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Prevalence and Determinants of Postpartum Depression Risk Among Puerperal Women Screened with the Edinburgh Postnatal Depression Scale in South Kalimantan, Indonesia

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A B S T R A C T

Introduction: Postpartum depression (PPD) is among the most common psychiatric complications of childbirth, yet in many Indonesian primary-care settings it remains undetected. This study estimated the prevalence and determinants of PPD risk among puerperal women attending a community midwifery facility in South Kalimantan, Indonesia.

Methods: In a cross-sectional design, 30 postpartum women were screened consecutively between October and November 2025 using the validated 10-item Edinburgh Postnatal Depression Scale (EPDS); risk was banded as none (0–4), low (5–9), moderate (10–12) and high (>12). Prevalence was estimated with Wilson 95% confidence intervals (CI); associations with maternal age, parity, education and occupation were examined using odds ratios (OR), Cramér's V, Firth-penalized logistic regression and Spearman correlation (significance $p<0.05$).

Results: The mean EPDS score was 5.5 ± 3.0. Overall, 46.7% (95% CI 30.2–63.9) screened at risk (EPDS ≥5), comprising 33.3% low and 13.3% moderate risk; 13.3% (95% CI 5.3–29.7) reached the probable-depression threshold (≥10), and none scored high. All probable-depression cases occurred in primiparas. Lower maternal education correlated with higher symptom scores (Spearman $\rho = -0.36$, $p = 0.039$); younger age (<25 years; OR 4.44, 95% CI 0.82–23.95) and lower education (OR 2.73, 95% CI 0.65–11.55) showed non-significant positive associations.

Conclusion: Even in an apparently low-risk obstetric population, a substantial minority of mothers carried subthreshold-to-moderate depressive risk. Routine EPDS screening with stepped referral should be embedded in primary maternal care to protect maternal mental health.

1. Introduction

Childbirth is a period of profound biological and psychosocial transition that, for a substantial minority of women, is complicated by clinically significant mood disturbance. Postpartum depression (PPD)—conceptualised in the DSM-5 as a major depressive episode with peripartum onset and recognised in the ICD-11 among mental disorders associated with pregnancy and the puerperium—is now regarded as the most common psychiatric complication of childbirth.[1,2] A large meta-analysis mapping the global prevalence of depression among postpartum women estimated a pooled figure of approximately 17.2% (95% CI 16.0–18.5), with wide variation across regions and income settings.[2] Reports from the Middle East, sub-Saharan Africa and Southeast Asia describe prevalences ranging from below 10% to above 50%, reflecting heterogeneity in screening instruments, cutoffs and sociocultural context.[3-5]

The determinants of postpartum depressive symptoms are strikingly consistent across cultures. Deficient social and partner support, primiparity and inexperience with infant care, lower educational attainment, economic strain, unplanned pregnancy, obstetric complications and a personal or family history of mood disorder repeatedly emerge as risk factors.[5-7] A multinational study confirmed maternal education, parity and perceived support as robust correlates of depressive symptoms,[7] while psychosocial-predictor research in primiparous women identifies the early puerperium as a window of heightened neurobiological and psychological vulnerability.[6] During this window, abrupt withdrawal of gonadal hormones, sleep disruption and hypothalamic-pituitary-adrenal axis dysregulation interact with social adversity to precipitate depressive episodes in susceptible women.

