BRUDNIAK, Katarzyna, GARBINO, Karolina, CZYCZERSKA, Magdalena, SZUŚCIK, Antoni, GADŻAŁA, Katarzyna, PRZYGODZKA, Sabina, MACH, Maciej and RUTKIEWICZ, Maciej. Postpartum Depression: A Closer Look at Treatment with Zuranolone. Quality in Sport. 2025;38:57838. eISSN 2450-3118.
https://doi.org/10.12775/QS.2025.38.57838
https://apcz.umk.pl/QS/article/view/57838

The journal has been 20 points in the Ministry of Higher Education and Science of Poland parametric evaluation. Annex to the announcement of the Minister of Higher Education and Science of 05.01.2024. No. 32553.
Has a Journal's Unique Identifier: 201398. Scientific disciplines assigned: Economics and finance (Field of social sciences); Management and Quality Sciences (Field of social sciences).
Punkty Ministerialne z 2019 - aktualny rok 20 punktów. Załącznik do komunikatu Ministra Szkolnictwa Wyższego i Nauki z dnia 05.01.2024 r. Lp. 32553. Posiada Unikatowy Identyfikator Czasopisma: 201398.
Przypisane dyscypliny naukowe: Ekonomia i finanse (Dziedzina nauk społecznych); Nauki o zarządzaniu i jakości (Dziedzina nauk społecznych).

The authors declare that there is no conflict of interests regarding the publication of this paper.
Received: 15.01.2025. Revised: 17.02.2025. Accepted: 18.02.2025 Published: 18.02.2025.

Postpartum Depression: A Closer Look at Treatment with Zuranolone

BRUDNIAK Katarzyna, GARBINO Karolina, CZYCZERSKA Magdalena, SZUŚCIK Antoni, GADŻAŁA Katarzyna, PRZYGODZKA Sabina, MACH Maciej, RUTKIEWICZ Maciej

Authors:

lek. Katarzyna Brudniak, Faculty of Medicine, University of Opole, Oleska Street 48, 45-052 Opole, Poland,

e-mail: lek.katarzynabrudniak@gmail.com

ORCID: https://orcid.org/0009-0001-1878-5294

lek. Karolina Garbino, 4. Military Clinical Hospital with Policlinic in Wroclaw, Weigla Street 5, 53-114 Wrocław, Poland

e-mail: karolinamgarbino@gmail.com

ORCID: https://orcid.org/0000-0002-2846-6035

lek. Magdalena Czyczerska, Faculty of Medicine, University of Opole, Oleska Street 48, 45-052 Opole, Poland

e-mail: magdalena.czyczerska@gmail.com

ORCID: https://orcid.org/0009-0001-1579-2501

lek. Antoni Szuścik, Faculty of Medicine, University of Opole, Oleska Street 48, 45-052 Opole, Poland

e-mail: antoni.szuscik@gmail.com

ORCID: https://orcid.org/0009-0001-2780-8208

lek. Katarzyna Gadżała, Wroclaw Medical University, wybrzeże Ludwika Pasteura 1, 50-367 Wrocław,

e-mail: kasia.gadzala@gmail.com

ORCID: https://orcid.org/0009-0005-4863-6045

lek. Sabina Przygodzka, T. Marciniak Hospital in Wroclaw, gen. Augusta Emila Fieldorfa 2, 54-049 Wroclaw, Poland

e-mail: sabinaprzygodzka@gmail.com

ORCID: https://orcid.org/0009-0002-0865-9451

lek. Maciej Mach, Medical University of Warsaw, Żwirki i Wigury 61, 02-091 Warsaw

e-mail: lek.maciej.mach@gmail.com

ORCID: https://orcid.org/0009-0004-8406-8746

lek. Maciej Rutkiewicz, Dolnośląskie Centrum Onkologii, Pulmonologii i Hematologii/ Lower Silesian Center of Oncology, Pulmonology and Haematology, Plac Ludwika Hirszfelda 19, 53-413 Wrocław

