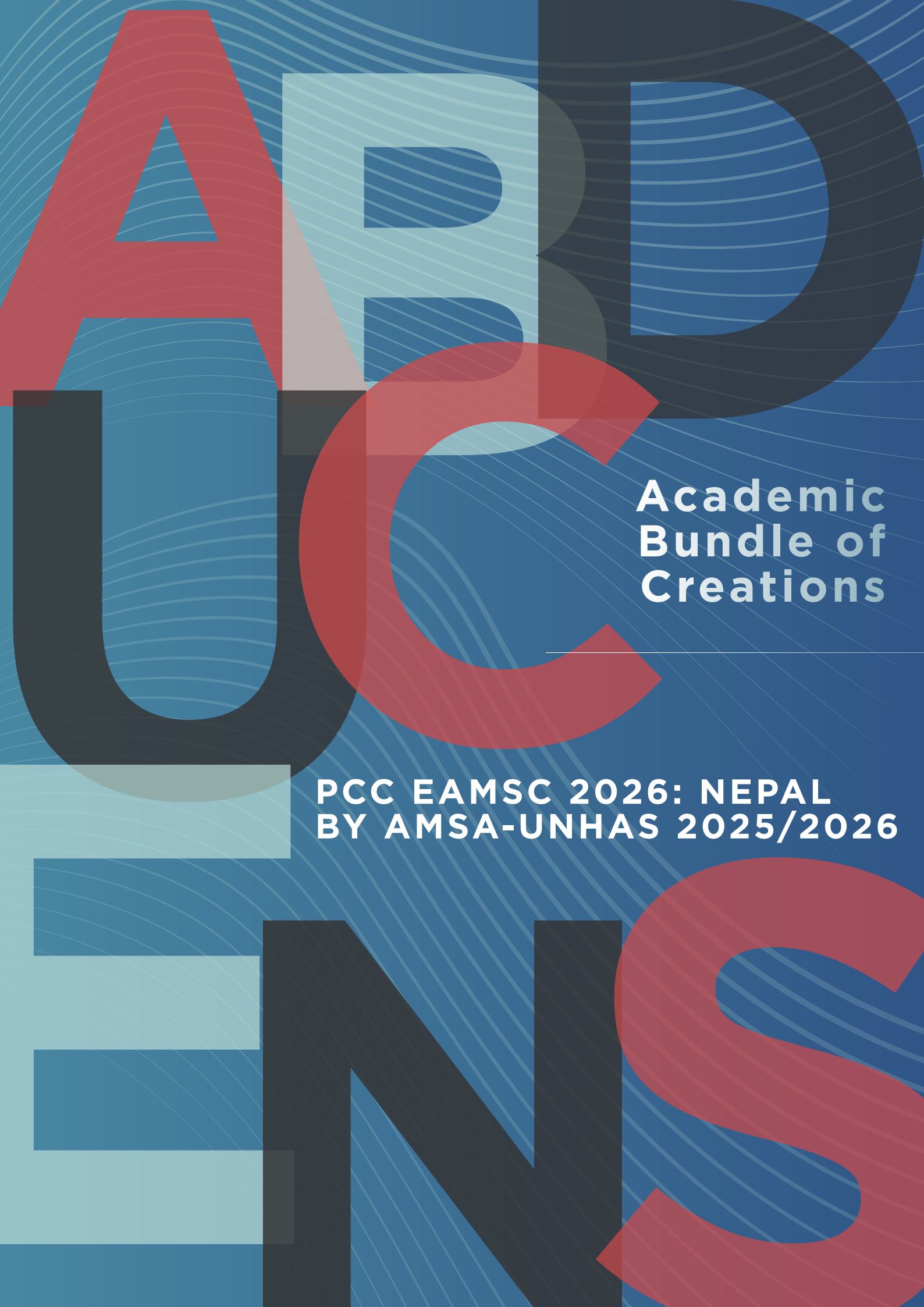
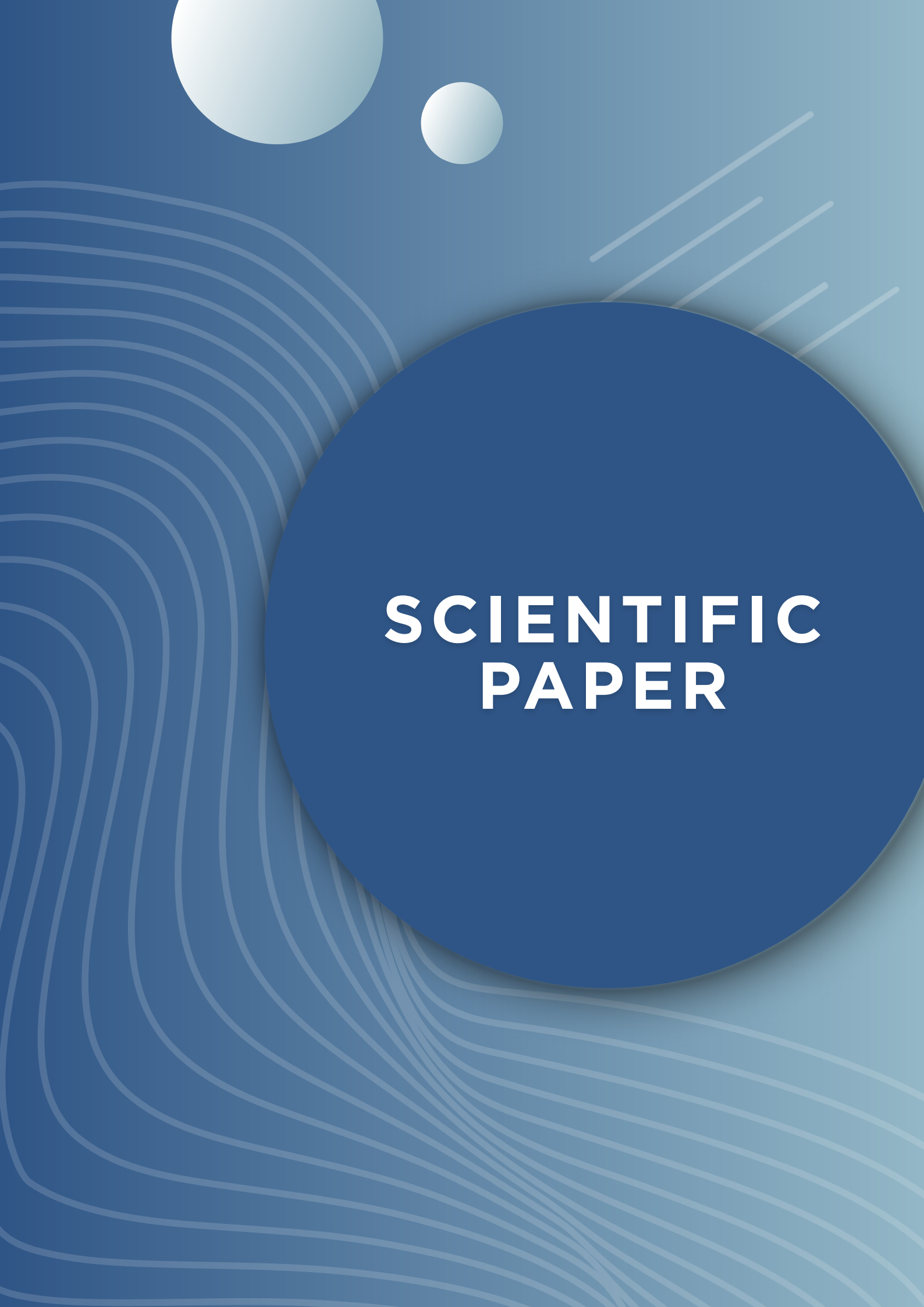