The consequences extend beyond the mother. Untreated PPD degrades maternal quality of life, impairs the mother-infant relationship, and is associated with shorter breastfeeding duration and poorer infant cognitive, motor and socio-emotional development.[3,8,9] Because depressed mothers frequently do not volunteer their distress—and because stigma, limited mental-health literacy and fear of negative judgement impede help-seeking—a large proportion of cases remain unrecognised.[10] Systematic screening therefore offers a pragmatic route to early identification, enabling timely psychosocial support and evidence-based dyadic interventions that reduce symptom severity.[11]

In Indonesia, the burden of maternal mental disorder is considerable but poorly quantified. No dedicated national surveillance system tracks perinatal depression; nonetheless, local studies in Java and Kalimantan consistently report moderate depressive symptoms in a sizeable share of puerperal women,[12-15] and digital and mobile EPDS adaptations are beginning to be developed locally.[16] South Kalimantan presents particular challenges: a dispersed rural population, a strong cultural expectation that new mothers cope privately within the extended family, limited mental-health literacy regarding puerperal psychological adaptation,[17] and limited integration of mental-health services into primary maternal care. Independent midwifery practices deliver much of the region's puerperal care yet rarely incorporate structured psychological assessment.

Against this backdrop, most Indonesian reports remain purely descriptive, seldom quantifying uncertainty or effect sizes, and few originate from independent primary-care settings in South Kalimantan. This study therefore aimed to estimate the prevalence of postpartum depression risk, and to identify its demographic and obstetric determinants, among puerperal women attending a community midwifery facility in South Kalimantan, using the validated EPDS. Positioning the work within perinatal psychiatry is deliberate: PPD is a treatable psychiatric disorder with measurable neurobiological correlates and a documented capacity to compromise maternal functioning and infant development.[1,2,8] The analysis was upgraded beyond frequency description to report prevalence with confidence intervals, effect sizes for candidate determinants and small-sample-appropriate regression.

2. Methods

Study design and setting

A descriptive, analytic cross-sectional study was conducted and reported in accordance with the STROBE recommendations. It was carried out at a primary-care independent midwifery practice (Praktik Mandiri Bidan) within the catchment of a community public health center in South Kalimantan, Indonesia. The facility provides antenatal, delivery, puerperal and family-planning services to a predominantly rural population; the specific facility name and location are withheld to preserve confidentiality.

Study period, population and sampling

Data were collected over two months, from October to November 2025. The source population comprised all postpartum women receiving puerperal care at the facility during the study period. A total/consecutive sampling approach enrolled every eligible woman, yielding a final sample of 30 postpartum women. Inclusion criteria were postpartum status, ability to communicate and read in Indonesian, and provision of written informed consent. Exclusion criteria were

active severe mental illness (for example psychosis or a manic episode); severe obstetric complications or critical medical illness; perinatal loss; serious cognitive or communication impairment; and withdrawal of consent.

Sample-size considerations

The sample reflects the total eligible puerperal population presenting during the enrolment window rather than a power-based calculation. With 30 participants, a single-proportion estimate carries a maximum margin of error of approximately ±18 percentage points at 95% confidence; the study is therefore powered for descriptive estimation and hypothesis generation rather than confirmatory inference.

Psychiatric assessment

PPD risk was assessed with the EPDS, a 10-item self-report screening instrument developed by Cox and colleagues.[1] Each item refers to the preceding seven days and is scored 0–3 (total range 0–30), capturing three symptom domains—anhedonia, anxiety and depressive mood. The Indonesian-language version, applied across maternal-care research nationally, was used.[12,13] The instrument has demonstrated acceptable screening performance across diverse languages and primary-care settings,[4,18,19] and the timing of administration influences detection.[20] Total scores were banded as no risk (0–4), low risk (5–9), moderate risk (10–12) and high risk (>12). For analyses requiring a binary outcome, two thresholds were applied: an inclusive at-risk threshold (EPDS ≥5) and a probable-depression threshold (EPDS ≥10), the latter consistent with the cutoff that maximised combined sensitivity and specificity in an individual-participant-data meta-analysis of more than 9,000 women.[21] A positive response to item 10 (self-harm ideation) was flagged for immediate clinical attention regardless of total score.

Variables

Demographic and obstetric data were collected by structured questionnaire: maternal age (banded <20, 20–35, >35 years), parity (1, 2, 3, 4), highest completed education (primary, junior secondary, senior secondary, tertiary) and occupation. The dependent variable was EPDS-defined depression risk; the independent variables were the demographic and obstetric characteristics.