E-mail: macrutkiewicz@gmail.com

ORCID: https://orcid.org/0009-0007-7249-0490

ABSTRACT

Introduction

Postpartum depression (PPD) is a severe mood disorder that affects approximately 1 in 7 women and 1 in 10 men, often occurring in the first year after childbirth. Its etiology is multifactorial, including hormonal changes, genetic predisposition, and environmental stressors, though its true prevalence is likely underestimated due to stigma and underreporting. Symptoms include persistent sadness, irritability, emotional instability, and difficulties in parenting, often accompanied by neglect of self-care and potential suicidal ideation. Untreated PPD can have long-term consequences for maternal-child relationships, child development,

and maternal health, including increased suicide risk. The condition remains underdiagnosed and undertreated due to stigma and systemic barriers to care. Zuranolone, an oral neuroactive steroid and positive allosteric modulator of GABA-A receptors, has recently garnered attention as a novel therapeutic option with the potential to target these underlying pathophysiological mechanisms.

Aim of the study

The aim of this study is to provide a comprehensive review of the therapeutic efficacy, safety, and pharmacological characteristics of Zuranolone in the treatment of postpartum depression (PPD), with focusing particularly on its mechanism of action, pharmacokinetics and clinical trial outcomes.

Materials and methods

A systematic literature review was conducted using PubMed and other medical databases. Keywords included "postpartum depression," "zuranolone," "GABA-A modulators,". Data from clinical trials, reviews, and pharmacological studies were analyzed.

Conclusions

Zuranolone has provided significant efficacy with a very rapid onset of action in the reduction of symptoms in postpartum depression and long-term improvements observed over several weeks. Its mechanism of action, targeting GABAergic dysregulation, offers a novel therapeutic pathway for addressing postpartum psychiatric disorders. Future longitudinal studies are required to explore its long-term impact on maternal mental health.

Keywords: postpartum depression, zuranolone, $GABA_A$ modulators

Introduction

Postpartum depression (PPD), also called postnatal depression, is a mood disorder that can occur in the mother and father after the birth of a child. It is estimated that postpartum depression affects about 1 in 7 women [1] and about 1 in 10 men [2]. The estimated time of onset of postpartum depression is from 2 to 8 weeks after delivery, but it should be noted that it can appear up to a year after the birth of the child [3]. The causes of postpartum depression may be hormonal changes, genetic predisposition and/or environmental factors. However, it

should be noted that the number of people suffering from this mood disorder is underestimated due to stigmatization and concealment of symptoms by patients [1]. PPD is characterized by feelings of persistent sadness, irritability, emotional lability, difficulties in caring for the child and in coping with daily duties, neglect of appearance and hygiene, etc. Suicidal thoughts may occur in the course of postpartum depression [4]. Behavioral elements that may be noticed by third parties and considered alarm symptoms include persistent crying, lack of bonding with the child, and doubts about one's ability to care for oneself and the child [3]. Studies indicate that postpartum depression is not limited to women – it can also affect young fathers [2]. It manifests itself through feelings of depression, chronic fatigue, excessive stress, and anxiety, as well as changes in appetite and sleep quality. These are symptoms similar to those observed in mothers suffering from this condition [2, 5]. The risk of postpartum depression in fathers is higher in the case of young people who have had depressive episodes and are experiencing conflicts in their relationships or financial problems. This type of disorder in fathers, also known as paternal postpartum depression, can negatively affect both family relationships and the emotional development of the child, as is the case for mothers struggling with this condition [5]. Long-term studies indicate that this condition can have a lasting impact on both the development and growth of the child and its bond with the mother, as well as on the mental health of women in the long term [6, 7]. In the course of an episode of postpartum depression, patients may become blocked and reluctant to become pregnant again [8]. Studies have shown that the leading cause of maternal death in the first year after childbirth is death by suicide which may be related to untreated PPD [9].

