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POSTPARTUM DEPRESSION: UNDERSTANDING TRIGGERS, DIAGNOSIS, AND EFFECTIVE TREATMENTS

Kamil Czerwiak[1] ✉, ***Magdalena Cyrkler[2]***, ***Aleksandra Maria Śledziewska[3]***, ***Aleksandra Drabik[4]***, ***Maciej Karasiński[5]***, ***Magdalena Lipian[6]***, ***Kamila Sieradocha[7]***

[1]Our Lady of Perpetual Help Hospital in Wolomin, Poland
[2]Military Institute of Medicine, Warsaw, Poland
[3]Military Institute of Medicine, Warsaw, Poland
[4]Provincial Specialist Hospital Stefan Cardinal Wyszyński Specialised Hospital in Lublin, Poland
[5]National Medical Institute of the Ministry of the Interior and Administration, Warsaw, Poland
[6]Military Institute of Medicine Warsaw, Poland
[7]University Clinical Hospital in Poznań, Poland

✉ ***kamil.czerwiak98@wp.pl***

ABSTRACT

Background: Postpartum depression (PPD) is a prevalent and serious mental health condition affecting approximately 17% of women after childbirth, with prevalence varying markedly between countries. Many cases remain undetected, and the condition's multifactorial etiology — encompassing hormonal, psychological, and social determinants — complicates early diagnosis and intervention. The COVID-19 pandemic has further increased PPD prevalence worldwide, highlighting the urgency of effective screening and treatment strategies. Recent advances, including the development of novel neuroactive steroids such as brexanolone and zuranolone, offer new therapeutic perspectives.

Results: PPD is a major depressive disorder that typically manifests shortly after childbirth. Contributing factors include rapid hormonal and neuroendocrine changes, pre-existing mental illness, psychosocial stressors, and adverse life events. Non-specific symptoms may delay diagnosis, increasing the risk of long-term complications for both mother and child. The COVID-19 pandemic has been associated with a marked increase in PPD prevalence, linked to social isolation, reduced healthcare access, and heightened anxiety. Consequences for the child include emotional and behavioral disturbances, impaired cognitive development, and reduced IQ.

Conclusions: Current pharmacological treatments, such as sertraline, and non-pharmacological approaches, including interpersonal psychotherapy, are effective and lead to significant clinical

improvement. Novel neuroactive steroids, such as brexanolone and zuranolone, show promise for treatment-resistant cases and warrant further investigation. Early intervention reduces maternal suicide risk, prevents child abuse, mitigates developmental pathologies, strengthens partner relationships, and improves maternal psychosomatic well-being.

Keywords: postpartum depression, COVID-19, women's health, mental health, postpartum period, brexanolone, zuranolone

INTRODUCTION

Pregnancy induces profound physiological, hormonal, and psychological changes, which may predispose women to mental health disorders in the peripartum period [1]. Among these, postpartum depression (PPD) is one of the most prevalent and impactful conditions, affecting maternal well-being, the mother–infant bond, and child development [2]. PPD is typically characterized by depressive symptoms without psychotic features, although severe cases with psychotic symptoms may occur [3].

According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), PPD is classified as a major depressive episode with peripartum onset, defined as symptom onset during pregnancy or within four weeks after delivery [4]. Screening is most often performed with the Edinburgh Postnatal Depression Scale (EPDS) and the Patient Health Questionnaire-9 (PHQ-9), while diagnosis is established based on DSM-5 criteria. The estimated prevalence ranges from 11–17% in women and around 10% in men [5], with contributing factors including rapid hormonal fluctuations, neuroendocrine changes, immune modulation, pre-existing mental illness, exposure to violence, smoking, and unwanted pregnancy [6,7].

Recent evidence suggests that the COVID-19 pandemic has further increased the prevalence of PPD. A national maternity survey in England reported a rise in clinically significant symptoms from 23% in 2014 to 29% in 2020 [53], while an umbrella review and meta-analysis estimated a pooled prevalence of 25.3% during the pandemic, substantially higher than pre-pandemic levels [54]. A cross-sectional study involving 860 women reported a significant increase in the prevalence of postpartum depressive symptoms during the COVID-19 pandemic compared to pre-pandemic levels [55]. These findings indicate that pandemic-related factors such as social isolation, reduced access to healthcare, and increased psychosocial stressors have amplified known risks for PPD.

