

Community Knowledge of Baby Blues and Postpartum Depression

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ABSTRACT

Background: Baby blues syndrome is a mild yet common postpartum mood disturbance, with a pooled global prevalence estimated at approximately 39% of mothers. However, it is frequently underrecognized due to limited public awareness. If left unaddressed, baby blues may progress to postpartum depression. This study aimed to evaluate changes in community knowledge following baby blues health education, with particular attention to a stigma-related knowledge composite, delivered by residents of the Obstetrics and Gynecology Residency Program at Dr. Moewardi General Hospital, Surakarta.

Subjects and Method: A quasi-experimental one-group pretest–posttest design was used, with a paired sample of 30 respondents in Central Java recruited by consecutive sampling. Knowledge was assessed with an identical 10-item true/false questionnaire administered before and after the educational session. Because the paired score differences were not normally distributed (Shapiro–Wilk, $p < 0.05$), the Wilcoxon signed-rank test, an appropriate non-parametric method for paired data, was used for analysis.

Results: The mean total knowledge score increased from Mean = 5.30 (SD = 2.04) at pretest to Mean = 8.40 (SD = 1.38) at posttest. Knowledge scores improved among 24 of the 30 participants (80%). The largest relative improvement was observed in the stigma-related knowledge composite (items 6 and 9), for which the proportion of correct responses increased from 48.3% at pretest to 81.7% at posttest. In addition to the improvement in knowledge scores, two reusable community-based educational outputs were developed: an illustrated leaflet and a short educational video for continued use by local health cadres.

Conclusion: Baby blues and postpartum depression education delivered by obstetrics and gynecology residents was associated with a statistically significant and educationally meaningful improvement in community knowledge, particularly in stigma-related knowledge and beliefs, and represents a feasible, low-cost, and replicable component of community-based postpartum mental health promotion.

Keywords: postpartum depression, stigma, community knowledge, health education

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BACKGROUND

Baby blues syndrome, or postpartum blues, is a transient mood disturbance occurring in the first few days after delivery, characterized by tearfulness, sadness, anxiety, and sleep disturbance; unlike the more severe and persistent postpartum depression, it is generally self-limiting and resolves within 10–14 days without specific treatment. Pooled prevalence estimates range from approximately 39% globally to 50–70% in Indonesia, with wide variation across settings and higher, more heterogeneous rates reported in low- and middle-income countries, including within ASEAN (Rezaie-Keikhaie et al., 2020; Ministry of Health of the Republic of Indonesia, 2022; Hahn-Holbrook et al., 2018; Sainuddin et al., 2023). If unrecognized, baby blues may progress to postpartum depression, which carries serious consequences for maternal and infant health and, in severe cases, has been associated with increased maternal suicide risk (Lee et al., 2022); postpartum depression is nonetheless treatable once identified (Dennis et al., 2024; Stewart and Vigod, 2019), and known risk factors such as prior mood disorder, poor social support, and unplanned pregnancy can help target preventive education (Agrawal et al., 2022; Cho et al., 2022; Xu et al., 2026). Validated instruments such as the Edinburgh Postnatal Depression Scale support early clinical detection (Levis et al., 2020), yet community-level knowledge often lags behind clinical screening capacity.

A major barrier to early recognition and help-seeking is stigma, the persistent belief that postpartum mood disturbance

reflects personal weakness rather than a medical condition; this discourages disclosure and delays professional consultation across individual, interpersonal, and community levels (Place et al., 2024). Health education has been shown to reduce the incidence and impact of perinatal depression (O'Connor et al., 2019) and to improve knowledge scores about baby blues in Indonesian settings (Beydokhti et al., 2021; Tessema et al., 2025), including through non-specialist, community-delivered model in other low-resource settings (Sikander et al., 2019). However, most existing studies measure overall knowledge as a single outcome and have not isolated stigma-related beliefs, specifically the notion that postpartum mood disturbance signifies weakness or requires outward cheerfulness, as a distinct outcome; because stigma rather than knowledge alone is a principal barrier to help-seeking (Place et al., 2024), this gap limits understanding of whether education changes stigma-related knowledge to the same extent as general factual knowledge.