Diagnostic Criteria

Postpartum depression (PPD) is diagnosed according to the same criteria as major depressive disorder (MDD). The condition must represent a distinct change from the individual's baseline functioning, and its onset must occur during pregnancy or within four weeks postpartum, though some experts propose extending this timeframe to up to one year postpartum. Diagnosis requires the manifestation of at least five symptoms lasting for a minimum of two weeks [10]. Symptoms of postpartum depression typically include severe fatigue, sleep and appetite disturbance, irritability, anxiety, feeling overwhelmed, difficulty bonding with the baby, thoughts of self-harm or harming the baby [1, 10]

Risk Factors

The exact mechanisms underlying postpartum depression (PPD) remain unclear, although it is considered a multifactorial condition involving genetic, hormonal, psychological, and environmental factors [11]. A family or personal history of depression is among the strongest predictors of PPD [1]. Hormonal fluctuations, particularly estrogen and progesterone postpartum contribute to emotional instability [12]. Psychosocial influences, including unplanned or unwanted pregnancies, unresolved trauma, a history of abuse, relationship conflicts, lack of social support and cultural pressures to meet idealized maternal roles, are also strongly associated with PPD [1, 11]. Negative events, such as pregnancy complications, prolonged labor, or unexpected medical challenges, are strongly associated with PPD [12], as are breastfeeding difficulties, advanced or adolescent maternal age, chronic stress, and sleep disruptions.[13, 14].

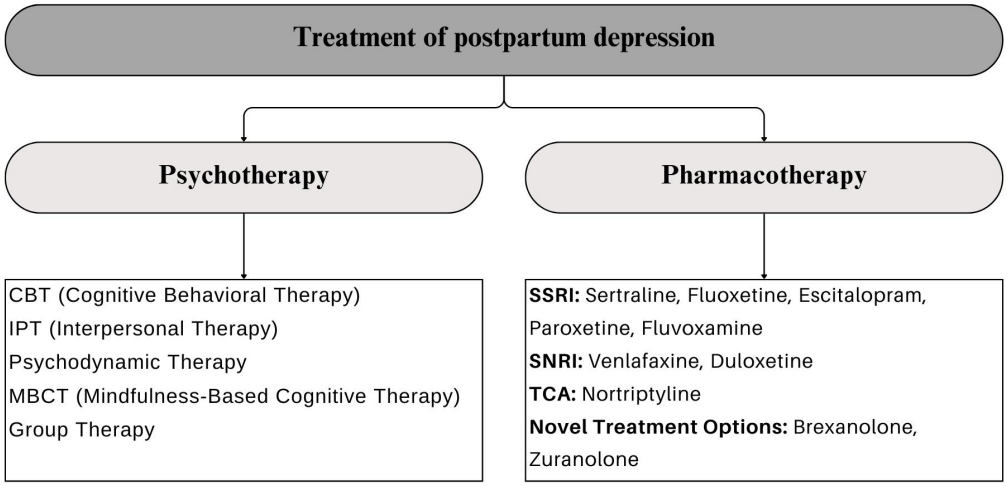
Consequences

For mothers, untreated PPD may serve as a precursor to chronic or recurrent depressive episodes, resulting in reduced ability to bond with their child, and long-term psychosocial difficulties [13]. One of the most alarming risks associated with PPD is suicide, which is a leading cause of mortality in the postpartum period [9, 15]. Maternal mental health significantly impacts the quality of care provided to the infant, children of mothers with untreated PPD face heightened risks of emotional, social, and developmental disruptions [11]. The lack of proper bonding can contribute to attachment disturbances, behavioral problems, and an increased possibility of psychiatric disorders during adolescence [1, 15, 16]. Additionally, partners of affected mothers often report higher levels of stress and relationship dissatisfaction, which can weaken the marital bond and negatively impact the effectiveness of co-parenting [12]. Siblings may experience feelings of neglect due to the changes in the household environment. Addressing this risk requires a multipronged approach, including improved screening for PPD during and after pregnancy, and ensuring that mothers receive comprehensive care. Without treatment, the consequences of PPD can be devastating, affecting not only the mother but also her child and family.

2. Treatment Options for Postpartum Depression

The treatment of PPD depends on the severity of the symptoms – mild and moderate depression is treated with psychotherapy, counseling, and support groups [1]. In cases of

severe postpartum depression resistant to psychotherapy, antidepressant medications are necessary [1, 12].