This review aims to provide a comprehensive synthesis of recent evidence from 2018–2024 on the epidemiology, risk factors, diagnostic approaches, and treatment strategies for postpartum depression in women. Special emphasis is placed on integrating recent international and Polish data, including the influence of the COVID-19 pandemic, and evaluating emerging therapeutic options such as brexanolone and zuranolone. The objective is to identify knowledge gaps, enhance clinical awareness, and support the development of effective early detection and intervention strategies to reduce the individual and public health burden of PPD.

METHODS

This narrative review was conducted in accordance with recognized principles for literature synthesis in biomedical research. A comprehensive search of PubMed, Scopus, and Web of Science databases was performed to identify review articles published between January 1, 2018, and April 30, 2024. The search strategy used combinations of the following keywords and MeSH terms: "postpartum depression", "perinatal depression", "epidemiology", "risk factors", "diagnosis", "screening", "treatment", "management", "COVID-19", "brexanolone", and "zuranolone". Boolean operators ("AND", "OR") were applied to refine the search.

Inclusion criteria

1. Systematic reviews, meta-analyses, and narrative reviews focusing on postpartum depression in women.
2. Articles providing data on epidemiology, risk factors, diagnostic approaches, screening tools, or treatment strategies.
3. Publications in English in peer-reviewed journals.

Exclusion criteria

1. Primary research studies, case reports, letters, and conference abstracts.
2. Articles focusing exclusively on paternal postpartum depression or other unrelated mental health conditions.

3. Non-peer-reviewed publications and preprints.

The titles and abstracts of all retrieved articles were screened to exclude irrelevant publications. Full-text articles meeting the eligibility criteria were reviewed in detail. Data from the included studies were extracted and synthesized narratively, integrating findings from international research and highlighting data relevant to the Polish context where applicable. No formal quality assessment tool was applied to the included reviews.

RESULTS

EPIDEMIOLOGY

The global prevalence of postpartum depression is estimated at 17%, yet half of all cases remain undetected [3]. These data vary geographically, because, for example, in Saudi Arabia, the prevalence of PPD is estimated to range from 45.64% to 52.25% of women [8], whereas in Poland it is 16–18% [9]. Studies from Iceland, Greenland and Norway have reported the prevalence of PPD to be 6.5%, 8.6% and 10%, respectively [3]. The presence of a woman's mental illness is considered to be a significant factor influencing the occurrence of PPD. PPD occurs in approximately 8% of women who have not previously suffered from a depressive disorder and in approximately 30–50% of women with a history of a depressive episode or bipolar disorder [10]. The COVID-19 pandemic has been associated with a marked increase in postpartum depressive symptoms. In England, national maternity surveys revealed that the prevalence of PPD symptoms rose significantly during the pandemic compared with pre-pandemic levels [53]. A meta-analysis of global data confirmed higher rates of PPD during the pandemic period, with contributing factors including increased social isolation, reduced healthcare access, and elevated anxiety [54]. A cross-sectional study of 860 women also found a substantial increase in depressive symptoms during the pandemic, with prevalence significantly exceeding pre-pandemic values [55].

In Poland, a prospective study by Klein et al. (2024) provided valuable insight into the local epidemiology of PPD [56]. The nationwide programme included screening of over 21,500 women in the first postpartum year. Edinburgh Postnatal Depression Scale (EPDS) results differed markedly depending on the mode of administration: the mean EPDS score in face-to-face screening was 4.73 (SD 4.14; n = 7,222) compared with 16.05 (SD 5.98; n = 10,454) in online screening. The proportion of women scoring above the cut-off for probable depression (EPDS > 12) was 7.3 % in face-to-face assessments and 77 % in online assessments. These findings not only indicate a substantial prevalence of PPD risk in Poland but also highlight the potential influence of screening modality on detection rates, suggesting that differences in access, stigma, and self-disclosure may affect accuracy and representativeness of prevalence estimates.

The prevalence of postpartum depression varies widely across different countries and regions, as summarized in Table 1.

Table 1. Prevalence of postpartum depression (PPD) in selected countries and regions

Country/Region	Reported prevalence (%)	Source
Global average	17%	[3]
Saudi Arabia	45.64–52.25%	[8]
Poland	16–18%	[9]
Iceland	6.5%	[3]
Greenland	8.6%	[3]
Norway	10%	[3]

Multiple studies have reported a notable increase in postpartum depression rates during the COVID-19 pandemic, as shown in Table 2.

