists but also midwives, psychologists, family physicians, and social workers. Such cooperation would allow a better understanding of the complex emotional health needs of women and would strengthen specialists' ability to provide comprehensive support during the postpartum period.

Strengthening competencies in the field of emotional health could contribute to higher-quality postpartum care, earlier identification of emotional difficulties, and more effective provision of support. This would not only improve women's emotional well-being but could also have a positive impact on the mother–infant relationship, family functioning, and overall quality of life after childbirth.

4. To encourage family and partner involvement in postpartum care

The results of the study revealed that social support is one of the most important factors associated with women's emotional well-being and sleep quality during the postpartum period. It was found that women receiving help from family members or other close individuals demonstrated lower levels of postpartum anxiety and better sleep quality. Considering this, it is recommended to more actively encourage the involvement of partners and family members in women's postpartum care, emphasizing the importance of their role for women's emotional and physical well-being.

The postpartum period often becomes a stage of intensive emotional, physiological, and social changes for women, during which new responsibilities, constant fatigue, and increased emotional sensitivity emerge. In such a situation, support from a partner or family may significantly reduce women's emotional burden and help them adapt more easily to changes related to motherhood. Practical assistance in infant care, household tasks, or daily responsibilities provides women with more opportunities to rest, recover physical strength, and reduce the risk of constant exhaustion.

Emotional support from close individuals is equally important. Partner support, understanding, and involvement in infant care may strengthen women's sense of emotional security, reduce feelings of loneliness, and help women feel more understood and supported. The study results

suggest that women who feel stronger emotional support cope more easily with daily motherhood challenges and less frequently experience stronger anxiety symptoms.

It is recommended that healthcare specialists actively involve partners and family members in the postpartum care process both during pregnancy and after childbirth. During consultations, educational sessions, or visits, it is important not only to provide information to women but also to encourage close individuals to understand possible emotional and physiological changes after childbirth. Information about the importance of sleep, emotional difficulties, and the significance of support may help close individuals become more actively involved in women's care and contribute to creating a more favorable emotional environment.

Attention should be paid to the role of the partner, since the partner's emotional and practical involvement may have an especially significant impact on women's well-being. Partner assistance during night-time infant care, emotional support, or shared responsibility may reduce women's physical and emotional exhaustion and contribute to better sleep quality. In addition, active partner participation may strengthen mutual relationships and create a more stable emotional environment within the family.

It is also important to pay attention to women who do not have sufficient social support or who live under more socially vulnerable conditions. In such cases, healthcare specialists should more actively assess the need for social support, encourage the involvement of close individuals, or, if necessary, refer women for additional social or psychological support services.

By encouraging family and partner involvement in postpartum care, it is possible not only to improve women's emotional well-being and sleep quality but also to reduce the risk of emotional exhaustion, anxiety, and long-term psychological difficulties. Comprehensive family support may become an important protective factor helping women adapt more safely and easily to motherhood and a new stage of life.

5. To pay greater attention to women who experienced unplanned pregnancy

The results of the study revealed that women whose pregnancy was unplanned demonstrated statistically significantly higher levels of postpartum anxiety and poorer sleep quality than respondents whose pregnancy was planned. Such results suggest that unplanned pregnancy may be associated with greater emotional vulnerability, psychological tension, and more difficult adaptation to motherhood and changes in life routine. Considering this, it is recommended to pay greater attention to this group of women during postpartum care by ensuring monitoring not only of physical but also emotional condition and providing individualized support.

Unplanned pregnancy often becomes an unexpected life change that may cause emotional

insecurity, fear about the future, feelings of uncertainty, or additional social and financial stress. Some women may feel insufficiently prepared for motherhood, doubt their ability to properly care for the infant, or experience stronger emotional pressure due to changed life circumstances. Such experiences may negatively affect both emotional well-being and sleep quality and, over time, increase the risk of emotional exhaustion and psychological difficulties.

It is recommended that healthcare specialists identify women whose pregnancy was unplanned at an early stage and provide them with greater emotional attention throughout the postpartum period. When assessing women's well-being, it is important to pay attention to their emotional preparedness for motherhood, experienced stress, availability of social support, relationships with partners, and overall emotional condition. Early recognition of emotional difficulties would create opportunities to provide timely support and reduce the risk of long-term psychological problems.