Source: [12, 13, 17, 18]

The first-line pharmacological treatment for PPD treatment are the selective serotonin reuptake inhibitors (SSRIs), enhancing serotonin levels to alleviate depressive symptoms. For patients who do not respond to SSRIs or in cases where their use is contraindicated, serotonin-norepinephrine reuptake inhibitors (SNRIs) represent an effective alternative [12, 13]. While SSRIs and SNRIs are recognized for their efficacy, they often require several weeks to show therapeutic effects, posing challenges for mothers in urgent need of relief [19]. If SSRIs or SNRIs are contraindicated, the use of tricyclic antidepressants (TCAs) [12], such as Nortriptyline may be considered. However, TCAs are associated with a heightened risk of overdose and a wider profile of potential side effects, necessitating careful consideration and monitoring [17]. Electroconvulsive therapy (ECT) is a highly effective treatment for severe postpartum depression [14], particularly in cases involving psychosis, suicidal ideation, or resistance to other therapeutic interventions [18]. Brexanolone and zuranolone are innovative neuroactive steroids that modulate the $GABA_A$ receptor, offering new hope for patients with postpartum depression (PPD), particularly those resistant to traditional therapies [1, 21] However, brexanolone has a relatively high cost and it is difficult to use as a first line medication as it needs to be administered as a continuous intravenous infusion over 60 hours (2.5 days), while patients are monitored [22, 23]. Zuranolone, a novel neurosteroid with a mechanism similar to brexanolone, provides a convenient and less invasive oral option [24].

Zuranolone as a New Treatment Option

Clinical Trials and Efficacy

Clinical trials assessing zuranolone have provided compelling evidence of its efficacy as a rapid-acting, short-course oral treatment for postpartum depression (PPD). Published in 2023, double-blind phase 3 trial on zuranolone (50 mg/day) for postpartum depression (PPD) included 200 patients, with 196 receiving the study drug or placebo. The demographically diverse population (38.3% Hispanic/Latina, 21.9% Black/African American) showed rapid and sustained improvements in depressive symptoms, with effects evident by day 3 and lasting through day 45. Zuranolone significantly reduced depression severity (HAM-D, CGI-S, MADRS) compared to placebo, with efficacy observed regardless of concomitant antidepressant use. Generally well tolerated, common adverse events included sedation, drowsiness, and dizziness. Although limited by a short observation period, lack of breastfeeding data, and potential patient heterogeneity, zuranolone shows promise as the first oral, fast-acting, short-course treatment for PPD [24].

The phase 3 MOUNTAIN study evaluated the efficacy and safety of zuranolone in patients with major depressive disorder (MDD). While the primary endpoint—change from baseline (CFB) in Hamilton Depression Rating Scale-17 (HDRS-17) at day 15—was not met for either the 20 mg or 30 mg doses compared to placebo, secondary and exploratory analyses revealed promising trends. Zuranolone 30 mg demonstrated significant reductions in depressive symptoms in patients with more severe baseline depression (HDRS-17 $\geq$ 24) and those with measurable plasma levels of the drug, with improvements evident as early as day 3. The safety profile was favorable, with common adverse events including drowsiness and dizziness, and adherence was high (98.3%). Limitations included a robust placebo response, stringent inclusion criteria, and undetectable plasma levels in 9% of patients, possibly affecting results. Despite these challenges, zuranolone's rapid onset and favorable tolerability suggest its potential as a novel, short-course treatment for MDD, warranting further research with higher doses, broader populations, and repeat treatment options [25].

A randomized, double-blind, placebo-controlled trial performed in 2021 evaluated the efficacy, safety, and tolerability of zuranolone (30 mg daily for 2 weeks) for postpartum depression

(PPD) in women aged 18-45, conducted across 33 U.S. centers. A total of 153 participants were randomized (78 to zuranolone, 73 to placebo), and outcomes were assessed up to day 45 post-treatment. The primary endpoint was a change in HAMD-17 total score at day 15, with secondary measures including anxiety (HAM-A), depressive symptoms (MADRS), global improvement (CGI-I), and maternal functioning (BIMF). Zuranolone showed rapid antidepressant effects by day 3, sustained through day 45. At day 15, the HAMD-17 score reduction was significantly greater in the zuranolone group than in the placebo group (−17.8 vs. −13.6; least-squares mean difference: −4.1; 95% CI, −6.9 to −1.5; P = .003). Zuranolone also led to higher remission (45% vs. 23%) and response rates (72% vs. 48%). Improvements were observed in anxiety, global functioning, and maternal functioning. The treatment was generally well tolerated, with no serious adverse events related to withdrawal, worsening depression, or loss of consciousness. The study confirmed zuranolone's potential as a rapid and effective therapy for PPD, addressing depressive symptoms, anxiety, and maternal functioning. While the results support the use of neuroactive steroid $GABA_A$ receptor modulators (NAS GABAAR PAMs) in PPD, limitations include the short follow-up (45 days) and the exclusion of breastfeeding participants. Further research is needed to assess long-term effects and breastfeeding safety [26].