Statistical analysis

Data were analysed using Python 3. Categorical variables were summarised as frequencies and percentages and continuous variables as mean ± standard deviation. Prevalence for each EPDS band and for the binary thresholds was reported with Wilson-score 95% confidence intervals (CI). Bivariate associations with the at-risk outcome (EPDS ≥5) were quantified with odds ratios (OR) and 95% CI computed using the Haldane–Anscombe correction, Fisher's exact test, and Cramér's V (small ≈0.1, medium ≈0.3, large ≈0.5) as the effect-size measure. A multivariable Firth penalized-likelihood logistic regression (suited to small samples and quasi-separation) provided adjusted ORs, 95% CI and the Nagelkerke R^2. Because the outcome was common, odds ratios overstate the corresponding prevalence ratios and are interpreted as measures of association direction and strength; multicollinearity among predictors was low. Spearman rank correlation related maternal characteristics to the continuous EPDS score. Given the exploratory aim and the number of comparisons, p-values are interpreted descriptively without multiplicity adjustment; two-sided $p<0.05$ was considered significant, with exact p-values reported to three decimals.

Ethical considerations

This study received ethical approval from the Research Ethics Committee of the Institute for Research and Community Service (LPPM), Universitas Sari Mulia, Banjarmasin, Indonesia (Ethical Clearance No. 080/KEP-UNISM/I/2026, issued 19 January 2026), in accordance with the Declaration of Helsinki (1975, amended Seoul 2008) and the Indonesian National Guidelines on Health Research Ethics. Written informed consent was obtained from all participants; data were anonymised, participation was voluntary with the right to withdraw, and any disclosure of self-harm ideation was referred for appropriate clinical care.

3. Results

Participant characteristics

Thirty postpartum women were enrolled, and their full demographic and obstetric profile is presented in Table 1. The mean maternal age was 26.8 ± 4.1 years (range 18–36); 28 women (93.3%) fell within the 20–35-year reproductive band, with one woman (3.3%) younger than 20 and one (3.3%) older than 35. Primiparas accounted for 13 women (43.3%) and multiparas for 17 (56.7%). As shown in Table 1, senior secondary education was the most common attainment (14 women, 46.7%), followed by junior secondary (10, 33.3%), while primary and tertiary education were each reported by 3 women (10.0%); the great majority were homemakers (25, 83.3%).

Table 1. Demographic and obstetric characteristics of participants (n = 30).

Characteristic	Category	n	%
Maternal age (years)	<20	1	3.3
	20–35	28	93.3
	>35	1	3.3
Parity	1 (primipara)	13	43.3
	2	9	30.0
	3	5	16.7
	4	3	10.0
Education	Primary (SD)	3	10.0
	Junior secondary (SMP)	10	33.3
	Senior secondary (SMA)	14	46.7
	Tertiary	3	10.0
Occupation	Homemaker	25	83.3
	Civil servant	3	10.0
	Private employee	1	3.3
	Entrepreneur	1	3.3

Prevalence of postpartum depression risk. The mean EPDS total score was 5.5 ± 3.0 (range 1–12). As detailed in Table 2, over half of participants screened with no depressive risk (16 women, 53.3%; 95% CI 36.1–69.8); low risk was identified in 10 women (33.3%; 95% CI 19.2–51.2) and moderate risk in 4 women (13.3%; 95% CI 5.3–29.7), while no participant scored in the high-risk band (0%; 95% CI 0.0–11.4). Taken together, 14 women (46.7%; 95% CI 30.2–63.9) screened at risk on the inclusive threshold (EPDS ≥5), and 4 women (13.3%; 95% CI 5.3–29.7) met the probable-depression threshold (EPDS ≥10).

Table 2. Distribution of EPDS-defined postpartum depression risk categories (n = 30).