**Academic
Bundle of
Creations**

**PCC EAMSC 2026: NEPAL
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SCIENTIFIC PAPER

NETWORK META-ANALYSIS AND META-REGRESSION ON DIETARY SUPPLEMENTATION FOR POSTPARTUM DEPRESSION

**CHRISTOPHER ABELARD SARIRA MADETHEN
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DISTRICT 6 WINNER

Pre-Conference Competition East Asian Medical Students' Conference 2026: Nepal

**Network Meta-Analysis and Meta-Regression on Dietary Supplementation for
Postpartum Depression**



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Network Meta-Analysis and Meta-Regression on Dietary Supplementation for Postpartum Depression

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Introduction: Postpartum depression (PPD) is a prevalent and debilitating mood disorder affecting women following childbirth. It disrupts daily life and is influenced by hormonal changes, stressors, and other factors. Approximately 10-15% of women worldwide experience PPD, with some regions, such as Japan, reporting higher rates. PPD is linked to increased morbidity and mortality, imposing significant burdens on affected individuals, families, and society.

Objective: This study aims to determine the most effective dietary supplementation for treating PPD by assessing changes in the Edinburgh Postnatal Depression Scale (EPDS) score, with the goal of improving maternal mental health outcomes.

Method: A network meta-analysis and meta-regression were conducted, following the PRISMA guidelines. We searched multiple databases, including PubMed and ScienceDirect, for studies published from 2015 to 2025. Randomized controlled trials (RCTs) involving women diagnosed with PPD and dietary supplementation interventions were included. Studies were assessed using the PICO framework and the Cochrane RoB 2 tool for risk of bias.

Results and Discussion: The analysis included various dietary supplements, with vitamin D + calcium demonstrating significant improvements in EPDS scores. Fish oil, magnesium, and other supplements showed minimal or non-significant effects. The Bayesian network analysis confirmed the most effective treatments and highlighted the value of using dietary supplementation as an adjunctive therapy.

Conclusion: Dietary supplementation, particularly vitamin D with calcium, showed promising results for alleviating PPD symptoms. While other supplements had limited effects, these findings underscore the potential of nutritional interventions for managing PPD, suggesting that further studies with standardized methodologies are essential for refining these approaches.

Keywords: *Dietary supplementation, postpartum depression, network meta-analysis, vitamin D.*

INTRODUCTION

Postpartum depression (PPD) is a multifactorial mood disorder that emerges in women following childbirth characterized by emotional disturbances that effect daily life. This condition is not merely a transient emotional response to childbirth but a serious mental health influenced by stressors and hormonal changes. Globally, studies have shown that between 10% to 15% of women experience forms of postpartum depression and this prevalence can be even higher in certain regions. In the observational study within Japan, 21,6% had a high Edinburgh Postnatal Depression Scale (EPDS) score of 9 or above. (Harauma et al., 2023). Furthermore, postpartum depression in women is linked to increased morbidity and mortality that creates a significant burden to their families and society (Yang et al., 2022)

Currently, the management of mental health conditions during pregnancy, including postpartum depression, involves the use of antidepressants. Regarding PPD, Selective Serotonin Reuptake Inhibitors (SSRIs) are the first line of treatment, especially Sertraline, which is currently the most commonly used due to its effectiveness (Frieder et al., 2019). Additionally, Sertraline has been shown to be more safe for breastfeeding mothers because the amount found in breast milk is lower compared to other medications (Besten-Bertholee et al., 2024). However, Sertraline consumption can cause infants to suffer from insomnia, anxiety, crying, and poor feeding, and these symptoms do not resolve even when the dose is reduced (Uguz et al., 2016). Furthermore, infants whose mothers consumed 100mg/day of Sertraline were found to have severe dehydration and gangrene (Morin et al., 2017).

There are many studies that explore how supplements and exposure to nutrients can be interventions for PPD (Yang et al., 2025). A relationship has been found between mothers with PPD having lower vitamin D levels compared to those without PPD (Apostolidou et al., 2025). In addition, crocin, the active ingredient in saffron, is natural and has fewer side effects than chemical drugs such as sertraline (Kolahdooz et al., 2023). Therefore, natural and low-risk therapies need to be studied more to treat mothers with PPD risks.

OBJECTIVE

This study aims to determine the most effective dietary supplementation for treating mothers with PPD based on EPDS so as to improve maternal mental health outcomes.

METHOD

Study Design and Search Strategies

This network meta-analysis and meta-regression was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, as outlined in Appendix 2. The databases searched for this study included Cochrane, PubMed, ScienceDirect, and Springer.

Study Eligibility Criteria

The selection process was guided by the PICO framework and specific criteria to maintain the relevance and quality of the included studies. Initially, all authors performed a screening of titles and abstracts based on predefined eligibility standards. Subsequently, the full texts of

potentially eligible studies were obtained and reviewed in detail. As a result, the final set of studies included in the analysis met high-quality standards and was consistent with the established framework and criteria outlined below.

Aspects	Details
Population	Women with postpartum depression
Intervention	Dietary Supplementation
Comparison	Placebo or usual care
Outcome	Decrease in Edinburgh Postnatal Depression Scale (EPDS) score

Table. 1 PICO framework

The inclusion criteria for this study were as follows: (1) studies published within the last ten years (2015–2025); (2) randomized controlled trials (RCTs); (3) studies involving women diagnosed with postpartum depression; (4) studies in which participants received dietary supplementation, for example Vitamin D or Omega-3 polyunsaturated fatty acids (PUFA); (5) studies that included participants who provided informed consent to participate; and (6) studies that reported measurable outcomes, such as a decrease in the Edinburgh Postnatal Depression Scale (EPDS) score.

The exclusion criteria included: (1) studies that did not report outcomes related to EPDS or symptom improvement in postpartum depression; (2) studies lacking sufficient data to assess the effectiveness of dietary supplementation; (3) publications not written in English; (4) review articles, systematic reviews, meta-analyses, conference abstracts, unrefereed preprints, textbooks, or study protocols; (5) non-randomized or observational studies; and (6) duplicate publications or overlapping datasets. Any discrepancies were resolved through discussion and consensus to ensure consistency in the selection process. Duplicate studies were removed using Rayyan.

RESULTS Study Selection

The PRISMA diagram of this study is shown in Appendix 2. Search strategies are attached in Appendix 1.

