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EMOTIONAL STATE OF PREGNANT WOMEN: PSYCHOGENIC AND CLINICAL FACTORS, TREATMENT OPTIONS, AND PREDICTION USING ARTIFICIAL INTELLIGENCE – A NARRATIVE REVIEW

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ABSTRACT

The aim of this study is to analyze the psychogenic and clinical factors influencing the emotional state of women during pregnancy and to discuss the possibilities for the treatment and prediction of mental disorders using artificial intelligence (AI). The article presents the physiological and psychosocial determinants of emotional functioning in pregnant women, with particular emphasis on risk factors for mood disorders, such as depression and anxiety.

Contemporary therapeutic approaches utilized in the perinatal period are discussed, encompassing both medical methods and non-medical forms of psychological support. Special attention is devoted to the role of modern technologies—including machine learning algorithms, mobile applications, and chatbots—in the process of early disorder detection and mental health support for pregnant women. Furthermore, the significance of diagnostic tools, such as ultrasonography (USG) and cardiotocography (CTG), in monitoring fetal well-being is addressed, alongside their potential integration with AI-based systems.

The literature review indicates that AI can serve as a significant supplement to traditional medical care, contributing to improved diagnostic quality, enhanced predictive capabilities and increased accessibility of support for pregnant women.

KEYWORDS

Pregnancy, Mental Health, Depression, Artificial Intelligence, Perinatal Care

CITATION

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1. Introduction

Pregnancy is a unique period in a woman's life, associated with numerous physiological, hormonal, and psychosocial changes. These changes may affect not only somatic functioning but also mental health, increasing vulnerability to emotional disorders such as depression and anxiety. Contemporary research indicates that the mental health of pregnant women is of significant importance both for the course of pregnancy and for the child's development.

At the same time, the dynamic development of digital technologies, including artificial intelligence (AI), opens new possibilities in medical and psychological care. AI is increasingly used in diagnostics, monitoring, and supporting the treatment of mental disorders, as well as in broadly understood perinatal care.

The aim of this study is to analyze the importance of mental health in pregnant women and to assess the potential of artificial intelligence in supporting it. The article discusses both biological and psychosocial determinants, as well as modern technological solutions that may contribute to improving the quality of care for pregnant women.

2. Materials and Methods

This study is a narrative review of the scientific literature on the mental health of women during pregnancy and the potential use of artificial intelligence in diagnosis and therapeutic support. The analysis included scientific publications, review articles, and reports from international institutions, mainly published between 2013 and 2025. The literature search was conducted using databases such as PubMed, Google Scholar, and resources of medical institutions (including WHO). Keywords in both Polish and English were used, including: "pregnancy," "perinatal depression," "women's mental health," "artificial intelligence in medicine" and "AI in psychiatry". Publications meeting the criteria of relevance and topical adequacy were included in the analysis, while studies of low substantive value or not directly related to the subject were excluded. The selection process aimed to ensure the reliability and up-to-date nature of the analyzed data.

3. Emotion Regulation and the Importance of Emotions in Human Functioning

3.1 Definition and Components of Emotions

Emotions are an integral element of human functioning and accompany individuals from the very beginning of life. They are linked to reactions to various stimuli, such as events, interpersonal relationships, experiences, and elements of the environment.

From a psychological perspective, emotions are defined as complex processes involving the interplay of cognitive, physiological, and behavioral components. K. Scherer describes emotions as a sequence of synchronized changes occurring in various subsystems of the organism, including cognitive processes, physiological arousal, and the motivational system (Abramciow, 2015).

According to the American Psychological Association, emotions represent a complex pattern of responses that encompass subjective experience, physiological reaction, and behavioral expression. R.J. Davidson emphasizes the neurobiological foundations of emotions, while B. Parkinson highlights their significance in the context of social functioning and the regulation of interpersonal relationships (University of West Alabama, 2019; Abramciow, 2015).

3.2 Emotions as a Cognitive-Adaptive Process

Emotions are closely linked to cognitive appraisal processes and the interpretation of events. They are accompanied by physiological changes and individual experiences shaped by prior experiences and coping mechanisms.

Emotions serve an important informational function, signaling the needs of the organism and supporting the adaptation process to changing environmental conditions (Abramciow, 2015). Emotions can also be viewed as internal informational signals that assist individuals in recognizing and satisfying their needs. Their evolutionary nature is emphasized, indicating that they represent a universal mechanism present in all mammals.