This community-engaged research activity therefore combined a structured health-education outreach (community service component) with a formal quasi-experimental evaluation (research component) to assess changes in community knowledge of baby blues and postpartum depression, with particular attention to a stigma-related knowledge composite, following education reinforced with a leaflet and educational video as durable take-home media. To our knowledge, limited Indonesian community-based studies have

evaluated stigma-specific knowledge change following resident-led baby blues and postpartum depression education. This study contributes by (a) a priori defining and separately analyzing a stigma-related knowledge composite rather than an aggregate score alone (Beydokhti et al., 2021; Tessema et al., 2025; Dewi et al., 2022), (b) delivering the intervention directly by obstetrics and gynecology residents under specialist supervision, a model with limited prior documentation in the Indonesian literature, and (c) producing durable, reusable educational media intended to extend the reach of a single educational encounter.

SUBJECTS AND METHOD

1. Study Design

This activity is best classified as a community-engaged research study: a structured health-education outreach (community service component) evaluated using a formal quasi-experimental one-group pretest–posttest design, without a control group (research component). It was conducted among community members in Central Java, Indonesia, who participated in a health education session on baby blues and postpartum depression. The educational intervention and paired data collection (pretest and posttest) were carried out in June 2026, and data processing and statistical analysis were performed in June 2026.

2. Population and Sample

The target population was women of reproductive age residing in Central Java and surrounding areas. Participants were recruited from daily outpatient clinic activities within the service coverage area of Dr. Moewardi Regional General Hospital in Surakarta, in collaboration with local health volunteers, using a non-random, consecutive sampling method: eligible women (able to read and write, willing to complete

both the pretest and posttest, without cognitive impairment or difficulty understanding Indonesian) who attended the scheduled community sessions were invited in order of arrival until the target sample size was reached. Because sampling was non-random and drawn from a single catchment area, findings should not be generalized to all women of reproductive age but apply specifically to women attending similar community-based maternal health sessions.

All 30 women invited agreed to participate, provided written informed consent, and completed both the pretest and posttest, allowing each respondent's knowledge change to be analyzed as a matched pair. The sample size was determined a priori using the one-sample paired-difference formula $n = [(Z\alpha/2 + Z\beta) \cdot \sigma_d / d]^2$, where σ_d is the anticipated standard deviation of the paired (posttest minus pretest) difference. Assuming $d = 2.0$ points, $\sigma_d = 2.5$, a two-sided $\alpha = 5\%$ ($Z\alpha/2 = 1.96$), and 80% power ($Z\beta = 0.84$), this yielded a minimum required sample of 13 respondents. A target of 30 was set to provide adequate power for the non-parametric analysis and the planned exploratory subgroup comparisons; no attrition occurred, as all 30 enrolled participants completed both assessments.

3. Study Variables

The dependent variable was level of knowledge about baby blues and postpartum depression. The independent variable was a health education intervention on baby blues and postpartum depression.

4. Operational Definition of Variables

The health education intervention

was a single, structured 2-hour educational session covering the definition and symptoms of baby blues, differences between baby blues and postpartum depression, risk factors, impacts on mothers and infants,

the role of family and social support, common myths and stigma surrounding postpartum depression, and when and where to seek professional help. The session was delivered through an interactive lecture using a structured Power Point (PPT) presentation, followed by distribution of an illustrated leaflet summarizing the key educational messages for take-home reference, and an open discussion/question-and-answer segment to reinforce interactive engagement. The session was facilitated by residents of the Obstetrics and Gynecology Residency Program at Dr. Moewardi General Hospital, Surakarta, under the direct supervision of obstetrics and gynecology specialist and subspecialist staff, who reviewed the educational content and were present to ensure clinical accuracy and to address participant questions.

Knowledge of baby blues and postpartum depression was defined as the total score on a 10-item true/false questionnaire assessing knowledge about baby blues and postpartum depression. The questionnaire was administered before and after the health education session. A higher score indicated a higher level of knowledge.