Risk of Bias

This study utilized the Cochrane RoB 2 tool to assess the methodological quality and potential sources of bias in the included randomized controlled trials, as shown in Figure .. . The overall results demonstrated that most studies exhibited a low risk of bias across all assessed domains, including bias arising from the randomization process (D1), bias due to deviations from intended interventions (D2), bias due to missing outcome data (D3), bias in measurement of

the outcome (D4), and bias in the selection of the reported result (D5). A few studies, such as those by Harauma et al. (2023) and Nguyen et al. (2017), showed some concerns in missing outcome data, while others like Hulkkonen et al. (2021), Sousa & Santos (2022), Stewart et al. (2016), and Vaz et al. (2017) presented a high risk of bias in specific domains, particularly in missing outcome data. Despite these findings, the majority of studies (over 70%) demonstrated an overall low risk of bias, suggesting that the evidence synthesized from these studies can be considered reliable and methodologically sound.

	D1	D2	D3	D4	D5	Overall
Amini et al., 2020	+	+	+	+	+	+
Fard et al., 2017	+	+	+	+	+	+
Harauma et al., 2023	+	-	+	+	+	-
Hulkkonen et al., 2021	+	+	X	+	+	X
Nguyen et al., 2017	+	+	-	+	+	-
Okronipa et al., 2017	+	+	+	+	+	+
Rouhi et al., 2018	+	+	+	+	+	+
Sheikh et al., 2017	+	+	+	+	+	+
Sousa & Santos, 2022	+	+	X	+	+	X
Stewart et al., 2016	+	+	X	+	+	X
Vaz et al., 2017	+	+	X	+	+	X

Study

Domains:
D1: Bias arising from the randomization process.
D2: Bias due to deviations from intended intervention.
D3: Bias due to missing outcome data.
D4: Bias in measurement of the outcome.
D5: Bias in selection of the reported result.

Judgement
X High
- Some concerns
+ Low

Figure 2. Risk of Bias

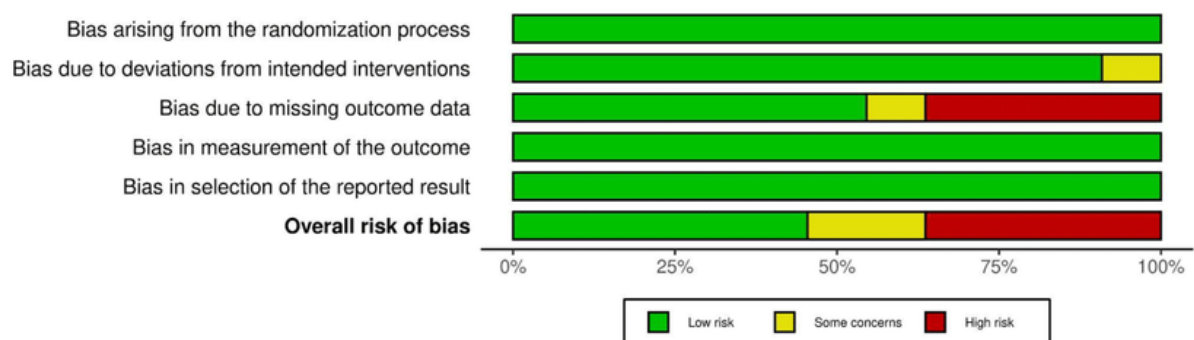


Figure 3. Risk of Bias

Statistical Analysis

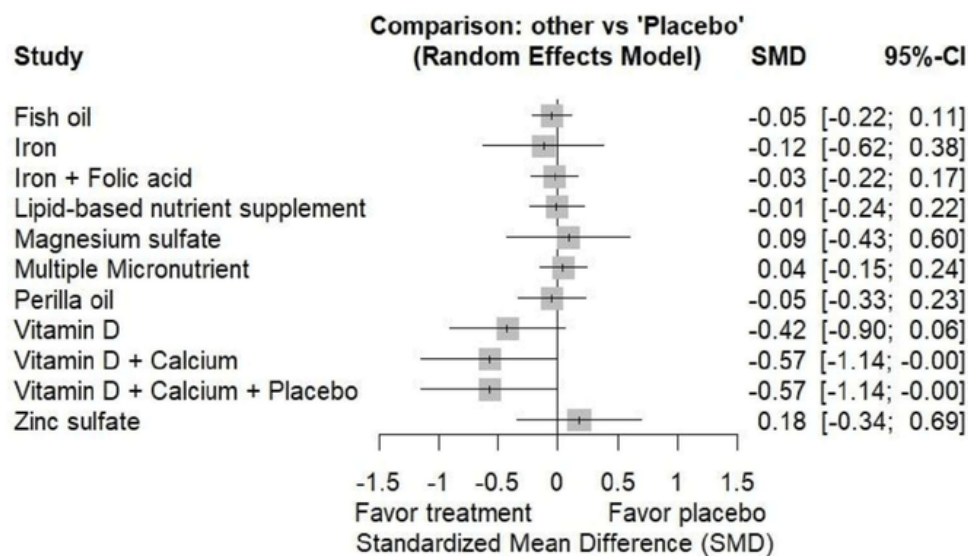


Figure 4. Forest Plot

The forest plot summarizes the standardized mean differences (SMD) and 95% confidence intervals (CI) of various dietary supplementations compared to placebo in reducing depressive symptoms, measured primarily using the Edinburgh Postnatal Depression Scale (EPDS). Detailed results are as follows:

- (1) Fish oil supplementation showed an SMD of -0.05 [95% CI $-0.22, 0.11$], indicating a minimal effect compared to placebo, with results not statistically significant.
- (2) Iron supplementation had an SMD of -0.12 [95% CI $-0.62, 0.38$], favoring treatment but remaining statistically insignificant.
- (3) Iron + Folic acid combination demonstrated a negligible effect (SMD = -0.03 [$-0.22, 0.17$]) with a confidence interval crossing zero.
- (4) Lipid-based nutrient supplement showed an SMD of -0.01 [$-0.24, 0.22$], suggesting no meaningful difference from placebo.
- (5) Magnesium sulfate and Multiple Micronutrient supplementation displayed SMDs of 0.09 [$-0.43, 0.60$] and 0.04 [$-0.15, 0.24$], respectively—both indicating no significant treatment advantage.
- (6) Perilla oil supplementation showed a small non-significant benefit (SMD = -0.05 [$-0.33, 0.23$]).
- (7) Vitamin D alone produced a moderate reduction in depressive symptoms with SMD = -0.42 [$-0.90, 0.06$], nearing statistical significance.
- (8) The combination of Vitamin D + Calcium resulted in a significant improvement compared to placebo (SMD = -0.57 [$-1.14, -0.00$]), suggesting synergistic benefits.
- (9) Similarly, the Vitamin D + Calcium + Placebo combination yielded SMD = -0.57 [$-1.14, -0.00$], indicating a consistent and statistically significant reduction in depression scores.
- (10) Zinc sulfate showed no significant effect with SMD = 0.18 [$-0.34, 0.69$].

Overall, the forest plot demonstrates that while most individual supplements showed modest or non-significant effects, Vitamin D, particularly when combined with calcium, exhibited the

most consistent and statistically significant improvement in postpartum depressive symptoms compared to placebo.