Conducted in 2023, a systematic review of Pubmed, Embase and Cochrane evaluated the efficacy and safety of zuranolone in treating postpartum depression (PPD). A comprehensive search identified two randomized controlled trials with 346 women aged 18–45 years diagnosed with major depression during late pregnancy or shortly after delivery. Participants received either zuranolone (30 mg or 50 mg) or a placebo. Zuranolone demonstrated significant improvements compared to placebo in key outcomes: higher Clinical Global Impression (CGI) response rates (OR 2.31; $p<0.001$), reduction in depression severity measured by the Hamilton Depression Rating Scale (HAM-D) at 15 and 45 days, increased remission rates at 3, 15, and 45 days, and greater reductions in the need for additional antidepressants (OR 13.74; $p=0.002$). Safety analysis showed an increased risk of sedation with zuranolone, particularly at the 50 mg dose, while other adverse events like dizziness, headache, and nausea were not significantly different between groups. The included studies were deemed to have a low risk of bias. This analysis highlights zuranolone's potential as a convenient and effective oral treatment for PPD, contrasting with the intravenous-only brexanolone. However, the limited number of trials, short follow-up (45 days), and the

absence of long-term safety data emphasize the need for additional research to confirm these findings in diverse populations and assess long-term outcomes [27].

In summary, the clinical trials on zuranolone indicate its promising role as an effective and rapid-acting treatment for postpartum depression (PPD). The 2023 phase 3 trial demonstrated significant improvements in depressive symptoms among a diverse patient population, with benefits evident as early as day 3. Similarly, the 2021 trial confirmed zuranolone's efficacy in reducing depression severity, enhancing remission and response rates, while also improving anxiety and maternal functioning. Although the systematic review further validated these findings and highlighted the potential of zuranolone as a convenient oral alternative to intravenous brexanolone, it also acknowledged the limitations of short follow-up periods and the need for more extensive studies to evaluate long-term safety and effectiveness. Overall, zuranolone represents a promising advancement in the treatment landscape for PPD, warranting further investigation to fully understand its benefits and potential applications in broader populations.

Indications

Zuranolone, marketed under the brand name Zurzuvae, is a groundbreaking medication approved by the U.S. Food and Drug Administration (FDA) in August 2023 for the treatment of postpartum depression (PPD) in adult women [23].

Mechanism of Action

Zuranolone is a neuroactive steroid that functions as a positive allosteric modulator of both synaptic and extrasynaptic $GABA_A$ receptors, offering a different approach to treating postpartum depression compared to traditional antidepressants such as SSRIs which target serotonin pathways [28, 29].

Drug Interactions

Zuranolone is significantly affected by CYP3A4 enzyme activity [23]. Coadministration with strong CYP3A4 inhibitors necessitates a dosage reduction of zuranolone, as these inhibitors can increase the systemic exposure of the drug, potentially leading to enhanced effects and adverse reactions.

Administration and Dosage

The recommended dosage is 50 mg once daily in the evening for a total duration of 14 days [23], taken with fat-containing food to enhance absorptiog for a duration of 14 days. Treatment should be initiated as soon as PPD is diagnosed with the adherence to the prescribed dosing schedule for the optimal therapeutic outcome [1]. A notable advantage of zuranolone is its ease of use. In contrast to brexanolone, which requires continuous infusion over 60 hours under close medical supervision [19], zuranolone's oral route allows patients to independently manage their treatment, thereby improving accessibility and reducing logistical challenges [30, 31].