For these women, it is recommended to provide more active emotional support, psychological counseling, and individualized care. Conversations with nursing specialists, psychologists, or other emotional health specialists could help women better understand their emotional experiences, reduce feelings of guilt, insecurity, or loneliness, and strengthen self-confidence in the maternal role. It is also important to provide clear information about possible emotional changes after childbirth, the significance of sleep for emotional health, and available support opportunities.

Strengthening social support is also of great importance. Women who experienced unplanned pregnancy may more often lack emotional support or face more difficult social circumstances; therefore, it is important to encourage the involvement of partners and close individuals in the care process. Emotional and practical assistance may help reduce women's stress experienced, provide more opportunities for rest, and facilitate adaptation to new life circumstances.

It is also recommended to provide such women with opportunities to participate in emotional support groups or educational sessions discussing motherhood challenges, emotional changes, and stress management methods. Communication with other women experiencing similar situations may reduce feelings of loneliness, strengthen emotional security, and promote a more positive attitude toward motherhood.

Greater attention to women who experienced unplanned pregnancy could contribute to earlier identification of emotional difficulties, better emotional well-being, and more successful psychological adaptation during the postpartum period. Comprehensive emotional, social, and informational support may become an important factor in reducing the risk of postpartum anxiety and improving women's quality of life after childbirth.

6. To provide greater emotional support to first-time mothers

The results of the study showed that first-time mothers demonstrated statistically significantly higher levels of postpartum anxiety than respondents with previous motherhood experience. Such results suggest that first childbirth becomes an emotionally sensitive stage of life for many women, accompanied by greater uncertainty, a stronger sense of responsibility, and adaptation difficulties. Considering this, it is recommended to pay greater attention to first-time mothers during the early postpartum period by ensuring consistent emotional support, education, and individualized care.

Women experiencing motherhood for the first time often face new and previously unexperienced situations that may cause anxiety and self-doubt. Infant care, feeding, changes in sleep routine, constant vigilance, and responsibility for the newborn's well-being may become strong emotional and physical challenges. Many women at this stage doubt their ability to properly care for the infant, fear making mistakes, or feel pressure to meet societal expectations of a "good mother." Such emotional states may significantly increase postpartum anxiety symptoms.

It is recommended that healthcare specialists provide first-time mothers with clear, understandable, and practically applicable information about infant care, feeding, sleep routines, emotional changes after childbirth, and the most common difficulties. Properly provided information may help reduce feelings of uncertainty, strengthen women's self-confidence, and reduce emotional tension. It is important that women feel supported rather than judged and can freely ask questions that concern them.

Emotional support is also of great importance. For first-time mothers, it is especially important to feel heard, understood, and emotionally safe. Nursing specialists, midwives, or family physicians should encourage open communication about women's well-being, emotional difficulties, and anxiety symptoms. Empathetic communication by specialists may help women more easily accept their emotional experiences and reduce feelings of guilt or inadequacy.

It is also recommended to encourage partner and family involvement in the care of first-time mothers. Emotional and practical support from close individuals may help reduce women's physical and emotional burden, provide more opportunities for rest, and strengthen the sense of security. Partner support is particularly important in cases where women feel insecure or doubt their ability to adapt to motherhood.

Special educational or emotional support groups may also be beneficial for first-time mothers, where they could share experiences with other women in similar situations. Such groups may help reduce feelings of loneliness, strengthen emotional resilience, and provide greater self-confidence in the maternal role.

Greater attention to first-time mothers may contribute to better emotional adaptation after childbirth, lower anxiety levels, and better overall well-being. Comprehensive emotional, informational, and social support may become an important protective factor helping women adapt

more safely and easily to a new stage of life.

7. To organize educational programs about the importance of sleep after childbirth

The results of the study revealed a statistically significant association between women's sleep quality after childbirth and the level of postpartum anxiety experienced; therefore, the topic of sleep should become an important part of postpartum care education. It was found that poorer sleep quality is associated with greater emotional sensitivity, higher anxiety levels, and a greater risk of emotional exhaustion. Considering this, it is recommended to organize educational consultations, lectures, or practical training sessions for women and their close individuals about the importance of sleep for emotional and physical health during the postpartum period.