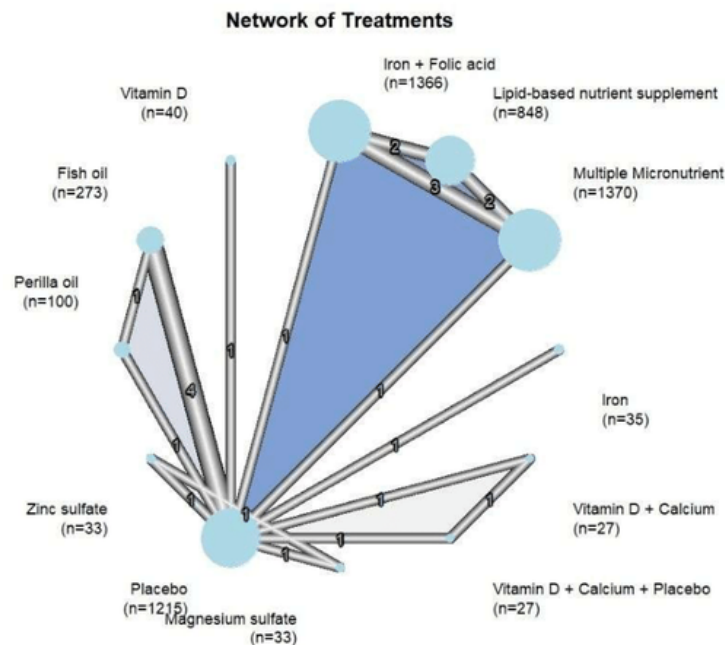


Figure 6. Bayesian Network Analysis

This figure illustrates the structure of direct and indirect comparisons among various dietary interventions used in the included studies. Each node represents a supplementation type, with node size proportional to the number of participants receiving that treatment. The connecting lines indicate direct head-to-head comparisons between interventions, and the thickness of each line reflects the number of studies contributing to that comparison.

In this network, placebo serves as the central reference point, connecting to nearly all other supplementations, including Vitamin D, Fish oil, Iron, Multiple Micronutrient, and Perilla oil. Larger nodes, such as Iron + Folic acid, Multiple Micronutrient, and Lipid-based nutrient supplements, indicate these interventions have been more extensively studied. Conversely, smaller nodes like Magnesium sulfate, Vitamin D + Calcium, and Zinc sulfate represent interventions with fewer participants or limited trial data.

The network's configuration highlights the extensive investigation into micronutrient-based supplementation, while also revealing strong interconnections between Vitamin D-based interventions and placebo-controlled trials. This structure supports a robust network meta-analysis capable of estimating both direct and indirect comparative effects across all dietary interventions in managing postpartum depression.

DISCUSSION

One of the main limitations encountered in this study was the presence of non inclusive papers. Some studies were not fully inclusive, as they excluded subgroups and lacked clearly defined inclusion and exclusion criteria that limits the findings to the broader population of postpartum women. Furthermore, inconsistencies in data presentation where studies reported mean values while others only present the median data. The heterogeneity of comparator groups also complicated interpretation, making it more difficult to determine the isolated effect of a supplementation. These limitations highlight the importance of adopting more inclusive studies and great data accessibility to generate more reliable evidence regarding postpartum depression.

CONCLUSION

In conclusion, this study highlights the potential role of supplementation as a promising adjunctive approach in alleviating symptoms of postpartum depression, a complex and multifactorial condition that significantly impacts maternal well-being and child development. Despite certain methodological limitations, such as heterogeneity in study design and data reporting, the overall evidence suggests that omega-3 may contribute to improved mood regulation and emotional stability in postpartum women. These findings reinforce the importance of exploring nutritional interventions as complementary strategies in mental health care, particularly in perinatal populations. Moreover, this research underscores the need for future studies to adopt standardized methodologies, inclusive sampling, and transparent data reporting to strengthen the reliability of outcomes. Ultimately, the study contributes to the growing body of literature emphasizing the intersection of nutrition, mental health, and maternal care, offering valuable insights for both clinical application and continued academic exploration.

RECOMMENDATION

Future studies should adopt more inclusive and standardized research sources ensuring that diverse populations of postpartum women are adequately represented to improve research results and researchers should define comparator groups and reporting data such as means, medians, and standard deviations to facilitate more accurate cross study comparisons.

ACKNOWLEDGEMENTS

We would like to express our deepest gratitude to all individuals and institutions that contributed to the successful completion of this research. Special appreciation is extended to the supervisors and academic mentors for their invaluable guidance, constructive feedback, and continuous encouragement throughout the study process. Sincere thanks are also given to the Faculty of Medicine, Universitas Hasanuddin, for providing academic resources and a supportive research environment that made this work possible. We would also like to acknowledge the Asian Medical Students' Association (AMSA) for fostering an atmosphere of scientific curiosity, collaboration, and professional growth among young researchers.

CONFLICT OF INTEREST

The authors declare no conflict of interest related to the conduct, analysis, or publication of this research. There are no financial, professional, or personal relationships that could have inappropriately influenced the study's path, data interpretation, or conclusions.