Table 2. Increase in postpartum depression prevalence during the COVID-19 pandemic

Study/Country	Pre-pandemic prevalence (%)	Pandemic prevalence (%)	Notable factors	Source
England (national maternity surveys)	Lower baseline (exact % not provided)	Significantly higher	Social isolation, reduced healthcare access, increased anxiety	[Harrison et al., 2023]
Global meta-analysis	Variable by country	Significantly higher overall	Social isolation, reduced healthcare access, increased anxiety	[Sahebi et al., 2022]
Brazil (Ciolac et al., 2023)	Lower baseline (exact % not provided)	Marked increase	Pandemic-related stressors	[Ciolac et al., 2023]
Poland ("Next Stop: Mum" programme) – face-to-face screening	7.3%	—	Lower disclosure in in-person settings	[Czarnocka et al., 2023]
Poland ("Next Stop: Mum" programme) – online screening	—	77%	Greater disclosure online, possible overrepresentation of symptomatic women	[Czarnocka et al.,

ETIOLOGY

The process of a woman's adaptation to becoming a mother begins from the moment of fertilization of the egg. Many of the changes taking place during this time can cause depressive symptoms in young mothers. The exact mechanisms of depression are not currently known, but there are many factors that may predispose to its occurrence to a greater or lesser extent. These include biological, psychological, social, socioeconomic and health factors [11]. The following factors have a huge negative impact on the development of PPD: low social status, lack of emotional support, unwanted pregnancy, perinatal complications, incriminating psychiatric history, depression in the family, conflicts with partner and stress related to the new role and responsibilities [12][13].

Rapid hormonal fluctuations are considered to be one of the main links between the symptoms of postpartum depression and the physiological changes that occur during pregnancy. In women at risk of developing PPD, most depressive symptoms report during the period of greatest fluctuations in estradiol and progesterone, which may emphasize the potential role of gonadal hormones in mood disorders. The research has shown that after the peak period of hormonal concentrations, there is a sharp decline, which increases depressive concerns. Therefore, it was found that women at risk are more sensitive to rapid hormonal fluctuations than to the concentrations of individual ovarian hormones [14][15]. One study also demonstrated the role of corticotropin-releasing hormone (CRH) in the development of postpartum depression. CRH plays a significant role in the etiology of depression in non-pregnant women, because in these patients there is an increased number of very hyperactive CRH neurons in the hypothalamus, which suggests that their activity may cause depressive symptoms [16].

The pathophysiology of PPD may be caused by changes in many biological and hormonal systems, and primarily in the Hypothalamic-Pituitary-Adrenal (HPA) axis. It has been proven that HPA is involved in the disease process of postpartum depression, because it is physiologically responsible for the release of cortisol in response to stress or trauma. The release of catecholamines is reduced when its function is disturbed, and that leads to a poor response of the body to these stimuli [17].

Moreover, it was noticed that an increased level of the pro-inflammatory cytokine interleukin 1 β (IL-1 β) very early in the postpartum period increases the risk of symptoms of depression in women [18]. Recent

studies have also shown the involvement of genetic factors in the development of postpartum depression. The influence of the 5-HTTLPR serotonin transporter gene polymorphism was demonstrated, as its presence correlated with depressive symptoms and a stressful life event [19].

Past experiences cause lasting changes in the psyche, especially when they were accompanied by very strong, negative emotions. Experienced traumas, experiences of abuse or post-traumatic stress disorder (PTSD) have a huge impact on the further condition of the psyche. Therefore, the mental health of a pregnant woman may also influence the manifestation of depressive symptoms [20]. Not only experiences have an impact on the condition of the psyche, but also events that occur during pregnancy, the perinatal period and the postpartum period. It has been shown that approximately 25% of women experience violence, especially from a partner during pregnancy. In comparison to women who have not been exposed to it, they have an increased risk of postpartum depression, therefore it is recommended that questions about domestic violence be included in preventive examinations [21][22]. Moreover, childbirth itself and complications occurring during or immediately after it are increasingly considered a potentially traumatic event. It was found that post-traumatic stress disorder may also develop when childbirth was uneventful, and its increased risk occurred when the newborn had to be admitted to the intensive care unit [23].

Recent reports also indicate the role of the recently ended COVID-19 pandemic in the increase in the incidence of postpartum depression. During it, the use of psychoactive substances such as opioids, cannabis, tobacco and alcohol among pregnant women increased [24]. These substances compensated the loss of physical and mental support for parents in the first months after delivery [25]. The cause is considered to be increased stress during this period caused by isolation, loss of support or lack of access to medical care.