In this view, emotions are not categorized as "good" or "bad"; rather, each serves a specific adaptive function, conveying information essential for the survival and functioning of the organism. They have a dynamic character — they appear and dissipate naturally, and besides the subjective feeling, they also evoke specific physiological reactions as well as facial expressions and body posture.

According to R. Plutchik, emotions primarily serve an adaptive function, enabling the organism to adjust to environmental conditions, including responding to threats and situations requiring mobilization, which is crucial for survival (Jankowska, 2020; Walat & Warchoł, 2019).

3.3 Classification of Emotions

P. Ekman proposed a division of emotions into basic emotions and derived emotions, also referred to as complex emotions. Basic emotions are present in humans from the moment of birth, although they are initially not fully conscious or controlled. They have a universal character and are experienced by all people, and as the individual develops, they gradually become identified and expressed more appropriately. Among the basic emotions, Ekman includes fear, sadness, anger, joy, and disgust.

On the other hand, complex emotions arise as combinations of basic emotions, and their diversity and manner of expression largely depend on cultural conditions and individual experiences (Łosiak, 2015).

3.4 Functions of Emotions

According to J. Reeve, emotions serve three basic functions:

- Adaptive: Allowing individuals to adjust to changing environmental conditions. Emotions mobilize the organism to act, supporting appropriate responses to situations, including the identification of threats and the undertaking of goal-directed actions.
- Social: Regulating interpersonal relationships and facilitating communication and
- the interpretation of others' behaviors.
- Motivational: Influencing the initiation of actions and the avoidance of undesirable situations (Gałuszka, 2022).

4. Physiological and Somatic Determinants of Emotional State During Pregnancy

4.1 Physiological Course of Pregnancy

The fertility of women and men differs significantly in biological terms. A woman is capable of conception only during a short period of the menstrual cycle, whereas a man remains fertile continuously. Ovulation, which occurs on average about 14 days before menstruation, involves the release of an egg cell from the ovary. This cell remains capable of fertilization for approximately 24 hours. Fertilization most commonly takes place in the fallopian tube, where a zygote is formed and subsequently undergoes intensive cell division. After approximately 3 days, the embryo moves into the uterine cavity, and within about 7 days after fertilization, implantation occurs. During this period, the development of the placenta and fetal membranes also begins.

Pregnancy lasts on average 266 days from the moment of fertilization or about 280 days counting from the first day of the last menstrual period, and it is divided into three trimesters. During this time, intensive fetal development takes place, including the formation of organs and systems. As early as around the 5th week, the development of the heart begins, which soon starts its contractile activity (Bręborowicz, 2016; Dudenhausen, 2017; Wytyczak-Partyka, 2017).

4.2 Common Pregnancy-Related Complaints – General Characteristics

During pregnancy, women may experience numerous ailments resulting from physiological and hormonal changes. The most common include changes in appetite, breast tenderness, fatigue, and excessive sleepiness, particularly in the early stages of pregnancy.

In the first trimester, nausea and vomiting frequently occur, usually subsiding around the 12th week. As the pregnancy progresses, skin pigmentation changes may appear, as well as gastrointestinal complaints such as heartburn (Bręborowicz, 2016; Dudenhausen, 2017; Wytyczak-Partyka, 2017).

4.3 Gastrointestinal Complaints

One of the most common problems during pregnancy are gastrointestinal complaints, with the highest intensity observed between the 4th and 14th weeks of gestation.

It is estimated that they affect approximately 50–60% of pregnant women and primarily include nausea and vomiting, often occurring in the morning, as well as heartburn and excessive salivation. These symptoms may be intensified by olfactory stimuli, especially strong odors that previously did not trigger similar reactions.

Non-pharmacological methods play an important role in alleviating these symptoms, such as following an easily digestible diet, consuming small and frequent meals, and using herbal preparations that support digestion and have calming properties. Herbal teas containing chamomile, lemon balm, lavender, or mint are most commonly used for this purpose. Additionally, pregnant women may experience gastrointestinal motility disorders, leading to constipation and, consequently, the development of hemorrhoids (Mustela, 2025).

4.4 Edema During Pregnancy

Edema is a commonly observed condition during pregnancy, primarily affecting the lower and upper limbs. It most often occurs in the third trimester and is associated with physiological fluid retention; during this time, the expectant mother’s body weight may increase by up to approximately 0.5 kg per week.