REFERENCES

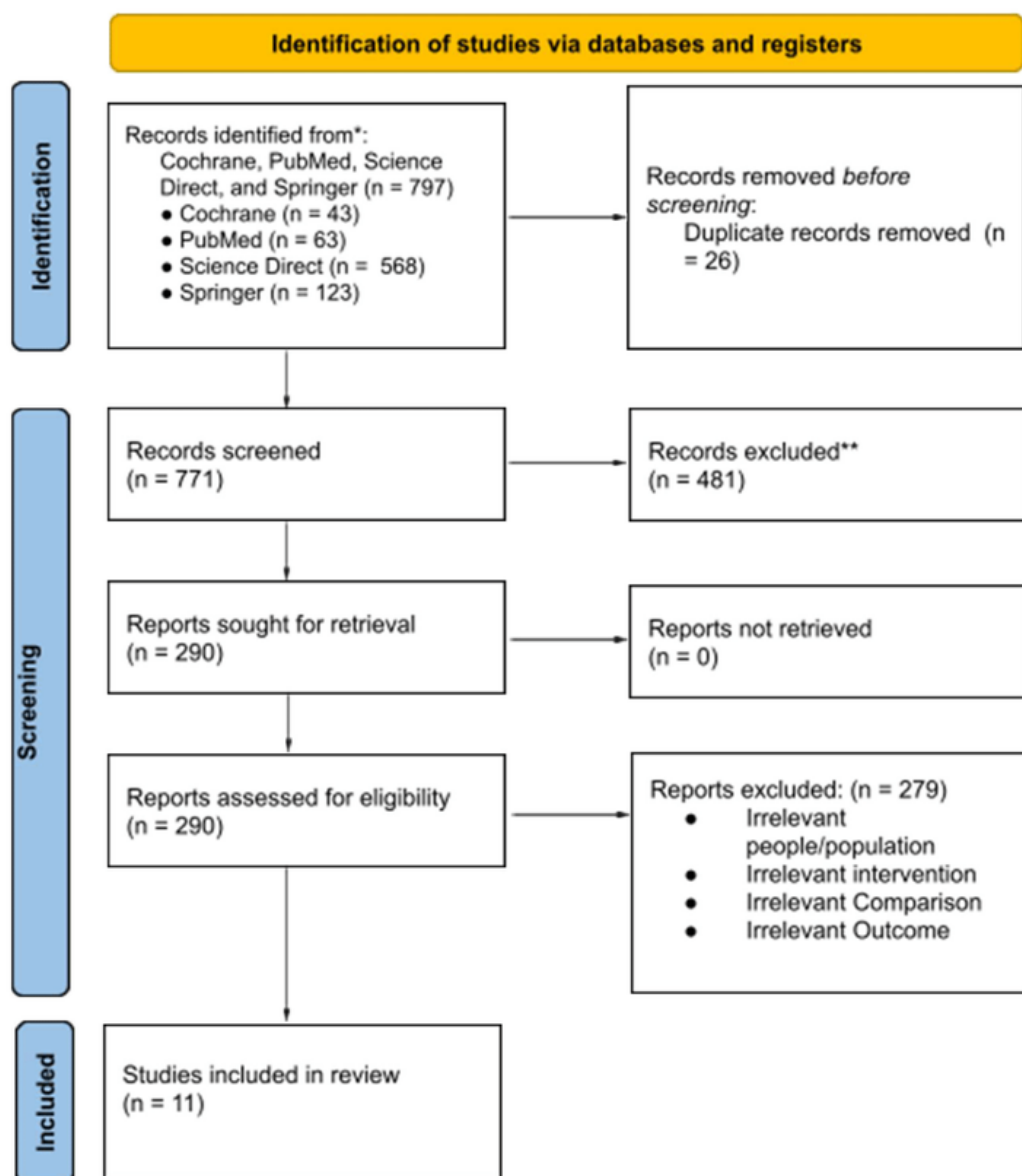
1. Apostolidou I, Baloukas M, Tsamesidis I. Relationship between Vitamin D Deficiency and Postpartum Depression. *Journal of Personalized Medicine*. 2025;15(7):290–290.
2. Besten-Bertholee DDB, Touw DJ, Damer EA, Mian P, Horst PGJT. Sertraline, citalopram and paroxetine in lactation: passage into breastmilk and infant exposure. *Frontiers in Pharmacology*. 2024;15:1414677.
3. Frieder A, Fersh M, Hainline R, Deligiannidis KM. Pharmacotherapy of Postpartum Depression: Current Approaches and Novel Drug Development. *CNS Drugs*. 2019;33(3):265–282.
4. Harauma A, Yoshihara H, Hoshi Y, Hamazaki K, Moriguchi T. Effects of Varied Omega-3 Fatty Acid Supplementation on Postpartum Mental Health and the Association between Prenatal Erythrocyte Omega-3 Fatty Acid Levels and Postpartum Mental Health. *Nutrients*. 2023;15(20):4388.
5. Kolahdooz G, Vosough I, Sepahi S, Mohajeri SA. The effect of crocin versus sertraline in treatment of mild to moderate postpartum depression: a double-blind, randomized clinical trial. *International Clinical Psychopharmacology*. 2022;38(1):9–15.
6. Morin C, Chevalier I. Severe Hyponatremic Dehydration and Lower Limb Gangrene in an Infant Exposed to Lamotrigine, Aripiprazole, and Sertraline in Breast Milk. *Breastfeeding Medicine*. 2017;12(6):377–380.
7. Uguz F, Arpacı N. Short-Term Safety of Paroxetine and Sertraline in Breastfed Infants: A Retrospective Cohort Study from a University Hospital. *Breastfeeding Medicine*. 2016;11(9):487–489.
8. Yang K, Wu J, Chen X. Risk factors of perinatal depression in women: a systematic review and meta-analysis. *BMC Psychiatry*. 2022;22(1):3684.
9. Yang Q, Lv Y, Gao S, Zhang Y, Zhai X. Supplementary approaches to perinatal depression: a review of pathogenesis, herbal interventions, and dietary supplements. *Frontiers in Psychology*. 2025;16:1529339.

APPENDIX

Appendix.1 Search Strategy

ScienceDirect
("postpartum depression" OR "postnatal depression") AND ("dietary supplement" OR "nutritional supplement")
Pubmed
("Depression, Postpartum"[Mesh]) AND "Dietary Supplements"[Mesh])
Cochrane
("postpartum depression" OR "perinatal depression") AND ((diet OR dietary) NEXT supplement*)
Springer
("postpartum depression" OR "postnatal depression") AND ("dietary supplement" OR "nutritional supplement")

Appendix 2. PRISMA



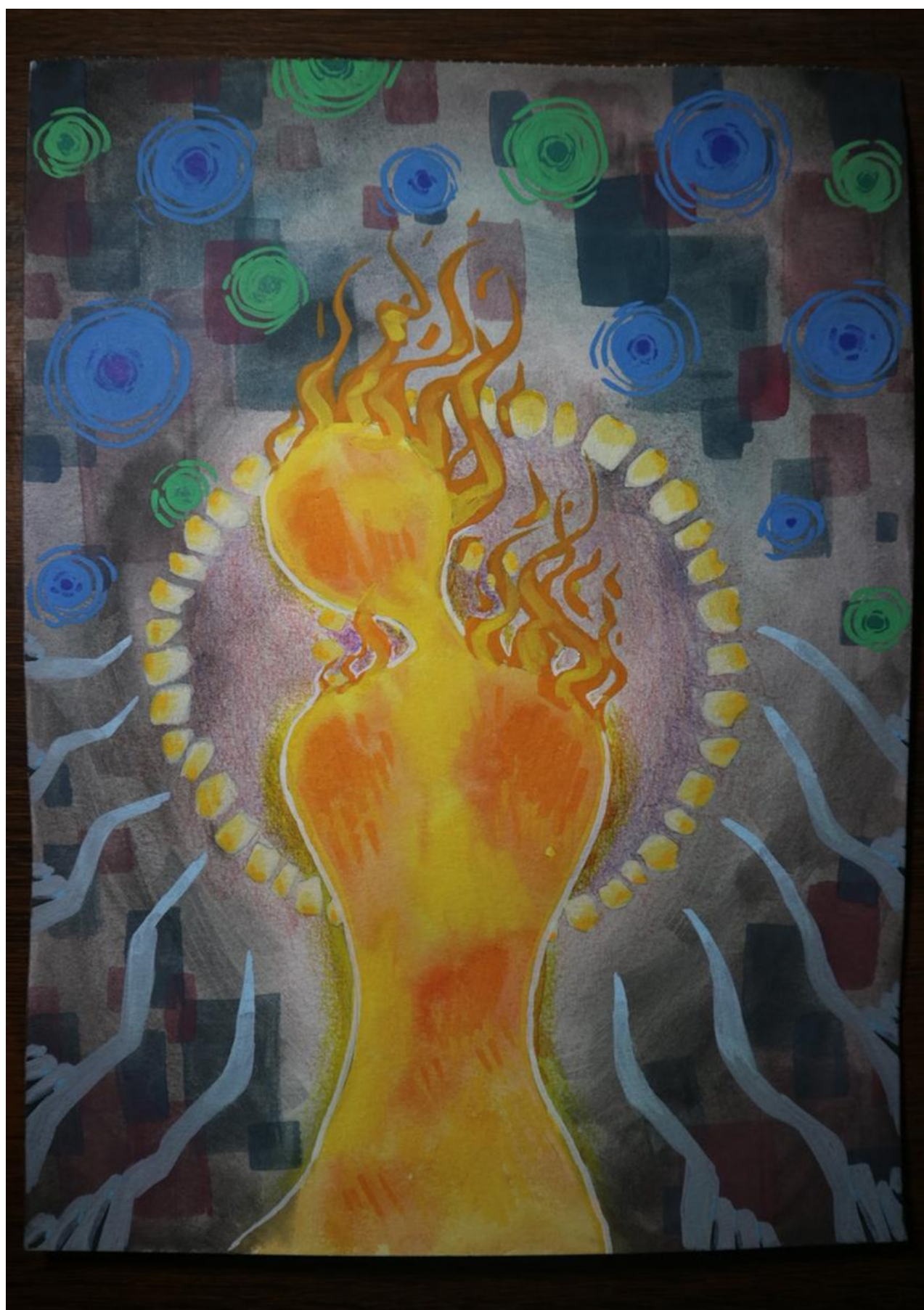
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ABSTRACT ART