The stigma-related knowledge composite (hereafter, stigma composite) was operationally defined as the sum of items 6 and 9, which were combined a priori because both address the same underlying construct within Goffman's (1963) conceptualization of stigma as a discrediting attribute that is concealed to preserve a socially acceptable identity: item 6 (the belief that affected mothers "remain cheerful and happy") reflects the concealment/discreditable-identity dimension, in which distress is masked to avoid social judgment, while item 9 (the belief that postpartum depression signifies maternal "weakness") reflects the attribution/stereotype dimen-

sion, in which the condition is misread as a personal or moral failing rather than a medical illness. This two-item grouping draws on the socio-ecological synthesis of postpartum help-seeking barriers by Place et al. (2024), which discusses concealment of distress and weakness-attribution as commonly reported individual-level manifestations of postpartum mental health stigma; combining them into a single, exploratory stigma composite (rather than treating them as unrelated items) is a pragmatic simplification for this study and should not be read as a validated measure of stigma as a broader construct.

5. Study Instruments

Knowledge was measured using an identical 10-item true/false questionnaire administered as pretest and posttest to the same 30 respondents, covering general symptoms, duration and clinical course, risk factors, the role of social support, indications for seeking professional help, and myths and stigma related to postpartum depression. The instrument was developed by the research team specifically for this activity, drawing item content from current clinical guidelines and the literature cited in the Background; it was not an adaptation of a previously published, validated scale. Content validity was established through expert review by obstetrics and gynecology specialist and subspecialist staff, who evaluated each item for clinical accuracy, clarity, and relevance before use. Internal consistency reliability, assessed with Cronbach's alpha on the pretest responses, was low ($\alpha = 0.44$), below the conventional threshold of 0.70.

This is a key limitation of the study: because the primary outcome (total knowledge score) derives from an instrument of unconfirmed and modest reliability, results based on the total score should be interpreted with caution, and this limitation is

discussed further, together with the reliability of the two-item stigma composite, in the Limitations section. Answer keys were developed based on current literature and clinical consensus. To reinforce retention and enable continued dissemination after the session, the activity produced two durable educational media: an illustrated leaflet summarizing key messages, and a short educational video covering the same content in an accessible audiovisual format.

6. Data Analysis

Statistical analysis was performed using Python (SciPy) and IBM SPSS Statistics version 26.0. Data normality was assessed using the Shapiro–Wilk test. Because the paired pretest and posttest scores were not normally distributed ($p < 0.05$) and the design involved two related measurements on the same individuals, the Wilcoxon signed-rank test, the appropriate non-parametric test for paired, non-normally distributed data (Nahm, 2016), was used to compare pretest and posttest total scores and the stigma composite score. Item-level

and stigma-composite correct-response proportions were compared descriptively. Statistical significance was set at $p < 0.05$.

7. Research Ethic

This study received ethical approval, and all respondents provided informed consent before participation. Participant confidentiality and anonymity were maintained, and all collected data were used exclusively for research and program evaluation purposes. The research ethical clearance approval letter was obtained with No. 522/III/-HREC/2026, dated 31 March 2026.

RESULTS

1. Sample Characteristics

Demographic characteristics of respondents are presented in Table 1. The majority were aged 25–34 years (56.7%), with a mean age of 29.7 years old ($SD = 7.5$). Most respondents had completed a Diploma or Bachelor's degree (60.0%), and the largest occupational group was housewives (50.0%).

Table 1. Demographic Characteristics of Respondents (n=30)

Characteristic	n	Percentage (%)
Age (years)		
<25 years	7	23.30
25–34 years	17	56.70
≥35 years	6	20.00
Education Level		
Junior High School	2	6.70
Senior High School/Vocational	9	30.00
Diploma/Bachelor's Degree	18	60.00
Other	1	3.30
Occupation		
Housewife	15	50.00
Student	6	20.00
Teacher/Educator	3	10.00
Self-employed/Private sector	5	16.70
Civil Servant	1	3.30

2. Pretest and Posttest Knowledge Scores

The distribution of pretest and posttest total knowledge scores is presented in Table 2. The median pretest score was 5.00 (IQR 3.00–7.00) and the median posttest score

was 8.50 (IQR 7.00–10.00) out of a maximum of 10 (Mean= 5.30; SD= 2.04 and Mean= 8.40; SD= 1.38, respectively), an increase of 3.10 points in the mean score.