Emotional and intelligence support, and empathic relationships also have an impact on the development of depression. Moreover, it was shown that women with a stable professional position reported lower severity of depressive symptoms compared to unemployed women [26].

SYMPTOMS

The course of postpartum depression can be varied. It is often insidious and unnoticeable by the patient and her surroundings, which is why it is so important to increase public awareness of its non-specific symptoms. Additionally, patients often conceal their mood disorders due to the shame they feel.

Non-specific symptoms of PPD include feelings of sadness, feelings of guilt and worthlessness, and a lack of interest and pleasure in things that previously provided them [4]. Additionally, patients may report sleep disturbances, decreased energy, irritability or negative thoughts. Some of these symptoms may resemble the "baby blues", which appear a few days after giving birth and disappear within 10 days, but do not involve suicidal thoughts. Although this period was considered benign, more and more studies show the risk of progression to PPD [27].

Postpartum depression may present also by sadness, depression, lack of energy, anxiety, guilt, obsessive worry, emotional lability, suicidal thoughts, or thoughts of harming the baby [28][29]. The research has shown that the symptoms of postpartum depression may differ from the symptoms of depressive mood disorders. It has been found that women with PPD are less likely to report feelings of sadness but have perceived feelings of guilt or worthlessness and a lack of pleasure and interest in things that previously provided them. In addition, they showed psychosomatic symptoms such as anxiety or agitation, and concentration/decision-making disorders were more severe. Therefore, it was proposed to include these criteria among the screening questions for postpartum depression. It was also noticed that patients had difficulty falling asleep and staying asleep [27][30]. Patients may also present with psychotic symptoms, which include delusions and hallucinations, in the form of voices urging harm to the infant [17].

DIAGNOSIS

Postpartum depression should be diagnosed immediately after observing the first prodromal symptoms, this will enable patients to be placed on an appropriate therapeutic path and prevent serious disease consequences. Identifying women with current risk factors and monitoring them more closely for the development of PPD may become a good diagnostic practice. Screening tests such as the Edinburgh Postnatal Depression Scale (EPDS) and Patient Health Questionnaire-9 (PHQ-9) may be considered for all women and men, especially those at risk [31][32]. And also, Matthey Generic Mood Question [MGMQ], Generalized Anxiety Disorder scale [GAD - 7], GAD - 2, and the Whooley questions are in use [33].

Moreover, a properly collected medical history is important in the prevention of the disease, taking into account past or present mental illnesses, traumatic experiences, experiencing violence or somatic diseases, the presence or treatment of which may cause depressive concerns [34].

In the international classification of diseases ICD-10, postpartum depression is listed under the code F53.0. Its main diagnostic criteria include depressive symptoms characterized by: depressed mood lasting for at least 2 weeks; loss of interest and loss of energy; decreased appetite; sleep disorder; psychomotor arousal or inhibition; feeling worthless; thinking disorders; recurrent thoughts about death/suicide or any suicidal behavior.

Additional diagnostic criteria include: occurrence of symptoms within 4 weeks of delivery; exclusion of the disease being caused by organic factors or the use of psychoactive substances and high intensity of symptoms impairing social, professional or family functioning [35].

In addition, two further criteria must be met: the symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning, and the episode cannot be attributed to the physiological effects of the substance or to another medical condition [4].

TREATMENT

When a diagnosis or suspicion of postpartum depression is made, treatment should be started as soon as possible, as delayed treatment may lead to intensification of symptoms, resistance to treatment or suicide. Treatment options for PPD vary depending on the severity of symptoms, the woman's mental state, socioeconomic conditions, and the ability to care for a newborn. Currently, two treatment options are proposed: pharmacological and non-pharmacological in the form of psychotherapy, which is the basis for the treatment of mild disease presentation [19].

The most frequently used form of psychological intervention and recommended by The World Health Organization (WHO) for women suffering from postpartum depression is interpersonal therapy (IPT) [36]. IPT is time-limited and focused on resolving the interpersonal problems that predispose, cause, and perpetuate the patient's distress [37]. The main areas in which IPT may be useful for women suffering from postpartum depression include grief, disputes, life/role changing, loneliness or conflicts with partner [38] [34].

The therapy is divided into three phases: initial, middle and termination phase. During the initial phase, the therapist's area of activity is identified, trust is established between the specialist and the client, and a treatment plan is established. The middle phase is the most active part of the therapy, during which there is a healing interaction between the patient and the therapist. In the termination phase, the specialist summarizes the effectiveness of the therapy and points out the client's achievements in the previous stages, which gives him a sense of competence and self-confidence [38].