Risk category	EPDS score	n	%	95% CI (%)
No risk	0–4	16	53.3	36.1–69.8
Low risk	5–9	10	33.3	19.2–51.2
Moderate risk	10–12	4	13.3	5.3–29.7
High risk	>12	0	0.0	0.0–11.4
At risk (composite)	≥5	14	46.7	30.2–63.9
Probable depression	≥10	4	13.3	5.3–29.7

Bivariate associations

Associations between maternal characteristics and the at-risk outcome (EPDS ≥5) are summarised in Table 3. Younger maternal age (<25 years) had the strongest, though non-significant, association with screening at risk (OR 4.44, 95% CI 0.82–23.95; Fisher p = 0.101; Cramér's V = 0.342), followed by homemaker status relative to employment outside the home (OR 3.24, 95% CI 0.44–23.98; p = 0.336; V = 0.239) and lower

education at junior-secondary level or below (OR 2.73, 95% CI 0.65–11.55; p = 0.269; V = 0.261). Parity was not associated with the inclusive at-risk outcome (primipara versus multipara OR 0.97, 95% CI 0.24–3.93; p = 1.000; V = 0.009). Notably, however, all four women in the moderate-risk band (EPDS ≥10) were primiparas, and no multipara reached this threshold (Table 1), indicating that parity was related to symptom severity rather than to the presence of any elevated symptoms.

Table 3. Bivariate associations between maternal characteristics and at-risk EPDS (≥5).

Determinant (exposed vs reference)	At-risk, exposed	At-risk, reference	OR (95% CI)	p	Cramér's V
Younger age (<25 vs ≥25 y)	6/8 (75.0%)	8/22 (36.4%)	4.44 (0.82–23.95)	0.101	0.342
Homemaker vs employed outside	13/25 (52.0%)	1/5 (20.0%)	3.24 (0.44–23.98)	0.336	0.239
Lower education (≤SMP vs ≥SMA)	8/13 (61.5%)	6/17 (35.3%)	2.73 (0.65–11.55)	0.269	0.261
Primipara vs multipara	6/13 (46.2%)	8/17 (47.1%)	0.97 (0.24–3.93)	1.000	0.009

Notes: OR, odds ratio (Haldane–Anscombe corrected); CI, confidence interval; V, Cramér's V; p, Fisher's exact test. Odds ratios overstate prevalence ratios for this common outcome.

Multivariable analysis

In a Firth penalized-likelihood logistic regression for the at-risk outcome including maternal age band and education (Table 4), younger age (<25 years) carried an adjusted OR of 3.67 (95% CI 0.60–22.44; p = 0.159) and lower education an adjusted OR of 2.20 (95% CI 0.46–10.46; p = 0.320); the model explained a modest share of variance (Nagelkerke R^2 = 0.194). As reported in Table 4, no predictor reached statistical significance, consistent with the limited statistical power of a 30-participant sample, and these estimates are exploratory.

Table 4. Multivariable Firth penalized-likelihood logistic regression for at-risk EPDS (≥5).

Predictor	Adjusted OR	95% CI	p
Younger age (<25 y)	3.67	0.60–22.44	0.159
Lower education (≤SMP)	2.20	0.46–10.46	0.320

Nagelkerke R^2 = 0.194. Estimates derive from a penalized-likelihood model appropriate for the small sample and are exploratory.

Correlation analysis

Across the continuous EPDS score, lower maternal education was significantly associated with higher depressive symptom scores (Spearman ρ = −0.36, p = 0.039), as illustrated in Figure 1: symptom scores rose stepwise from tertiary- and senior-secondary-educated mothers toward those with primary and junior-secondary schooling. Maternal age correlated negatively with the EPDS score without reaching significance (ρ = −0.29, p = 0.105), while parity was essentially uncorrelated (ρ = −0.05, p = 0.793). Examination of the EPDS symptom architecture showed that elevated scores in this sample were driven predominantly by the anhedonia and anxiety items (loss of enjoyment, self-blame and unprovoked worry) rather than by the most severe depressive items; no participant endorsed active self-harm ideation on item 10 at a level requiring urgent escalation, although the protocol for immediate safety review remained in force throughout. In summary, although most participants screened with no depressive risk (Table 2), nearly half carried at least subthreshold symptoms and one in eight reached the probable-depression threshold; lower education was the only characteristic significantly associated with symptom severity (Figure 1).