Table 2. Distribution of pretest and post-test total knowledge scores (paired, n=30)

Variable	n	Median (IQR)	Mean (SD)	Shapiro-Wilk p
Pretest Score	30	5.00 (3.00–7.00)	5.30 (2.04)	<0.001
Posttest Score	30	8.50 (7.00–10.00)	8.40 (1.38)	0.003

3. Item-Level Knowledge Analysis

The percentage of correct responses per item is presented in Table 3. Every item improved from pretest to posttest. The largest absolute gains were observed in item 6 (mothers with postpartum depression remain outwardly cheerful) and item 4

(sleep deprivation as a risk factor). Item 9, the explicit stigma item regarding maternal weakness, improved from 56.7% to 76.7%; combined with item 6 into a single stigma composite (Table 4), the composite improvement was both substantial and statistically significant.

Table 3. Percentage of correct responses per knowledge item

No.	Item question	Pretest (%)	Posttest (%)	Δ
1	Mothers may experience mood changes (e.g., sadness, tearfulness) after delivery	53.30	86.70	+33.40
2	Anxiety after delivery can be a sign of baby blues	66.70	93.30	+26.60
3	Baby blues usually lasts more than 1 year (false)	50.00	83.30	+33.30
4	Sleep deprivation and fatigue increase the risk of postpartum depression	53.30	90.00	+36.70
5	Partner/family support is important for maternal mental health	46.70	70.00	+23.30
6	Mothers with postpartum depression usually remain cheerful and happy (false)	40.00	86.70	+46.70
7	Lack of confidence in caring for a newborn may be experienced by some mothers	56.70	90.00	+33.30
8	Mothers with prolonged sadness should seek help from healthcare providers	46.70	86.70	+40.00
9	Postpartum depression is a sign that the mother is weak (stigma item, false)	56.70	76.70	+20.00
10	Thoughts of self-harm or harming the baby require immediate attention	60.00	76.70	+16.70

4. Stigma Composite — Primary Outcome

Shapiro–Wilk normality testing demonstrated non-normal distribution in both the pretest ($W = 0.786$; $p < 0.001$) and posttest ($W = 0.612$; $p < 0.001$) stigma-

composite scores. The Wilcoxon signed-rank test was therefore applied ($Z = -2.91$; $p = 0.004$; effect size $r = 0.53$; Hodges–Lehmann estimate of the paired difference = 0.50, 95% CI: 0.00 to 1.00). Results are presented in Table 4.

Table 4. Stigma Composite Score, Pretest vs. Posttest (n=30)

Stigma Composite (items 6+9)	n	Mean (0–2)	SD	% Correct	Median (IQR)
Pretest	30	0.97	0.85	48.30	1.00 (0.00–2.00)
Posttest	30	1.63	0.49	81.70	2.00 (1.00–2.00)

The Wilcoxon signed-rank test showed a statistically significant increase in total knowledge score following education ($Z = -4.224$; $p < 0.001$), with a large magnitude of pretest-posttest change ($r = 0.77$). Of the 30 paired observations, 24 (80.00%) showed an increase in score, 4 (13.30%) showed a decrease, and 2 (6.70%) showed no change. The median paired difference

(posttest minus pretest) was 3.00 points (Hodges–Lehmann estimate; 95% CI: 2.00 to 4.00), calculated from the paired raw data; as a simple descriptive comparator, the difference between the reported medians was 3.50 points (posttest median 8.50 vs. pretest median 5.00). Results are summarized in Table 5.