The conducted research showed an improvement in the mental condition of women with PPD and improved satisfaction with family of patients after undergoing IPT. The optimal duration of intervention was between 4 and 8 weeks, but greater family satisfaction was observed the longer it was [39][40].

The short-term nature may be insufficient for women who need long-term support, and the focus on interpersonal problems may be insufficient for patients who experience other problems such as trauma or anxiety. Therefore, it may be necessary to change the therapy, e.g. to cognitive-behavioral therapy or even antidepressant treatment, which is recommended in cases of resistance to psychotherapy, severe clinical manifestations or the patient's will [41]. A combination of psychotherapy and antidepressants is also recommended for women with moderate or severe depression.

The drugs of first choice in the treatment of PPD are selective serotonin reuptake inhibitors (SSRIs), with sertraline being the most widely used [42]. Paroxetine is also used [43]. It is recommended to avoid the use of fluoxetine because studies have shown an increased risk of neonatal withdrawal syndrome, manifested by increased crying, difficulty sleeping, gastrointestinal sensitivity or irritability [44]. Despite the fact that most antidepressants pass into breast milk, their use is recommended because the risk of complications in the newborn is very low and the untreated mother's disease poses a much greater threat to it. The substances listed are considered the safest during breastfeeding [45].

For patients who want to breastfeed but are afraid of exposing their baby to drugs, repetitive precranial magnetic stimulation may be an alternative. It uses magnetic waves that stimulate nerve cells that are insufficiently active due to disease. Effectiveness is noticed with treatments 5 times a week for 4-6 weeks. The method is considered safe and well tolerated, but may have minor side effects, such as headaches, dizziness, or facial muscle tremors [17].

Serotonin and norepinephrine reuptake inhibitors (SNRIs) are used as a second choice, but data on their use in the treatment of postpartum depression are limited [41].

Another innovative and proposed treatment method is the use of brexanolone, which is a neuroactive

steroid synthesized by a metabolite of progesterone - allopregnanolone, and zuranolone, a drug with a similar effect [46][47]. Their use is reserved exclusively for treatment-resistant depression and ineffectiveness of electrotherapy. B rexanolone is administered as a 60-hour infusion that lasts approximately 2.5 days [17]. It is recommended that breastfeeding women temporarily discontinue this method and wait until four days after the infusion ends before restarting it [48]. The drug is well tolerated and provides rapid effectiveness, however, ongoing research on its long-term safety should be monitored [17].

In severe depression, benzodiazepines can also be used for a short period of time as a form of supporting the period until the antidepressants take effect, as well as electroconvulsive therapy, in case of resistance to the above-mentioned methods [26].

CONSEQUENCES

The mental, as well as physical health of a young mother plays a key role in creating a new bond between her and her child. When one of them is disturbed, many aspects of life deteriorate, including the bond being formed [26]. This may lead to abnormalities in the child's emotions, behavior or psyche in the future [17]. The effects of postpartum depression can be very dramatic and require immediate intervention, because untreated depression can lead to the murder of a child and suicide by the patient herself [49]. Moreover, the patient who does not undergo treatment has problems with maintaining a proper body weight, breastfeeding and social relationships. They also have an increased predisposition to taking psychoactive substances and alcohol abuse [50]. Related suicide attempts are the cause of death in 20% of women in the postpartum period [51]. Patients with PPD repeatedly appear in emergency departments and make numerous visits to general practitioners or mental health clinics, which results in 90% higher health care expenses compared to healthy women [52].

PPD has been shown to have a negative impact on the mother's caring behavior, the development of her child's language skills and a reduction in his IQ [48]. PPD may also impair a child's cognitive, motor, and social development [27][28].

DISCUSSION

Postpartum depression remains a significant public health concern with a multifactorial etiology encompassing biological, psychological, and social determinants. The synthesis of recent data from 2018–2024 confirms that rapid hormonal shifts, neuroendocrine changes, immune modulation, and pre-existing psychiatric history remain key biological contributors, while socioeconomic deprivation, exposure to violence, lack of social support, and stressful life events act as strong psychosocial drivers [11]. The COVID-19 pandemic further amplified these risk factors by increasing social isolation, reducing access to perinatal care, and elevating stress and anxiety levels, resulting in a marked rise in PPD prevalence across diverse populations [24].