Edema tends to worsen in the afternoon and evening hours and subsides after nighttime rest. This mechanism is adaptive in nature and prepares the body for potential fluid loss during childbirth.

Additionally, edema, especially in the lower limbs may result from impaired venous return caused by pressure from the enlarged uterus on blood vessels. Preventive measures include avoiding prolonged periods in one position, particularly standing or sitting, resting with the lower limbs elevated, and maintaining an appropriate diet.

However, it should be emphasized that severe or atypical edema, especially involving the face and hands and occurring before the 36th week of pregnancy, may be a symptom of preeclampsia and requires immediate medical consultation (Mustela, 2025; Wawryków et al., 2017).

4.5 Back Pain and Changes in the Musculoskeletal System

Another common complaint during pregnancy is back pain, primarily resulting from biomechanical changes occurring in the woman's body.

As body weight increases and the uterus enlarges, the center of gravity shifts and the physiological curvatures of the spine become more pronounced, particularly in the lumbar region. These changes lead to increased muscle tension and pressure on neural structures. Additionally, fetal movements and pressure on the pelvic area may intensify pain symptoms, including those radiating to the lower limbs, associated with irritation of the sciatic nerve.

In advanced cases, pain may significantly limit the physical mobility of the pregnant woman. Preventive measures include maintaining proper body posture, avoiding prolonged periods in one position, and engaging in moderate physical activity adapted to the woman's health condition (Pilewska-Kozak et al., 2016; Urtnowska et al., 2015).

4.6 Fatigue and Anemia

Another common complaint during pregnancy, as well as in the postpartum period, is fatigue. It manifests as excessive sleepiness, weakness, and reduced overall physical capacity.

This phenomenon is primarily associated with hormonal changes occurring in the pregnant woman's body.

At the same time, fatigue may be exacerbated by iron deficiency leading to the development of anemia. In such cases, in addition to exhaustion, additional symptoms may occur, such as reduced exercise tolerance, palpitations, shortness of breath, dizziness, and pallor.

When deficiencies are identified, it is necessary to correct them, which is important both for improving the mother's health and for the proper development of the fetus (Pietrzak et al., 2016; Karakulska-Prystupiuk, 2019).

4.7 Abdominal Pain and Warning Symptoms

An important complaint occurring during pregnancy is abdominal pain, which may be either physiological or pathological.

In the early stages of pregnancy, it is most often associated with hormonal changes and increased blood flow to the pelvic organs. In later stages, it mainly results from the enlargement of the uterus and the stretching of its ligaments, which may cause pain of varying intensity. Particular attention should be paid to cramp-like pain, especially if it is rhythmic, accompanied by abdominal tightening, and increasing in frequency. These symptoms may indicate the onset of labor or, in some cases, pose a risk to the pregnancy (Mustela, 2025).

A serious symptom requiring immediate medical consultation is also vaginal bleeding.

In the first trimester, it may indicate a risk of miscarriage, while in later stages of pregnancy it may be associated, among others, with abnormal placental positioning or premature placental abruption. Bleeding is often accompanied by abdominal pain, which further increases the risk of complications (Pasiński, 2022).

4.8 Urinary System Complaints

During pregnancy, urinary system complaints are also frequently observed. They most commonly manifest as increased frequency of urination, which is associated with pressure from the enlarging uterus on the bladder. In some women, symptoms of urinary incontinence may also occur, resulting from anatomical and functional changes within fundus of the uterus. (Habib, 2022)

5. Risk Factors for Emotional Disorders During Pregnancy

5.1 Epidemiology of Emotional Disorders in the Perinatal Period

Depressive disorders constitute a significant public health problem, affecting over 350 million people worldwide, including approximately 10% of the population in Poland. In the context of the perinatal period, particular importance is attributed to mood disorders associated with pregnancy and the postpartum period (Osińska et al., 2017).

Data from the past decade indicated that the risk of postpartum depression ranged from 13% to 30%, with considerable regional differences. The global prevalence of depressive symptoms varied widely, from 0.5% to 60.8%, with higher rates observed in developing countries.

At the same time, so-called "baby blues" could affect up to 40–80% of women after childbirth (Niegowska & Kobos, 2019; Norhayati et al., 2015).

More recent data suggest that depressive disorders occur in approximately 10% of pregnant women, with prevalence varying by trimester: about 3.8% in the first trimester, 4.9% in the second trimester, and 3.1% in the third trimester.