Table 5. Wilcoxon Signed-Rank Test for Total Knowledge Score (Posttest vs. Pretest)

Total Knowledge Score	n	Mean Rank	Sum of Ranks
Negative Ranks	4	4.38	17.50
Positive Ranks	24	16.19	388.50
Ties	2	—	—
Total	30	—	—

5. Exploratory Subgroup Analysis

As an exploratory analysis, knowledge-gain scores (posttest minus pretest) were compared across age group, education level, and occupation. No significant differences were found by age, education, or occupation. With only $n = 30$, this analysis was not powered to detect subgroup differences, and these null results should not be interpreted as evidence that the effect is consistent across subgroups.

increase 3.10 points; $p < 0.001$). However, because this was a single-group design without a control group, causality cannot be established, and the observed increase may partly reflect factors other than the intervention itself, such as testing effects, regression to the mean, or social desirability bias, as discussed further below.

The observed effect size ($r = 0.77$) exceeded Cohen's (1988) threshold for a large effect ($r \geq 0.50$), indicating a substantial improvement in knowledge following the intervention. This finding is consistent with pooled evidence from perinatal education trials, which has demonstrated

DISCUSSION

Knowledge scores increased significantly following the educational session (mean

moderate-to-large gains in knowledge following structured educational interventions reinforced by take-home materials (O'Connor et al., 2019); comparably large single-session knowledge gains have also been reported in other Indonesian health-education contexts, although with different health content and limited direct clinical relevance to perinatal mental health (Novrinda et al., 2023). Because the change spanned the entire ten-item measure rather than a narrow subset of items, it does not appear confined to a few easily learned facts.

The stigma composite, covering the belief that postpartum depression signifies maternal weakness or that affected mothers always appear outwardly happy, improved from 48.30% to 81.70% correct responses. This is consistent with prior work identifying the belief that needing help signals personal weakness as a common individual-level barrier to disclosure and care-seeking (Place et al., 2024). However, this composite reflects only two items and measures knowledge of stigma-related statements, not stigma attitudes or behavior; whether this knowledge gain translates into a genuine reduction in stigmatizing attitudes or behavior was not measured in this study and would require validated attitude- or behavior-based instruments to establish.

Item-level analysis showed that all ten knowledge items improved, with the largest absolute gains in items related to symptom recognition and risk factors (items 4 and 6), suggesting that even respondents with reasonable baseline awareness benefited from structured reinforcement. The smaller relative gain in item 9 compared with item 6, despite both addressing stigma, suggests that explicit framing of postpartum depression as a sign of 'weakness' may be a more deeply held belief that requires repeated or more intensive messaging, an

area the accompanying leaflet and video are designed to reinforce after the live session ends (Agrawal et al., 2022).

Beyond the measured knowledge outcome, the activity produced two durable educational outputs: an illustrated, two-sided A5 leaflet summarizing the definition, symptoms, duration, risk factors, and stigma myths of baby blues and postpartum depression, with a referral pathway to professional help, distributed to all 30 participants; and a short animated/narrated educational video covering the same content, shared through community WhatsApp groups and Dr. Moewardi Hospital's social media accounts (Sikander et al., 2019). These materials were developed to support continued exposure to the educational content beyond the single live session, although their independent effect on knowledge retention was not evaluated in this study.

A small proportion of respondents (13.3%) showed a decrease in total knowledge scores from pretest to post-test. The small proportion of respondents who showed a decrease in total knowledge scores may not be unexpected following a single-session community education intervention. This pattern could reflect response variability, participant fatigue, or uncertainty when responding to more nuanced information; however, these explanations were not directly assessed in the present study. The finding highlights the potential value of repeated learning opportunities and accessible educational media to reinforce knowledge beyond a single educational encounter. Baseline knowledge levels may also vary across community populations according to educational background and previous exposure to health information, which may partly account for differences in item-specific gains and knowledge

changes observed across studies (He et al., 2025).