Side effects

Zuranolone is generally well-tolerated, with most side effects being mild to moderate in severity. Commonly reported adverse events include somnolence, particularly affecting activities such as driving for up to 12 hours post-administration [23]. Other side effects are dizziness, headache, and gastrointestinal disturbances such as nausea and diarrhea [30].

Conclusions

Postpartum depression (PPD) remains a significant public health concern, impacting mothers, children, and families. Despite advancements in diagnostic criteria and treatment modalities, there is a pressing need for innovative therapies. Zuranolone, a novel neuroactive steroid and $GABA_A$ receptor modulator, represents a promising addition to the PPD treatment, offering potential for rapid symptom relief and improved outcomes. Continued research into zuranolone's long-term efficacy, safety, and integration into clinical practice is essential.

Author’s contribution

Conceptualization, Brudniak K, and Garbino K; methodology, Gadżała K; software, Mach M; check, Przygodzka S, Szuścik A and Czyczerska M; formal analysis, Rutkiewicz M; investigation, Garbino K, and Mach M; resources, Brudniak K, Gadżała K; data curation, Brudniak K; writing - rough preparation, Brudniak K, Garbino K, Mach M, Szuścik A; writing - review and editing, Rutkiewicz M; visualization, Mach M; supervision, Garbino K, and Brudniak K; project administration, Czyczerska M, Przygodzka S.

All authors have read and agreed with the published version of the manuscript.

Funding Statement:

Not applicable.

Institutional Review Board Statement:

Not applicable.

Informed Consent Statement:

Not applicable.

Data Availability Statement:

Not applicable.

Acknowledgments:

Not applicable.

Conflict of interest statement:

Authors have declared no conflict of interests.

Conflict of interest statement.

There was no conflict of interest during the creation of this review study. We didn't receive any funding.

References

[1] Carlson K, Mughal S, Azhar Y, et al. Postpartum Depression. [Updated 2024 Aug 12]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK519070/

[2] James F. Paulson, Sharnail D. Bazemore, Prenatal and Postpartum Depression in Fathers and Its Association With Maternal Depression, „Journal of the American Medical Association", 303 (19), 2010, s. 1961, DOI: 10.1001/jama.2010.605.

[3] UNICEF. What is postpartum depression?. Retrieved January 15, 2025, from https://www.unicef.org/parenting/mental-health/what-postpartum-depression

[4] DepresjaPoporodowa.pl. Informacje o przyczynach i leczeniu depresji poporodowej. Retrieved January 15, 2025, from https://depresjapoporodowa.pl

[5] https://www.mayoclinic.org/diseases-conditions/postpartum-depression/symptoms-causes/syc-20376617

[6] Whitaker RC, Orzol SM, Kahn RS. Maternal mental health, substance use, and domestic violence in the year after delivery and subsequent behavior problems in children at age 3 years. Arch Gen Psychiatry. 2006 May;63(5):551–60. https://doi.org/10.1001/ archpsyc.63.5.551 PMID:16651512

[7] Mallikarjun PK, Oyebode F. Prevention of postnatal depression. J R Soc Promot Health. 2005 Sep;125(5):221–6. https://doi. org/10.1177/146642400512500514 PMID:16220736

[8] Chaudron LH. Postpartum depression: what pediatricians need to know. Pediatr Rev. 2003 May;24(5):154–61. https://doi. org/10.1542/pir.24-5-154 PMID:12728188

[9] Oates M. Perinatal psychiatric disorders: a leading cause of maternal morbidity and mortality. Br Med Bull. 2003;67(1):219–29. https://doi.org/10.1093/bmb/ldg011 PMID:14711766 13. Wisner KL, Sit DK, McShea MC, Rizzo DM, Zoretich

[10] American Psychiatric Association (APA) (2013) Diagnostic and Statistical Manual of Mental Disorders (DSM-V). 5th Edition, American Psychiatric Publishing, Washington DC. https://doi.org/10.1176/appi.books.9780890425596

[11] Zhao, X., & Zhang, Z. (2020). Risk factors for postpartum depression: An evidence-based systematic review of systematic reviews and meta-analyses. Asian Journal of Psychiatry, 102353. doi:10.1016/j.ajp.2020.102353

[12] Stewart DE, Vigod SN. Postpartum Depression: Pathophysiology, Treatment, and Emerging Therapeutics. Annu Rev Med. 2019 Jan 27;70:183-196. doi: 10.1146/annurev-med-041217-011106. PMID: 30691372.