An important issue is also anxiety disorders during the perinatal period, with an estimated prevalence of 11–17% (Brodowska & Bąk-Sosnowska, 2020; Fairbrother et al., 2016).

5.2 Stress during pregnancy as a risk factor

Stress is a common element of modern life and affects human functioning regardless of age, gender, or social situation. It is particularly relevant in pregnant women, for whom this period is associated with numerous biological, emotional, and social changes.

Studies indicate that a significant proportion of pregnant women experience a decline in mental well-being, manifested by anxiety, tension, mood swings, fatigue, and reduced energy levels.

The sources of stress during this period are multifactorial and include both biological and psychosocial factors (Postępska et al., 2023; Carpinelli & Savarese, 2022; Kaczmarska & Curyło-Sikora, 2016).

5.3 Psychogenic and psychosocial factors

Significant determinants include physiological and anatomical changes occurring in a woman's body, which may cause discomfort and difficulties in adaptation, particularly among first-time mothers. Changes in body appearance, such as weight gain, stretch marks, or edema, may additionally contribute to decreased self-esteem and intensify concerns about acceptance by a partner (Okrój, 2017).

An important source of stress is also anxiety about the health of the fetus, the proper course of pregnancy, and childbirth. These concerns are especially pronounced in women with previous experiences of obstetric complications. Furthermore, fear of childbirth, particularly among primiparous women, constitutes a significant psychological burden (Dembińska & Wichary, 2016).

Social and economic factors are also of considerable importance, including lack of support from a partner or family, difficult financial circumstances, and uncertainty related to the future parental role. The prospect of responsibility for a child and changes in daily functioning may further intensify emotional tension (Kamasz et al., 2021).

5.4 Clinical and somatic factors

The literature also highlights the importance of somatic factors, such as pregnancy-related ailments (nausea, pain, fatigue), hormonal changes, and sleep disturbances, which may further increase stress levels and contribute to the development of emotional problems. Biological factors and chronic stress also play a significant role, as they may affect not only the mental state of the woman but also fetal development and the child's later functioning (Szydełko et al., 2016; Choręza, 2023; Arnal-Remón et al., 2015).

6. Depression and emotional disorders in pregnancy – etiopathogenesis and clinical presentation

6.1 Definition and clinical significance of depression

Over the years, depression has been subject to numerous definitions in the scientific literature. It is most commonly defined as a serious mental disorder characterized primarily by low mood, reduced energy, and diminished activity, which significantly impairs daily functioning.

This disorder is associated not only with a decline in the quality of life but also with an increased risk of somatic diseases and higher mortality rates. Furthermore, the World Health Organization indicates that depression is one of the leading causes of disability and occupational incapacity worldwide (Osińska et al., 2017).

6.2 Perinatal depression

In the perinatal context, depression is a common and potentially serious mood disorder that can occur both during pregnancy and within the first year after delivery, affecting approximately one in seven women. Its etiology is multifactorial, involving an interplay of hormonal changes, genetic predispositions, and environmental factors (Carlson et al., 2025).

Postpartum depression, in turn, is defined as a mood disorder occurring after childbirth.

Its severity can range from moderate to severe, and it most commonly develops within the first four weeks postpartum. A depressive episode may persist for several months, up to nine months; however, in the absence of appropriate treatment, symptoms may endure significantly longer, extending beyond the first year after delivery (Małus et al., 2016; Dominiak et al., 2019).

6.3 Risk factors for the development of depression during pregnancy

The risk of developing depression during pregnancy increases under the influence of numerous situational, psychosocial, and health-related factors. Unintended or mistimed pregnancy is of particular significance, especially when combined with difficult life circumstances, a lack of readiness for the maternal role, or the coexistence of other personal problems.

Another significant risk factor is the lack of social support from the partner, family, or social environment, which can lead to feelings of isolation, insecurity, and increased emotional tension. A substantial role is also played by a history of mood disorders (both personal and familial), as well as adverse life experiences, including the loss of a loved one, relationship breakdown, or health issues. Contributing factors also include experiences of violence—physical, psychological, or sexual—which may lead to diminished self-esteem and a chronic sense of threat (Kocur, 2024).