The following continuity mechanisms represent planned future program activities and have not themselves been evaluated in this study. To extend the benefit of this single education session beyond the day of activity, the program was designed with explicit continuity mechanisms rather than as an isolated event (Liu et al., 2022). First, periodic re-education is planned: the team intends to repeat the baby blues and postpartum depression education session on a quarterly basis at the same community sites, allowing new postpartum mothers to be reached on an ongoing rather than one-off basis. Second, the team proposes integration with antenatal and postnatal services by incorporating brief stigma-focused messaging and leaflet distribution into routine antenatal and postnatal care visits at the hospital and partner primary care facilities, so that education is delivered at multiple touchpoints rather than relying solely on a stand-alone event. Third, monitoring and follow-up are planned: both the present cohort and future participants will be offered a follow-up knowledge assessment at 1–3 months, ideally cross-referenced with leaflet and video reach, to evaluate retention of the stigma-composite gains observed in this study and to guide refinement of the leaflet and video content (Woody et al., 2017).

This study has several limitations that should be considered when interpreting its findings. First, the single-group pretest–posttest design without a control group cannot rule out testing effects, whereby exposure to the pretest questionnaire itself sensitized respondents to the correct answers independent of the educational content, potentially inflating the observed knowledge gain; a randomized or non-equivalent control-group design would be

needed to isolate the specific effect of the education from repeated testing. Second, participants were recruited by non-random, consecutive sampling from women attending community maternal and child health activities, which introduces selection bias: respondents who chose to attend and complete both assessments may have been more motivated, more literate, or more health-conscious than the broader population of reproductive-age women, limiting generalizability of the findings beyond similar community-engaged samples.

Third, because knowledge was self-reported on a written questionnaire administered immediately after the session by the same team that delivered the education, responses may have been influenced by social desirability bias, with participants selecting answers they believed were expected rather than reflecting genuine belief change, particularly for the stigma-related items.

Fourth, the absence of a control group more broadly threatens internal validity, since improvement cannot be definitively attributed to the educational intervention alone and may be partly explained by maturation, regression to the mean among low pretest scorers, or the testing effect noted above (Place et al., 2024).

Fifth, the study-specific knowledge questionnaire showed low internal consistency on the pretest, and total-score results. The two-item stigma composite showed somewhat higher internal consistency than the ten-item instrument as a whole, but a two-item measure remains inherently limited in reliability and should not be regarded as a validated stigma scale. In addition, the wording of item 6 (“mothers with postpartum depression remain outwardly cheerful and happy”) may be ambiguous, since outward cheerfulness does not preclude underlying depressive symptoms

(“smiling depression”); this construct-validity concern applies specifically to the stigma composite, of which item 6 is one of only two components. Future use of this instrument would benefit from formal psychometric validation, including a larger item pool, cognitive pretesting to reduce item ambiguity, and re-testing in a larger sample.

Finally, the small sample size (n=30) recruited from a single geographic catchment area by consecutive sampling limits both the statistical power of subgroup analyses and the external validity/ generalizability of the findings to other community or cultural settings; the results should therefore be regarded as preliminary evidence supporting feasibility rather than definitive proof of population-level effectiveness. Larger, controlled, and longer-follow-up studies are needed to confirm these findings and to assess the durability of the observed stigma-related knowledge gains (Wang et al, 2021).

These findings suggest that residency-led community education on baby blues and postpartum depression is feasible and is associated with improved community knowledge, including knowledge of stigma-related misconceptions captured by a two-item composite (items 6 and 9). Because this study used a single-group design without a control group or follow-up, these results should be considered preliminary; controlled studies with longer follow-up are needed before concluding that this education model is broadly effective.

AUTHOR CONTRIBUTION

SS and MAB contributed to conceptualization, study design, and critical revision of the manuscript for important intellectual content, and provided overall supervision. NWPA contributed to conceptualization, study design, formal statistical analysis,

interpretation of results, drafting of the manuscript, and served as corresponding author. EEY, WP, SHR, HN, LA, and RR contributed to supervision of the educational intervention, critical review of the educational content for clinical accuracy, and critical revision of the manuscript. DPA, ND, MDY, YPM, and LRL contributed to data collection, development of the leaflet and educational video, administration of the pretest and posttest questionnaires, and preliminary data management. All authors read, critically revised, and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

CONFLICT OF INTEREST

The authors declare that the study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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