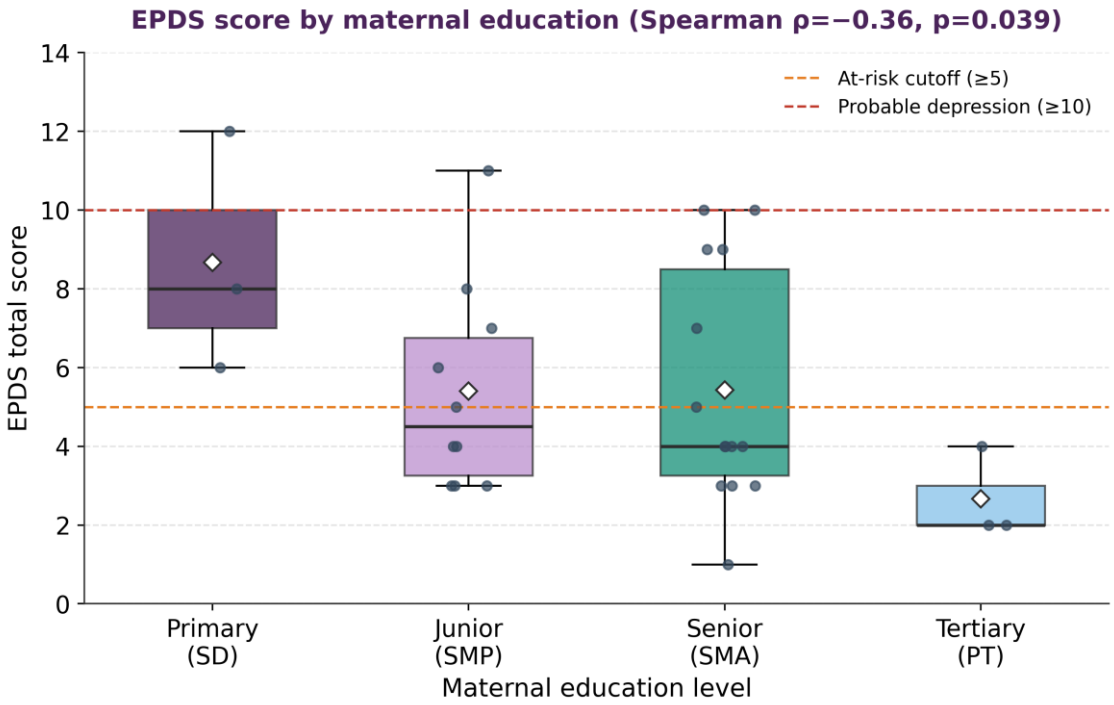

Figure 1. EPDS total score by maternal education level (Spearman ρ = −0.36, p = 0.039). Boxes show medians and interquartile ranges; diamonds show means; dashed lines mark the at-risk (≥5) and probable-depression (≥10) thresholds. The primary-education box reflects three participants.

4. Discussion

In this cross-sectional screening study of 30 puerperal women attending a community midwifery facility in South Kalimantan, nearly half (46.7%, 95% CI 30.2–63.9) screened with at least low-grade depressive symptoms on the EPDS, and 13.3% (95% CI 5.3–29.7) reached the probable-depression threshold, with a mean score of 5.5 ± 3.0 and no high-risk cases (Table 2). Lower maternal education was significantly correlated with higher symptom burden (Figure 1), and younger age, homemaker status and lower education showed consistent—if statistically non-significant—positive associations with screening at risk (Table 3). Although the overall picture is reassuring for an apparently low-risk obstetric population, the finding that a substantial minority carried unrecognised depressive risk is the central clinical message.