6.4 Factors related to pregnancy course and lifestyle

An important group of factors comprises circumstances related to the course of pregnancy and childbirth, such as complicated or multiple pregnancies, preterm birth, infant health problems, and negative outcomes in previous pregnancies. Additionally, the risk of depression is exacerbated by adverse living conditions, single motherhood, functioning within toxic relationships, as well as an unhealthy lifestyle, sleep disorders, and chronic fatigue.

The development of depression is also conditioned by individual psychological predispositions. Individuals who experience difficulty expressing emotions, tend to suppress emotional experiences, or exhibit excessive self-reliance may be more susceptible to developing depressive disorders when facing the significant physiological and psychological stressors inherent to the gestational period (Pietkiewicz, 2025; Urban-Kowalczyk, 2017; USPSTF, 2019).

6.5 Clinical presentation of depression during pregnancy

Depression during pregnancy and the postpartum period can manifest through a broad spectrum of emotional, cognitive, and somatic symptoms. The most frequently observed include persistent low mood, feelings of sadness, and a tendency toward excessive tearfulness, often occurring without an apparent cause. Women may also experience intensified negative thoughts, low self-esteem, and a perceived loss of self-worth and attractiveness.

Typical symptoms also include physical exhaustion, such as chronic fatigue, lack of energy, and feelings of weakness, which are frequently accompanied by a sense of loneliness and isolation. Furthermore, the course of depression is characterized by a loss of interest in previously enjoyed activities and anhedonia (the inability to experience pleasure).

The disorder may also involve the biological sphere: sleep disturbances (including both hypersomnia and insomnia), difficulties with concentration and decision-making, and changes in appetite occur. There is often a tendency to withdraw from social interactions, even with those in the immediate environment. In more severe cases, symptoms may lead to significant impairment in daily functioning, including the neglect of basic needs such as personal hygiene or daily responsibilities. Suicidal ideation may also emerge, necessitating urgent clinical attention and appropriate specialist support (Brudkiewicz, 2021).

7. Medical and non-medical management strategies for emotional problems in pregnant women

7.1 Diagnosis of depression during pregnancy

The treatment process for depression in pregnant women should commence with a consultation with a specialist to establish an accurate diagnosis. Diagnostics are based on both a clinical assessment conducted by a physician and the use of standardized screening tools.

These evaluations are typically performed twice during pregnancy – between the 11th and 14th week and between the 33rd and 37th week of gestation. Their purpose is the early detection of depressive symptoms and the identification of women at high risk of developing the disorder (Iracka & Lewicka, 2014).

7.2 Pharmacological treatment

The treatment of postpartum depression is conducted using two primary modalities: pharmacotherapy and psychotherapy. Pharmacological treatment of depression during pregnancy and the postpartum period poses a significant challenge due to potential risks to both the mother and the developing fetus. Since no currently available antidepressant is entirely risk-free, the decision to initiate treatment must be made by a physician on an individualized basis.

A crucial aspect is the assessment of the benefit-to-risk ratio; the implementation of pharmacotherapy is justified primarily when the potential benefits for the woman's mental health outweigh the possible risks to the infant. In the treatment of perinatal depression, selective serotonin reuptake inhibitors (SSRIs) are most commonly utilized, with the exception of certain substances such as paroxetine. Many antidepressants are classified as FDA Category C, indicating that animal studies have shown potential adverse effects on fetal development, while conclusive human data remain insufficient. This group includes, among others, venlafaxine, duloxetine, mirtazapine, trazodone, and tricyclic antidepressants (TCAs) (Mossakowska-Wójcik et al., 2019; Urban-Kowalczyk, 2017; Iracka & Lewicka, 2014).

7.3 Psychotherapy as a first-line treatment

Psychotherapy for the treatment of perinatal depression is primarily based on two main approaches: cognitive-behavioral therapy (CBT) and interpersonal therapy (IPT).

Cognitive-behavioral therapy focuses on the identification and modification of maladaptive thought patterns that influence the patient's emotions and behaviors. Throughout the therapeutic process, the woman learns to recognize the interdependencies between thoughts, emotions, and reactions, enabling the implementation of more constructive ways of interpreting reality and coping with challenging situations.

In contrast, interpersonal therapy focuses on social relationships and their impact on the patient's mental state. In the context of pregnancy and the postpartum period, it primarily addresses the improvement of relationship quality with the partner and the immediate social environment. The objective of this modality is to strengthen social support, which plays a pivotal role in the recovery process and adaptation to new life circumstances (Małus et al., 2016; Maliszewska & Preis, 2014).