Many women after childbirth experience persistent fatigue, sleep fragmentation, and lack of rest; however, they often perceive these difficulties as a “natural part of motherhood” and do not seek support. For this reason, it is important to increase awareness among women and their close individuals that long-term sleep disturbances may have a significant impact on emotional well-being, the ability to adapt to motherhood, and overall quality of life. Educational programs could help women better understand their well-being, recognize signs of fatigue and emotional exhaustion, and seek support in a timely manner.

During training sessions, it is recommended to discuss the main principles of sleep hygiene, such as the importance of rest routines, suitability of the environment for sleep, planning rest during the day, and opportunities to use the infant's sleep time for women's rest. It is also important to provide practical recommendations about fatigue management strategies, sharing responsibilities within the family, and the importance of accepting support. Many women feel internal pressure to do everything independently; therefore, education should encourage understanding that rest is an essential part of emotional and physical health rather than a sign of weakness.

In educational programs, it is important to discuss not only physiological aspects of sleep but also its relationship with emotional health. Women should be informed that constant sleep deprivation may increase irritability, emotional sensitivity, anxiety symptoms, and difficulties coping with everyday stressors. Awareness of these associations may help women recognize emotional difficulties earlier and take a more active role in caring for their well-being.

It is very important to include partners and other close individuals in educational programs as well. The results of the study showed the great importance of social support for women's sleep quality and emotional well-being; therefore, close individuals' understanding of the importance of rest may contribute to more effective support for women in daily infant care. Partners and family members should be encouraged to become more actively involved in night-time infant care, sharing household

responsibilities, and providing emotional support, thereby giving women more opportunities to rest. It is recommended to organize educational programs in various forms—individual consultations, group sessions, remote seminars, or informational publications. Such information should be available both during pregnancy and after childbirth so that women could prepare in advance for possible changes in sleep and emotional well-being.

Educational programs about the importance of sleep after childbirth could contribute to better emotional and physical well-being among women, lower levels of postpartum anxiety, and better quality of life. By increasing awareness about the significance of sleep and providing practical rest management skills, it would be possible to strengthen women's emotional resilience and promote healthier adaptation during the postpartum period.

8. To ensure more accessible psychological support after childbirth

The results of the study revealed that during the postpartum period many women face increased anxiety levels, emotional sensitivity, and sleep quality disturbances; therefore, accessibility of psychological support should become one of the most important areas of postpartum care. The identified significant associations between emotional well-being, social support, and sleep quality suggest that early emotional support may play an important role in reducing the risk of postpartum anxiety and improving women's psychological adaptation after childbirth. Considering this, it is recommended to strengthen the accessibility of psychological support for women after childbirth within the healthcare system.

The postpartum period often becomes a stage of major biological, emotional, and social changes for women. Persistent fatigue, changes in daily routine, responsibility for infant care, and increased emotional expectations may significantly affect women's psychological condition. During this stage, some women may experience constant tension, insecurity, emotional exhaustion, or difficulties adapting to the maternal role. If emotional difficulties are not recognized and addressed in a timely manner, they may progress and negatively affect women's quality of life, family relationships, and the mother–infant bond.

Early consultations with psychologists, mental health specialists, or emotional support specialists could help women better understand their emotional experiences, reduce anxiety symptoms, and strengthen emotional resilience. Psychological support may provide women with a safe space to talk about their well-being, fears, fatigue, or difficulties experienced during the postpartum period. Such emotional support may help reduce feelings of loneliness, strengthen self-confidence, and facilitate adaptation to a new stage of life.

It is especially important to ensure that psychological support is easily accessible and available

as early as possible. Many women avoid seeking support because of fear of being misunderstood, feelings of guilt, or stereotypes about motherhood that still exist in society. For this reason, it is important to reduce stigmatization and promote the understanding that experiencing emotional difficulties after childbirth is a common and natural phenomenon, while seeking support is part of responsible self-care.

It is recommended to integrate psychological support into routine postpartum care services. Assessment of emotional condition and the opportunity to receive psychological consultation could be offered during regular visits at healthcare institutions, outpatient nursing care, or home visits. It is particularly important to pay greater attention to higher-risk groups—first-time mothers, respondents who experienced unplanned pregnancy, women not receiving social support, or those demonstrating poorer sleep quality.