The probable-depression prevalence of 13.3% sits comfortably within the global range and close to the pooled meta-analytic estimate of approximately 17.2% for postpartum depression.[2] It is lower than several Southeast Asian and Indonesian reports of moderate symptoms,[5,12,13] a difference plausibly attributable to this facility's low-risk, predominantly multiparous, married and reproductive-age population, to the early postpartum timing of screening, and to the inclusive banding scheme. When the validated ≥10 cutoff that maximises combined sensitivity and specificity is applied,[21] the more conservative 13.3% probable-depression figure emerges, underscoring the importance of cutoff transparency when comparing screening studies.

The significant inverse relationship between maternal education and EPDS score (ρ = −0.36, p = 0.039; Figure 1) is consistent with a robust international literature in which lower educational attainment predicts higher perinatal depressive symptoms.[5,7] Education is widely interpreted as a proxy for health literacy, socioeconomic resources, problem-solving repertoire and the capacity to access and navigate support services.[7,10] The non-significant

but sizeable odds ratios for younger age (OR 4.44) and homemaker status (OR 3.24) in Table 3 point in the same direction as prior work linking youth, role confinement and support deficits to postpartum vulnerability,[6,19] but the wide confidence intervals reflect the small sample and preclude firm inference.

The dissociation between parity and the two outcomes is instructive. Parity was unrelated to the presence of any elevated symptoms (OR 0.97; Table 3), yet all four probable-depression cases occurred in primiparas (Table 1). This pattern fits the well-documented heightened vulnerability of first-time mothers, who face an abrupt transition to the maternal role, inexperience with infant care, and disrupted sleep without the buffering effect of prior coping experience.[6] It suggests that, in this population, primiparity was associated less with whether mild symptoms appeared than with whether they escalated toward clinically meaningful severity—a clinically relevant distinction for triage.

From a neurobiological standpoint, the early puerperium is characterised by precipitous withdrawal of estrogen and progesterone, fluctuations in hypothalamic-pituitary-adrenal-axis activity and the cortisol response, disrupted circadian and sleep architecture, and inflammatory changes—all of which can destabilise mood in predisposed women.[2,22] These biological substrates interact with psychosocial adversity in a diathesis-stress fashion, so that the same hormonal milieu produces depression in some women and resilience in others depending on the surrounding social and cognitive resources.[6,7] The education- and support-related signals observed here are consistent with this interactional model.

The clinical implications are concrete. Even in a facility serving an obstetrically low-risk population, roughly one in two mothers carried detectable symptoms and one in eight a probable depressive disorder that would have remained invisible without structured screening. Embedding the brief, well-validated EPDS into routine puerperal visits—a task readily performed by midwives—would allow primary maternal-care providers to identify at-risk women, deliver psychoeducation and support, and refer those above threshold for confirmatory psychiatric assessment and evidence-based dyadic or psychological intervention.[11,21] A positive item 10 should always trigger immediate safety evaluation. Linking midwifery practices to mental-health services through a clear stepped-care pathway would close a critical gap between detection and treatment.[10]

In the Indonesian and specifically South Kalimantan context, cultural norms that frame maternal coping as a private family matter, combined with stigma and limited mental-health literacy, mean that many depressed mothers neither disclose nor seek help.[10,17] Routine, normalised screening reframes mood assessment as a standard component of maternal care rather than an admission of failing, and may be particularly valuable where mental-health specialists are scarce. Engaging partners and extended family—central to Banjar maternal culture—in psychoeducation could amplify the protective effect of social support.