[13] Kroska, E. B., & Stowe, Z. N. (2020). Postpartum Depression. Obstetrics and Gynecology Clinics of North America, 47(3), 409–419. doi:10.1016/j.ogc.2020.05.001

[14] Stewart, Donna E., Emma Robertson, Cindy Lee Dennis and Sherry Lynn Grace. “POSTPARTUM DEPRESSION: LITERATURE REVIEW OF RISK FACTORS AND INTERVENTIONS.” (2003) https://api.semanticscholar.org/CorpusID:146755081

[15] Slomian J, Honvo G, Emonts P, Reginster JY, Bruyère O. Consequences of maternal postpartum depression: A systematic review of maternal and infant outcomes. Womens Health (Lond). 2019 Jan-Dec;15:1745506519844044. doi: 10.1177/1745506519844044. Erratum in: Womens Health (Lond). 2019 Jan-Dec;15:1745506519854864. doi: 10.1177/1745506519854864. PMID: 31035856; PMCID: PMC6492376.

[16] Dubber, S., Reck, C., Müller, M., & Gawlik, S. (2014). Postpartum bonding: the role of perinatal depression, anxiety and maternal–fetal bonding during pregnancy. Archives of Women’s Mental Health, 18(2), 187–195. doi:10.1007/s00737-014-0445-4

[17] Macqueen, Glenda & Frey, Benicio & Ismail, Zahinoor & Jaworska, Natalia & Steiner, Meir & Lieshout, Ryan & Kennedy, Sidney & Lam, Raymond & Milev, Roumen & Parikh, Sagar & Ravindran, Arun. (2016). Canadian Network for Mood and Anxiety Treatments (CANMAT) 2016 Clinical Guidelines for the Management of Adults with Major Depressive Disorder: Section 6. Special Populations: Youth, Women, and the Elderly. The Canadian Journal of Psychiatry. 61. 10.1177/0706743716659276.

[18] Frieder, Ariela & Fersh, Madeleine & Hainline, Rachel & Deligiannidis, Kristina. (2019). Pharmacotherapy of Postpartum Depression: Current Approaches and Novel Drug Development. CNS Drugs. 33. 10.1007/s40263-019-00605-7.

[19] Eldar-Lissai A, Cohen JT, Meltzer-Brody S, Gerbasi ME, Chertavian E, Hodgkins P, Bond JC, Johnson SJ. Cost-Effectiveness of Brexanolone Versus Selective Serotonin Reuptake Inhibitors for the Treatment of

Postpartum Depression in the United States. J Manag Care Spec Pharm. 2020 May;26(5):627-638. doi: 10.18553/jmcp.2020.19306. Epub 2020 Mar 19. PMID: 32191592; PMCID: PMC10391201.

[20] Gentile S. Tricyclic antidepressants in pregnancy and puerperium. Expert Opin Drug Saf. 2014 Feb;13(2):207-25. doi: 10.1517/14740338.2014.869582. Epub 2014 Jan 3. PMID: 24383525.

[21] Amodeo G, Laurenzi PF, Santucci A, Cuomo A, Bolognesi S, Goracci A, Rossi R, Beccarini Crescenzi B, Neal SM, Fagiolini A. Advances in treatment for postpartum major depressive disorder. Expert Opin Pharmacother. 2020 Oct;21(14):1685-1698. doi: 10.1080/14656566.2020.1779702. Epub 2020 Jun 25. PMID: 32584616.