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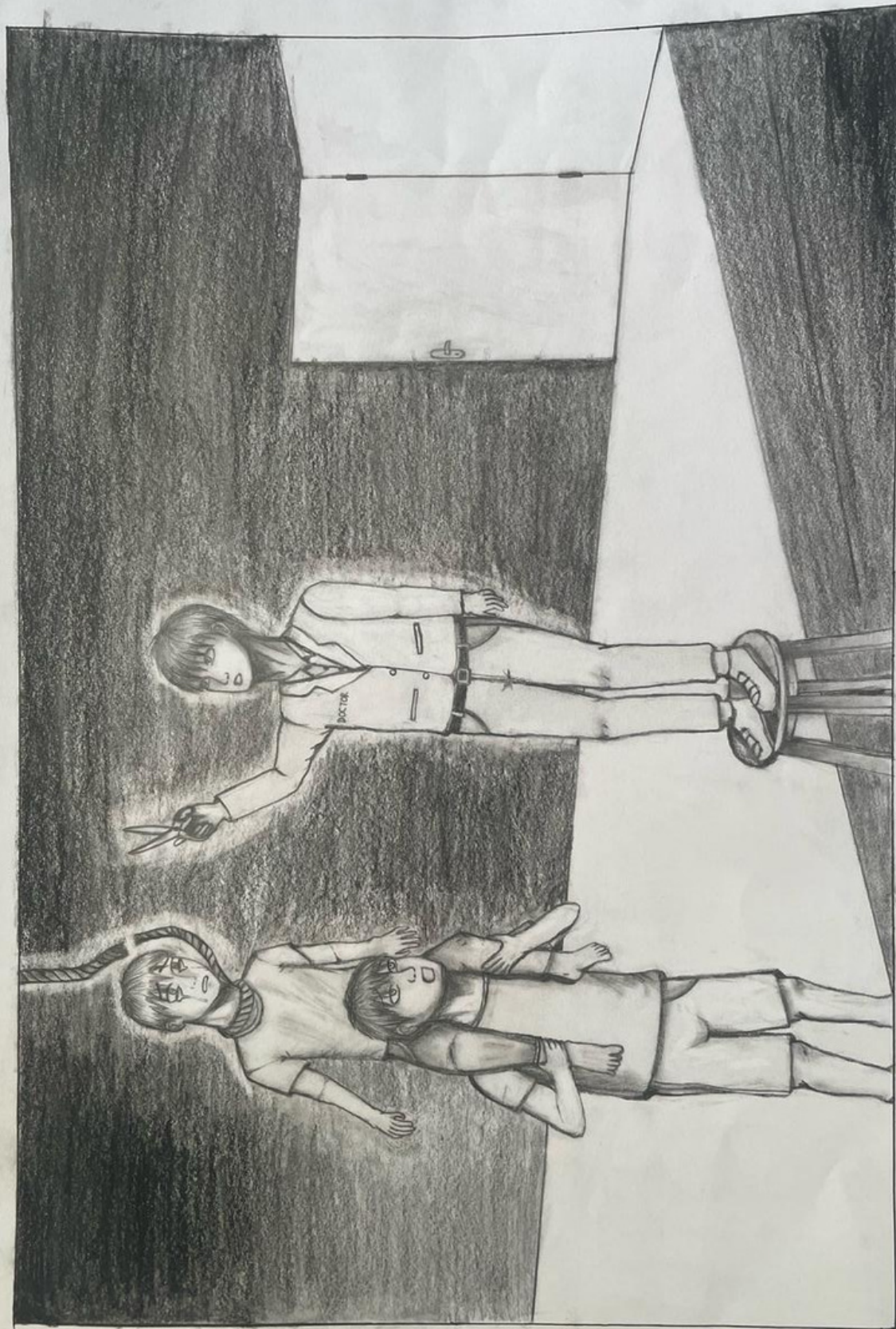
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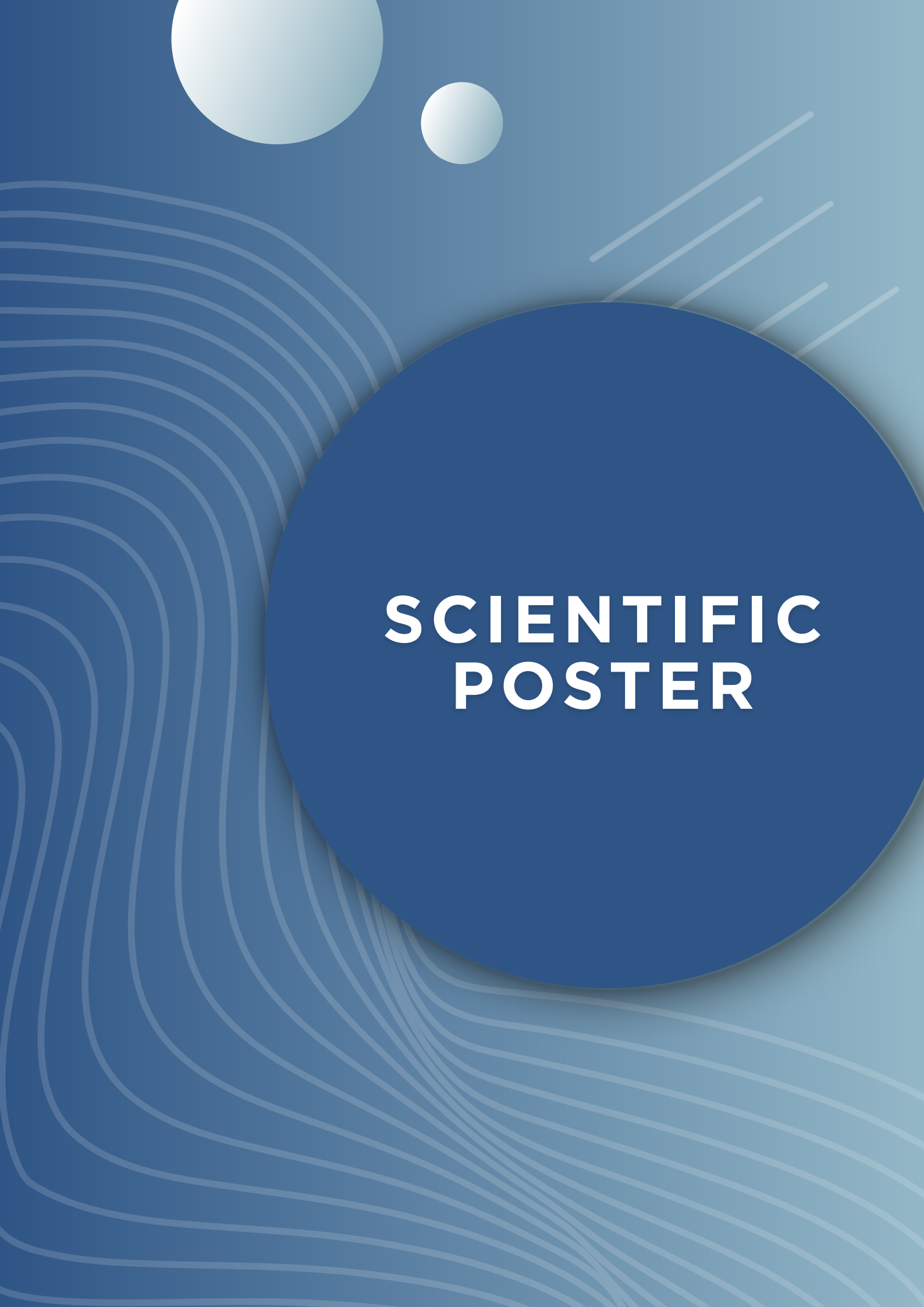
DISTRICT 6 WINNER