The variability in prevalence across regions underscores the influence of methodological differences in screening, cultural perceptions of mental health, and healthcare system accessibility. The Polish national postpartum depression prevention programme demonstrated striking disparities between face-to-face and online EPDS screening results, suggesting that the choice of screening modality can substantially influence detection rates. This raises critical questions about the representativeness and accuracy of prevalence estimates and highlights the importance of tailoring screening strategies to local contexts.

Despite the availability of effective pharmacological options such as selective serotonin reuptake inhibitors (SSRIs) and non-pharmacological interventions like interpersonal psychotherapy, underdiagnosis remains a major barrier to timely intervention [36][42]. Stigma surrounding mental illness in the peripartum period discourages help-seeking, particularly in settings where public awareness of PPD symptoms is low. This points to the urgent need for structured awareness campaigns targeting both healthcare providers and the general public, integrated into antenatal education and primary care settings.

Emerging evidence on neuroactive steroids such as brexanolone and zuranolone offers promising avenues for treatment, particularly for severe or treatment-resistant cases. However, current clinical data are limited in scope and duration, necessitating larger, well-designed trials to determine efficacy, safety, and accessibility in routine clinical practice [17][46]. Parallel research into the cost-effectiveness and feasibility of integrating such therapies into national health systems is also warranted.

Future research should prioritize longitudinal and multicenter studies to identify predictive risk profiles, optimize screening modalities, and evaluate culturally adapted prevention strategies. Strengthening local epidemiological surveillance, as in the case of Poland, and integrating findings into national perinatal mental health policies can enhance early detection and intervention, ultimately reducing the burden of PPD on

mothers, children, and families.

LIMITATIONS

This narrative review has several limitations. First, although a comprehensive search of major biomedical databases was performed, only articles published in English were included, which may have resulted in the exclusion of relevant studies published in other languages. Second, the review did not apply a systematic review methodology or use standardized tools such as AMSTAR 2 to formally assess the methodological quality of the included studies. Third, the absence of a meta-analytical synthesis limits the ability to quantitatively compare prevalence estimates and treatment outcomes. Finally, the focus on international and Polish studies may not fully capture regional variations in postpartum depression epidemiology, risk factors, and healthcare practices in other settings.

CONCLUSIONS

Postpartum depression is a prevalent and debilitating condition with profound consequences for maternal well-being, child development, and family functioning. Its multifactorial etiology, shaped by complex interactions between biological, psychological, and social determinants, requires an integrated and multidisciplinary approach to prevention, diagnosis, and management.

Early detection remains the cornerstone of effective intervention. Optimizing screening strategies, including the selection of appropriate tools and modalities, can significantly improve case identification, particularly in high-risk populations. The Polish national programme illustrates both the potential and challenges of large-scale screening initiatives, emphasizing the importance of adapting methods to cultural and systemic contexts.

Current evidence supports the efficacy of SSRIs and structured psychotherapies as first-line treatments. The introduction of neuroactive steroids such as brexanolone and zuranolone may represent a paradigm shift in pharmacological management, especially for severe or treatment-resistant PPD, but further robust research is essential before broad clinical implementation.

Reducing stigma and increasing awareness among healthcare providers, mothers, and their families are essential to improve help-seeking behavior and adherence to treatment. Public health campaigns and educational initiatives should be systematically integrated into perinatal care pathways.

Future priorities include longitudinal studies to refine risk stratification, the evaluation of cost-effective and culturally adapted prevention programmes, and the development of evidence-based national guidelines that incorporate emerging therapeutic modalities. Such measures will contribute to reducing the individual and societal burden of postpartum depression and improving long-term outcomes for mothers and their children.

In summary, this review integrates recent international and national (Polish) epidemiological data, highlights the amplified burden of postpartum depression during the COVID-19 pandemic, and critically evaluates the therapeutic prospects of neuroactive steroids, providing a consolidated framework for advancing evidence-based prevention, diagnosis, and management strategies.

AUTHOR CONTRIBUTIONS

Conceptualization: Kamil Czerwiak; methodology: Magdalena Cyrkler;

Formal analysis: Aleksandra Drabik; investigation: Aleksandra Maria Śledziewska;

Resources: Maciej Karasiński; data curation: Magdalena Lipian;

Writing original draft: Kamil Czerwiak, Aleksandra Śledziewska, Magdalena Cyrkelr, Kamila Sieradocha;

Writing review and editing: Kamil Czerwiak, Maciej Karasiński, Magdalena Lipian;

Supervision: Kamil Czerwiak; project administration: Kamil Czerwiak

USE OF AI

AI-based software was applied only for grammar checking and language editing, with all

modifications reviewed and approved by the authors

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