It is also recommended to expand various forms of psychological support—individual consultations, emotional support groups, remote consultations, or short-term intervention programs. Remote consultations could be especially beneficial for women who, due to infant care, place of residence, or other reasons, cannot easily attend healthcare institutions. Group support formats may also help women feel less lonely and provide opportunities to share experiences with other women facing similar situations.

More accessible psychological support after childbirth could contribute to earlier identification of emotional difficulties, lower intensity of postpartum anxiety symptoms, and better emotional well-being among women. Comprehensive emotional support and timely psychological interventions may become important preventive measures helping strengthen women's psychological well-being and ensure more successful adaptation to motherhood.

9. To promote interinstitutional cooperation in the field of postpartum care

The results of the study revealed that women's emotional and physiological well-being after childbirth depends on many interrelated factors—sleep quality, emotional condition, social support, pregnancy planning, and assistance received from close individuals. Such results indicate that postpartum care should not be limited only to monitoring women's physical health; therefore, it is recommended to strengthen interinstitutional cooperation among specialists from various fields in order to ensure comprehensive care for women after childbirth.

During the postpartum period, women often require not only medical but also emotional, psychological, and social support. For this reason, it is important to ensure close cooperation among nursing specialists, midwives, family physicians, psychologists, psychiatrists, social workers, and other specialists who could comprehensively assess women's needs and provide coordinated support.

Such an interdisciplinary approach would allow earlier recognition of emotional difficulties, social problems, or greater risk of postpartum anxiety and ensure timely provision of the necessary support. Nursing specialists and midwives are often the first professionals to notice changes in women's emotional condition after childbirth; therefore, their cooperation with psychologists and family physicians is particularly important. Upon noticing increased anxiety levels, emotional exhaustion, severe sleep disturbances, or lack of social support, women could be referred more quickly for additional consultations or support services. This would help prevent situations in which emotional difficulties remain unnoticed for a long time and continue to progress.

An important part of interinstitutional cooperation is also the involvement of social workers. The results of the study showed the great importance of social support for women's emotional well-being and sleep quality; therefore, women who do not receive sufficient assistance from close individuals or who face difficult social circumstances may require additional social support. Social workers could help assess family situations, organize support services, mediate regarding assistance measures, or refer women to community support programs.

It is also recommended to strengthen information exchange among specialists and ensure consistent monitoring of women's condition throughout the postpartum period. Women after childbirth often interact with different specialists; however, without effective communication between institutions, part of the important information may be lost. Regular cooperation among specialists, joint discussions, or clear referral systems could ensure continuous and coordinated support for women.

It is recommended to organize joint training sessions, seminars, or supervisions for specialists from different fields in order to strengthen their knowledge about emotional difficulties during the postpartum period, the importance of sleep quality, and effective organization of support. Interdisciplinary cooperation would not only improve communication among specialists but also help form a unified approach toward the importance of women's emotional health.

Comprehensive and coordinated support could contribute to earlier identification of emotional difficulties, better emotional well-being among women, and lower risk of postpartum anxiety. Interinstitutional cooperation would ensure that women after childbirth receive not fragmented but comprehensive care corresponding to their individual needs and focused on physical, emotional, and social well-being.

10. To conduct further research on women's postpartum well-being

The results of the study revealed significant associations between women's sleep quality after childbirth, postpartum anxiety, and various social and situational factors; however, they also showed

that postpartum well-being is a multifaceted and complex phenomenon. For this reason, it is recommended to continue scientific research examining women's emotional, psychological, and physiological well-being after childbirth in order to gain a more comprehensive understanding of the factors influencing women's adaptation to motherhood and emotional well-being during the postpartum period.

Future studies should include a broader range of social, biological, and psychological factors. Although this study identified a significant association between sleep quality and postpartum anxiety, a portion of the variation in emotional well-being remained unexplained; therefore, it can be assumed that other aspects also influence women's emotional state, such as hormonal changes, personality traits, previous psychological experiences, financial situation, partner relationships, social security, or overall quality of life. A more comprehensive analysis of these factors could help better understand the mechanisms and risk factors of postpartum anxiety development.