[22] U.S. Food and Drug Administration. (2019). Prescribing information for Zulresso (brexanolone). Retrieved January 15, 2025, from https://www.accessdata.fda.gov/drugsatfda_docs/label/2019/211371lbl.pdf

[23] U.S. Food and Drug Administration. (2023). Prescribing information for zuranolone. Retrieved January 15, 2025, from https://www.accessdata.fda.gov/drugsatfda_docs/label/2023/217369Orig2s000Corrected_lbl.pdf

[24] Deligiannidis KM, Meltzer-Brody S, Maximos B, Peeper EQ, Freeman M, Lasser R, Bullock A, Kotecha M, Li S, Forrestal F, Rana N, Garcia M, Leclair B, Doherty J. Zuranolone for the Treatment of Postpartum Depression. Am J Psychiatry. 2023 Sep 1;180(9):668-675. doi: 10.1176/appi.ajp.20220785. Epub 2023 Jul 26. Erratum in: Am J Psychiatry. 2024 Dec 2:appiajp20220785correction. doi: 10.1176/appi.ajp.20220785correction. PMID: 37491938.

[25] Clayton AH, Lasser R, Nandy I, Sankoh AJ, Jonas J, Kanes SJ. Zuranolone in Major Depressive Disorder: Results From MOUNTAIN-A Phase 3, Multicenter, Double-Blind, Randomized, Placebo-Controlled Trial. J Clin Psychiatry. 2023 Feb 20;84(2):22m14445. doi: 10.4088/JCP.22m14445. PMID: 36811520.

[26] Deligiannidis KM, Meltzer-Brody S, Gunduz-Bruce H, Doherty J, Jonas J, Li S, Sankoh AJ, Silber C, Campbell AD, Werneburg B, Kanes SJ, Lasser R. Effect of Zuranolone vs Placebo in Postpartum Depression: A Randomized Clinical Trial. JAMA Psychiatry. 2021 Sep 1;78(9):951-959. doi: 10.1001/jamapsychiatry.2021.1559. Erratum in: JAMA Psychiatry. 2022 Jul 1;79(7):740. doi: 10.1001/jamapsychiatry.2022.1274. Erratum in: JAMA Psychiatry. 2023 Feb 1;80(2):191. doi: 10.1001/jamapsychiatry.2022.4181. PMID: 34190962; PMCID: PMC8246337.

[27] Oliveira JA, Eskandar K, Freitas MAA, Philip CE. Zuranolone for postpartum depression: a systematic review and meta-analysis of two randomized studies. Rev Bras Ginecol Obstet. 2024 Dec 4;46:e-rbgo79. doi: 10.61622/rbgo/2024rbgo79. PMID: 39669307; PMCID: PMC11637452.

[28] Cutler AJ, Mattingly GW, Maletic V. Understanding the mechanism of action and clinical effects of neuroactive steroids and GABAergic compounds in major depressive disorder. Transl Psychiatry. 2023 Jun 26;13(1):228. doi: 10.1038/s41398-023-02514-2. PMID: 37365161; PMCID: PMC10293235.

[29] Althaus AL, Ackley MA, Belfort GM, Gee SM, Dai J, Nguyen DP, Kazdoba TM, Modgil A, Davies PA, Moss SJ, Salituro FG, Hoffmann E, Hammond RS, Robichaud AJ, Quirk MC, Doherty JJ. Preclinical characterization of zuranolone (SAGE-217), a selective neuroactive steroid GABAA receptor positive allosteric modulator. Neuropharmacology. 2020 Dec 15;181:108333. doi: 10.1016/j.neuropharm.2020.108333. Epub 2020 Sep 22. PMID: 32976892; PMCID: PMC8265595.

[30] ZURZUVAE® (zuranolone) C-IV | Treatment Information Sage Therapeutics. (2025). Zurzuvae™ (zuranolone): Dosing and Administration. Retrieved January 14, 2025, from https://www.zurzuvaehcp.com/en-us/home/starting-zurzuvae/dosing.html

[31] Zuranolone for the Treatment of Postpartum Depression Practice Advisory by the American College of Obstetricians and Gynecologists with the assistance of Tiffany A. Moore Simas, MD, MPH, MEd; M. Camille Hoffman, MD, MSc; Kay Roussos-Ross, MD; Emily S. Miller, MD, MPH; Manisha Gandhi, MD; and Andrea Shields, MD, MS. American College of Obstetricians and Gynecologists. (2023, August). Retrieved January 14, 2025, from https://www.acog.org/clinical/clinical-guidance/practice-advisory/articles/2023/08/zuranolone-for-the-treatment-of-postpartum-depression