7.4 Physical activity as a supportive intervention

Physical activity, including therapeutic exercise, constitutes a significant non-medical method supporting the treatment of perinatal depression. Regular exercise can beneficially influence both the physical and mental state of women, contributing to a reduction in emotional tension and providing a distraction from negative thoughts. Additionally, group-based activities facilitate social interaction and reinforce a sense of support.

The underlying mechanism of exercise is associated, among other factors, with increased levels of endorphins, serotonin, and other neurotransmitters, which translates into improved mood, sleep quality, concentration, and overall well-being. Regular physical activity can also support the restoration of self-esteem, enhance self-confidence, and contribute to the improvement of overall physical fitness (Urban-Kowalczyk, 2017).

7.5 The role of social support

An essential element supporting the treatment of perinatal depression is support from the patient's immediate social environment. The assistance of a partner is of particular importance, encompassing emotional, psychological, and physical support. Sharing household responsibilities and tasks related to newborn care helps alleviate the woman's burden and fosters a sense of security. The proximity and involvement of loved ones enable more effective physiological recovery and facilitate adaptation to new life circumstances (Kucharska & Janicka, 2018; Koss et al., 2014).

7.6 Support groups and social relations

A complementary form of support involves contact with other women at a similar stage of life. Participation in support groups allows for the exchange of experiences, obtaining practical advice, and reducing the sense of isolation. Shared experiences foster a better understanding of one's own emotions and raise awareness that physical and psychological difficulties are a common phenomenon. This type of peer support can contribute to improved well-being, increased self-esteem, and the alleviation of depressive symptoms (Müldner-Nieckowski et al., 2015).

8. Applications of artificial intelligence in mental health care for pregnant women

In recent years, there has been a dynamic expansion of artificial intelligence (AI) applications in medicine, including the fields of mental health and perinatal care. These technologies are increasingly utilized in the diagnosis of emotional disorders, as well as in their monitoring and the support of therapeutic processes for pregnant women (Shatte et al., 2019; Esteva et al., 2019).

The development of AI-based tools aligns with the concept of personalized medicine, which aims to tailor healthcare to the individual needs of the patient. This is of particular significance in the context of the mental health of pregnant women, as this period is characterized by high emotional variability and the interplay of biological, psychological, and social factors (Topol, 2019; WHO, 2019)

8.1 AI in the diagnosis of depression and emotional disorders

Artificial intelligence enables the early detection of emotional disorders through the analysis of large datasets of behavioral and physiological data (Shatte et al., 2019).

Research conducted by De Choudhury demonstrated that the analysis of social media activity can facilitate the identification of depressive symptoms even before their clinical diagnosis (De Choudhury et al., 2013).

Furthermore, Campbell points to the potential of utilizing smartphone-derived data-such as physical activity levels, sleep quality, and social interaction patterns—to monitor users' mental health status (Campbell et al., 2016).

In the context of pregnancy, these technologies can support the identification of women at risk for depression or anxiety disorders by analyzing changes in behavior, circadian rhythms, and activity levels (Zhang et al., 2020).

Additionally, the advancement of machine learning algorithms enables the development of predictive models that, based on clinical and psychosocial data, can estimate the probability of psychiatric disorders, which is of vital importance for preventive interventions (Saria et al., 2018; Topol, 2019).

8.2 AI in perinatal care and women's health

Artificial intelligence also finds application in the broader scope of care for pregnant women. According to World Health Organization reports, the development of digital tools and AI can contribute to improving the quality of healthcare and increasing the accessibility of medical support (World Health Organization, 2019).

Researchers such as Topol and Saria emphasize that machine learning algorithms can support physicians in assessing the risk of pregnancy complications and monitoring patients' health status in real-time (Topol, 2019; Saria et al., 2018).

Regarding mental health, this enables the earlier detection of concerning changes and the implementation of appropriate preventive and therapeutic measures (Shatte et al., 2019).

AI can also facilitate the integration of data from various sources (e.g., electronic health records, wearable devices, and mobile applications), allowing for a more comprehensive assessment of the patient’s health status (Esteva et al., 2019; Topol, 2019).