It is recommended to pay greater attention to the long-term effects of sleep disturbances on women's emotional and psychological health. While this study found that poorer sleep quality is significantly associated with higher anxiety levels, it would be valuable in future research to examine how long-term sleep deprivation affects women's emotional state one or several years after childbirth. Such studies could help determine whether postpartum sleep disturbances have long-term consequences for psychological health, quality of life, and women's ability to adapt to motherhood.

It is also important to further analyze the role of partners and family members in women's emotional adaptation after childbirth. The results of this study demonstrated the importance of social support for women's well-being; therefore, future research should more precisely examine which specific forms of partner or family support have the greatest positive impact on women's emotional state and sleep quality. Such an approach could contribute to the development of more effective family involvement strategies in postpartum care.

Future research is also recommended to evaluate the effectiveness of various interventions in reducing the risk of postpartum anxiety and improving women's emotional well-being. It would be valuable to analyze the impact of psychological support programs, emotional support groups, sleep hygiene education, partner involvement, or comprehensive nursing interventions on women's emotional and physiological condition. Such studies could help identify the most effective support measures and contribute to evidence-based improvement of postpartum care. It is further recommended to conduct larger-scale and longitudinal studies involving more diverse samples of women from different social, cultural, or geographical backgrounds. This would allow for a more detailed assessment of the influence of different environmental factors on women's well-being and a better understanding of individual postpartum experiences.

Further scientific research on women's postpartum well-being could contribute to earlier

identification of emotional difficulties, the development of more effective preventive measures, and higher-quality postpartum care. The obtained data would be important not only from a scientific but also from a practical perspective, helping to strengthen emotional healthcare and improve women's quality of life during the postpartum period.