**DON'T GIVE UP,
WE ARE HERE
FOR YOU**

JESSICA HO



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SCIENTIFIC POSTER

**ADDRESSING THE SILENT MENTAL
HEALTH CRISIS AMONG
DEPRESSIVE-VULNERABLE
POPULATIONS: CAN TELEMEDICINE
BECOME AN EFFECTIVE SOLUTION?
A SYSTEMATIC REVIEW AND META-
ANALYSIS**

**JEDIDYA RICARDO SIAGIAN
AHMAD RIZQI MAULANA MIHIDIN MADUBUN
ALFIRA SYIFA AZZAHRA
INDIRA PUTRI DHARMAYANI SANUSI
JESSICA HO**

Addressing the Silent Mental Health Crisis among Depressive-Vulnerable Populations: Can Telemedicine Become an Effective Solution? A Systematic Review and Meta-Analysis

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Sanusi^[1], Jessica Ho^[1]

^[1]Faculty of Medicine, Hasanuddin University

Introduction: Telemedicine and digital interventions have emerged as crucial solutions to address the limitations in mental health access, especially among populations vulnerable to depression. However, no comprehensive synthesis of evidence from clinical trials by systematic review has been conducted yet.

Objective: To evaluate the effectiveness of telemedicine and digital interventions in improving mental health outcomes across vulnerable populations.

Method: 4 databases were used in creating the systematic review. Studies were filtered according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) 2020 guideline. Risk of bias assessment was done with the Cochrane Risk of Bias 2. Meta-analyses were conducted via the Review Manager 5.4.1. Data were displayed in standardized mean differences (SMD) with 95% confidence intervals (CI). Heterogeneity was evaluated using the Chi-squared test and I^2 statistic, with the Patient Health Questionnaire (PHQ-9) and Edinburgh Postnatal Depression Scale (EPDS) used as the primary outcomes.

Results: Analysis from 15 randomized controlled trials showed that telemedicine carried a significant improvement of PHQ-9 score compared to the usual care (SMD: -0.20 [95% CI -0.35 to -0.06], $p=0.006$, $I^2=45\%$). No significant PHQ-9 score improvements were found between telemedicine and waitlisted groups; similarly, no significant result was found between the telemedicine group and usual care towards EPDS among postpartum depression populations. Although the results were insignificant, both analyses still favoured the intervention group. Interestingly, analysis of effect sizes comparing digital interventions to waitlisted groups yielded a significant EPDS improvement (SMD = -0.60 , [95% CI -0.87 to -0.33], $p<0.0001$, $I^2=0\%$).

Conclusion: Telemedicine was considerably potent as an intervention tool to combat depression among vulnerable populations, although some inconsistencies in the findings left room for more study to assess its effectiveness as the main tool for treating depression.

Keywords: *Depression, mental health, postpartum depression, telemedicine, vulnerable populations*



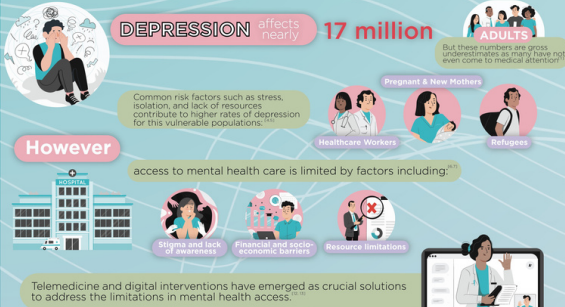
Addressing the Silent Mental Health Crisis among Depressive-Vulnerable Populations: Can Telemedicine Become an Effective Solution? A Systematic Review and Meta-Analysis

Jedidya Ricardo S.¹, Ahmad Rizqi M. M. Madubun¹, Alfira Syifa A.¹, Indira P. D. Sanusi¹, Jessica Ho¹

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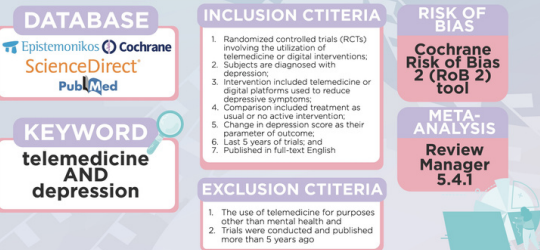
01. Introduction



02. Objective

To evaluate the effectiveness of telemedicine and digital interventions in improving mental health outcomes across vulnerable populations