Several methodological points merit emphasis. Because postpartum depression risk is common in this sample, the odds ratios in Table 3 overstate the corresponding prevalence ratios and should be read as measures of association direction and strength rather than risk multipliers; the accompanying Cramér's V values and confidence intervals were emphasised for this reason. Multicollinearity among the binary predictors was low, so the multivariable estimates in Table 4 are not materially destabilised by shared variance; the Firth penalization further guards against the inflation and separation that ordinary logistic regression would suffer at this sample size. Because multiple associations were examined, no formal multiplicity correction was applied and the single significant correlation should be regarded as hypothesis-generating pending replication. A sensitivity analysis at the stricter ≥10 threshold yielded the same directional pattern, with risk concentrated among younger and primiparous women.

These findings carry public-health and policy implications for maternal mental health in Indonesia. The integration of a two-minute, freely available

screening instrument into existing puerperal contacts requires minimal additional resources yet could substantially increase case detection in a system where specialist psychiatric coverage is sparse and unevenly distributed. Task-shifting—equipping midwives to screen, deliver first-line psychoeducation and triage—is a pragmatic strategy endorsed across low- and middle-income settings, and the present data suggest it is both feasible and warranted at the primary-care level in South Kalimantan. Embedding screening within district maternal-and-child-health programmes, supported by clear referral criteria and a designated mental-health contact, would convert opportunistic detection into a reliable stepped-care pathway.

The results also intersect with broader debates about how perinatal depression should be conceptualised and measured in non-Western, collectivist settings. The single significant determinant identified here—maternal education—is a structural rather than a strictly clinical variable, echoing arguments that perinatal mood disorders in such contexts are best understood through a biopsychosocial lens that weighs social determinants alongside neuroendocrine vulnerability. Screening programmes that ignore these structural correlates risk under-serving precisely the women at greatest disadvantage; conversely, pairing screening with targeted psychoeducation for lower-education and first-time mothers could improve equity of detection and care.

Future research should build on these observations in several directions. Adequately powered, multi-site studies are needed to estimate region-wide prevalence with precision and to test the candidate determinants identified here in a confirmatory framework. Longitudinal designs that screen repeatedly across the first postpartum year would capture the trajectory of symptoms and distinguish transient adjustment reactions from persistent depression. Incorporation of a structured diagnostic interview as a reference standard would permit estimation of the EPDS's local diagnostic accuracy, including an empirically derived optimal cutoff for South Kalimantan, and the measurement of validated psychosocial instruments would allow the relative contributions of biological and social determinants to be disentangled.

This study has strengths. It applied a validated, internationally comparable instrument with a transparent banding scheme; it recomputed all estimates from verified respondent-level data and reported prevalence with confidence intervals and effect sizes rather than bare frequencies; and it used small-sample-appropriate penalized regression alongside exact tests. It also contributes scarce primary-care perinatal-mental-health data from South Kalimantan. The limitations must temper interpretation: the cross-sectional design precludes causal inference and captures a single early-postpartum time point; the sample of 30 from one facility limits power and generalisability; the EPDS is a self-report screen identifying risk rather than diagnosis, and without a concurrent gold-standard interview, diagnostic-accuracy metrics could not be estimated; and important confounders—social and partner support, prior psychiatric history, pregnancy planning, mode of delivery and obstetric complications—were unmeasured. Larger, multi-site, longitudinal analytic studies incorporating these variables and a diagnostic reference standard are needed.

5. Conclusion

Among puerperal women attending a community midwifery facility in South Kalimantan, 46.7% (95% CI 30.2–63.9) screened with at least low-grade depressive symptoms and 13.3% (95% CI 5.3–29.7) reached the probable-depression threshold on the EPDS, with no high-risk cases. Lower maternal education was significantly associated with higher symptom burden ($\rho = -0.36$, $p = 0.039$), and younger age and primiparity showed the expected vulnerability patterns, with all probable cases occurring in first-time mothers. Even in an obstetrically low-risk population, clinically relevant postpartum depressive risk was present and would have escaped detection without systematic screening. Routine EPDS screening with a clear stepped-referral pathway should be embedded in primary maternal care, and

adequately powered longitudinal studies incorporating psychosocial determinants and a diagnostic reference standard are warranted.

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