In the context of perinatal care, diagnostic technologies such as ultrasonography (USG) and cardiotocography (CTG) play a vital role as fundamental tools for monitoring the course of pregnancy and fetal well-being. Ultrasound examinations enable the assessment of fetal anatomical development, detection of congenital anomalies, and monitoring of growth at various gestational stages, while CTG allows for the continuous evaluation of the fetal heart rate and uterine contractile activity. Modern AI-based systems can support the analysis of ultrasound images and CTG tracings, increasing diagnostic accuracy, accelerating result interpretation, and assisting medical personnel in clinical decision-making (Topol, 2019; Esteva et al., 2019; WHO, 2019).

8.3 AI as psychological support (chatbots and mobile applications)

A significant area of AI application is psychological support delivered through mobile applications and chatbots. Tools such as Woebot or Wysa offer users the opportunity to engage in supportive dialogues based, among others, on cognitive-behavioral therapy techniques (Fitzpatrick et al., 2017; Inkster et al., 2020).

These solutions can serve as a supplement to traditional therapy, particularly in situations involving limited access to specialists or barriers such as stigmatization and time constraints. These applications enable ongoing mood monitoring, the performance of therapeutic exercises, and the acquisition of real-time support, which can be of vital importance for pregnant women experiencing low mood or anxiety (Liu et al., 2021).

At the same time, it must be emphasized that these tools do not replace professional medical care, and their effectiveness depends, among other factors, on the quality of the algorithms and the level of user engagement (Inkster et al., 2020; WHO, 2019).

8.4 AI and high-risk pregnancies

The application of AI is of particular significance in the case of high-risk pregnancies, where the risk of emotional problems is substantially higher. The stress associated with threats to the health of the mother or child, previous negative experiences, or uncertainty regarding the course of pregnancy can lead to the exacerbation of depressive and anxiety symptoms (Liu et al., 2021).

Artificial intelligence algorithms can support the identification of women particularly vulnerable to developing mental disorders by analyzing clinical, psychological, and behavioral data (Zhang et al., 2020; Shatte et al., 2019).

The literature also emphasizes the role of digital biomarkers, which enable continuous monitoring of the patient's condition and early detection of concerning changes (Inkster et al., 2020).

The use of AI in this field creates opportunities for implementing personalized interventions and better tailoring medical and psychological care to the individual needs of the patient, which is especially vital in high-risk pregnancy cases (Topol, 2019; Saria et al., 2018).

9. Discussion

The literature review indicates that emotional problems during pregnancy constitute a significant public health challenge, with a multifactorial etiology encompassing both biological and psychosocial factors. Available publications emphasize the increasing prevalence of depressive and anxiety disorders among pregnant women, which justifies the necessity for early diagnosis and the implementation of effective support systems.

In this context, particular importance is attributed to modern technologies, including solutions based on artificial intelligence. The results of the analyzed studies suggest that AI can support the diagnostic process by enabling the earlier detection of emotional disorders through the analysis of behavioral and physiological data. Furthermore, digital tools such as mobile applications and chatbots can serve as a supplement to traditional therapeutic methods, increasing the accessibility of psychological support.

Simultaneously, it must be emphasized that the application of AI in care for pregnant women is associated with certain limitations. The literature highlights, among others, issues related to personal data protection, the necessity for clinical validation of algorithms, and the risk of over-reliance on technological solutions at the expense of direct contact with medical personnel.

A significant limitation of this study is its review-based nature and the limited number of publications directly addressing the application of AI in the mental health of pregnant women. This underscores the need for further research, particularly of an empirical nature.

In conclusion, the findings of this review align with the growing body of research on the utilization of digital technologies in perinatal care. Artificial intelligence represents a promising tool for supporting mental health care for women during pregnancy; however, its implementation should be conducted responsibly and in a manner complementary to traditional forms of medical care.

10. Conclusions

The mental health of women during pregnancy is a vital component of comprehensive perinatal care, influencing both maternal well-being and child development. An analysis of the available literature indicates that this period is associated with an elevated risk of emotional disorders, which are determined by a multifactorial interplay of biological, psychological, and social elements.

The advancement of artificial intelligence creates new opportunities for the early detection of mental disorders, health status monitoring, and the enhancement of the therapeutic process.

AI-based tools—such as predictive systems, mobile applications, and chatbots—can serve as valuable supplements to traditional medical care, increasing its accessibility and effectiveness. At the same time, it must be emphasized that the utilization of AI in medicine requires further research and appropriate oversight to ensure the safety and high quality of the services provided. The integration of modern technologies with classical medical care may represent a key direction for the future development of perinatal care.

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