03. Methods



04. Result & Discussion

Table 1. Characteristics of included studies in meta-analysis

Author, Year	Intervention Group	Control Group	Intervention	Control	Duration	Outcomes
Agarwal et al., 2024	642	633	Digital platform generate automated text messages related to mental health	Usual care that open access to a web-based mental health platform	6 months	PHQ-9, mean (SD)
Daneshmandi et al., 2023	96	95	NonMedication-based app plus personal depression program	Usual care (personal depression program)	12 weeks	PHQ-9, mean ± SD
Dennis et al., 2020	120	121	12 weekly 60-min nurse-delivered telephone-PT sessions	Standard local postpartum care	12 weeks	EPDS, mean (SD)
Vigod et al., 2021	37	40	Neuro-Maternal Care (telehealth-based discussion board and support group)	Usual care	10 weeks	EPDS, mean (SD)
Lawrence et al., 2024	45	47	PostpartumCare.ca website for PPD	Waitlisted	4 weeks	EPDS, mean ± SD
Liu Chao et al., 2022	65	65	Web App provides information and personal social support interventions for perinatal depression during childbirth	Waitlisted	8 weeks	EPDS, mean per item (SD)
Logie et al., 2025	113	110	A single 15-min interactive and interactive VR session	List of mental health resources in Ontario	16 weeks	PHQ-9, mean (SD)
Rohr et al., 2021	65	68	Self-help app	Physioeducational reading material (brochure)	4 weeks	PHQ-9, mean (95% CI)
Törnqvist et al., 2021	22	23	Web-based, real-time video consultations with mental health specialists	Usual care	3 months	PHQ-9, mean (SD)
Karyotaki et al., 2022	48	52	iCBT	TAU	7 weeks	PHQ-9, mean (SD)
Sadeh-Sharvit et al., 2023	23	24	AI platform	TAU	2 months	PHQ-9, mean (SD)
Karkosz et al., 2024	36	38	Web-based and mobile therapy chatbot	Self-help book	2 weeks	PHQ-9, mean (SD)
Koolen et al., 2024	265	267	Computer-guided CBT	CAU	8 weeks	PHQ-9, mean (SD)
M.A. Biddy et al., 2024	128	132	Online self-guided ultra-brief intervention	Waitlisted	5 weeks	PHQ-9, EMR (SD)
Tutubure et al., 2025	44	53	iCBT-CBT	Waitlisted	7 weeks	PHQ-9, mean (SD)

Table of characteristics of all included studies is fully displayed in Appendix 2

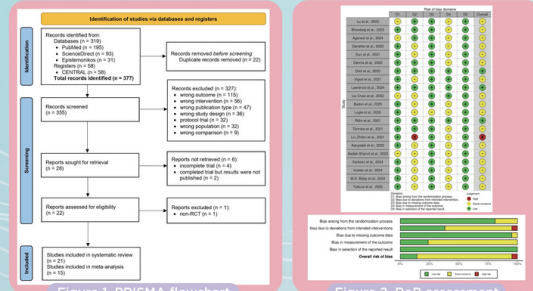


Figure 1. PRISMA flowchart



Figure 2. RoB assessment

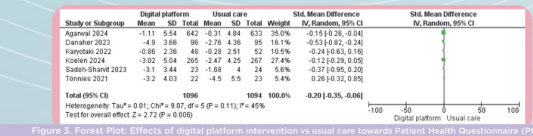


Figure 3. Forest Plot: Effects of digital platform intervention vs usual care towards Patient Health Questionnaire (PHQ-9). The forest plot indicates that the majority of studies reported lower PHQ-9 scores in the digital platform group compared with usual care. The pooled SMD was -0.20 (95% CI -0.35 to -0.06), suggesting that digital interventions produced a statistically significant reduction in PHQ-9 scores relative to usual care ($Z = 2.72$, $p = 0.006$).

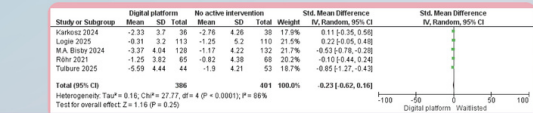


Figure 4. Forest Plot: Effects of digital platform intervention vs no active intervention towards Patient Health Questionnaire (PHQ-9). The forest plot shows that although most studies reported lower PHQ-9 scores in the digital platform group compared with no active intervention, the pooled SMD of -0.23 (95% CI -0.42 to -0.04) did not reach statistical significance ($Z = 1.16$, $p = 0.25$). This indicates that, overall, digital interventions were not significantly more effective than the absence of an intervention in reducing depressive symptoms.

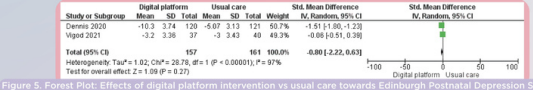


Figure 5. Forest Plot: Effects of digital platform intervention vs usual care towards Edinburgh Postnatal Depression Scale (EPDS). The forest plot comparing digital platforms with usual care showed a non-significant pooled effect (SMD = -0.80 , 95% CI -1.22 to -0.38 , $p = 0.27$) with substantial heterogeneity ($I^2 = 97\%$).



Figure 6. Forest Plot: Effects of digital platform intervention vs waitlisted towards Edinburgh Postnatal Depression Scale (EPDS). Conversely, when compared with a waitlist or no-treatment control, digital interventions demonstrated a significant effect (SMD = -0.60 , 95% CI -0.87 to -0.33 , $p < 0.0001$) with no observed heterogeneity ($I^2 = 0\%$). This finding indicates that digital interventions were consistently effective in reducing EPDS scores compared with no active intervention.

Significance and Effectiveness

- Telemedicine encompasses a wide range of adaptable digital approaches—from apps and chatbots to video consultations—tailored to different clinical support levels and patient needs.
- Digital mental health interventions produced modest yet meaningful improvements in PHQ-9 scores, showing comparable or even superior effectiveness to in-person care, particularly for rural and underserved populations.
- Among women with PPD, telemedicine showed a non-significant pooled effect compared to usual care (SMD = -0.80 , 95% CI -1.22 to -0.38 , $p = 0.27$), though the overall trend favored digital interventions. The high heterogeneity ($I^2 = 97\%$) suggests that effectiveness varies widely across contexts.
- Further rigorous research is needed to identify contextual factors and determine which interventions, delivery modes, and approaches are most effective for specific mental health outcomes.

Advantages

- Enhances access to care for vulnerable and rural populations
- Supports collaborative and culturally sensitive models
- Reduces costs while improving system efficiency

Challenges

- Weakened patient-provider connection
- High dropout rates
- Technological and access barriers
- Persistent privacy-security concerns

Integration and Future Direction

- Patients and healthcare providers must mutually uphold privacy and security standards in telemedicine.
- Ensure compliance with confidentiality laws at all times.
- Telemedicine should act as a complementary tool, not a full replacement.
- Future studies should develop secure hybrid models and address cultural adaptability.

Strengths

- Most up-to-date systematic review of RCTs from the past 5 years.
- Provides a comprehensive synthesis across postpartum women, refugees, and healthcare workers.
- Addressing a timely topic amid rapid digital health developments.

Limitations

- Small samples, limited blinding, and reliance on self-reported outcomes.
- High heterogeneity.
- English-only inclusion.

05. Conclusion

Telemedicine demonstrated meaningful improvement in depressive symptoms, particularly among refugees, healthcare workers, and postpartum women with limited access to care. Although overall effects were positive, significance varied across subgroups. Further standardized studies are needed to confirm its role as an adjunct to conventional therapy.

Recommendation

- Strengthen policies for cross-sector collaboration.
- Enhance healthcare and telepsychology skills.
- Conduct large-scale RCTs and adapt cultural adaptations.
- Integrate telemedicine into maternal, refugee, and occupational mental health programs.

06. Acknowledgements & Conflict of Interest

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