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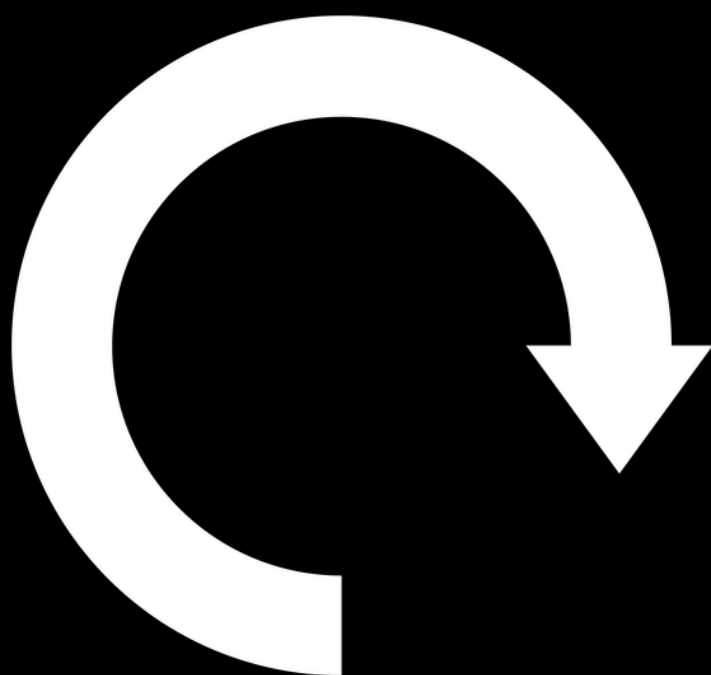
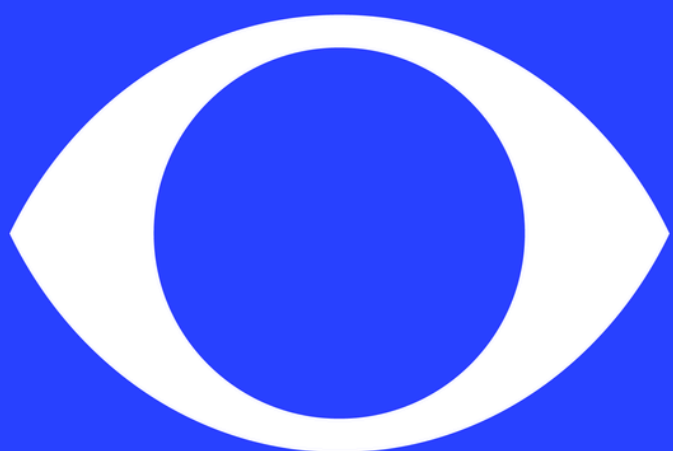
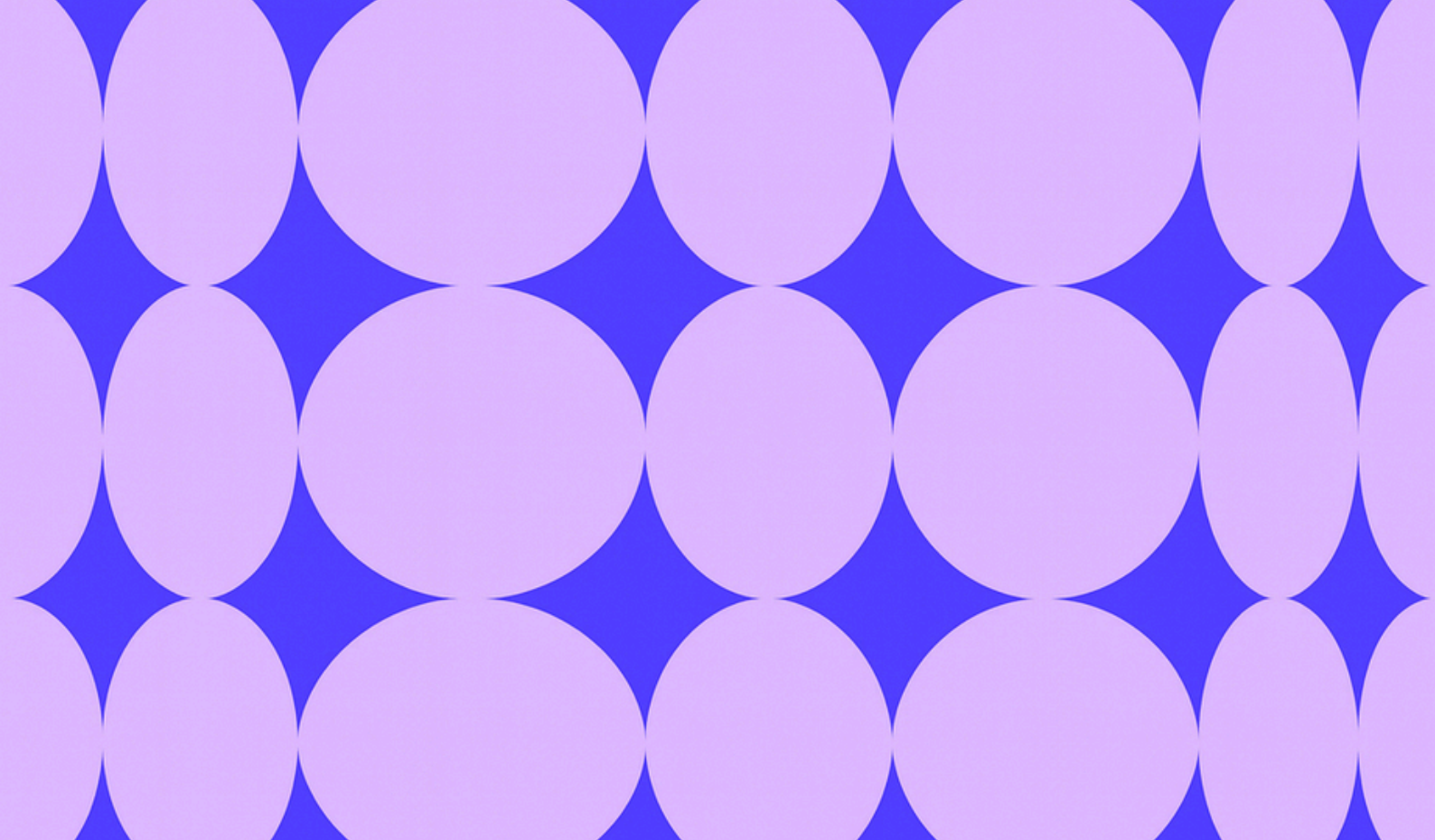
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