



Effectiveness of Theory of Planned Behavior-Based Health Education on Postpartum Depression Prevention Behaviors among Postpartum Mothers

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ABSTRACT

Postpartum depression is a mental health disorder that negatively affects mothers, infants, and families. Health education based on the Theory of Planned Behavior (TPB) may improve preventive behaviors by addressing attitudes, subjective norms, perceived behavioral control, and intentions. This study evaluated the effectiveness of TPB-based health education in improving postpartum depression prevention behaviors among mothers in Badung Regency, Bali. A quasi-experimental study employed a non-equivalent control group design involving 100 postpartum mothers on days 0–7 after childbirth, with 50 participants each in the intervention and control groups. Participants were selected using simple random sampling. The intervention group received TPB-based health education, while the control group received standard health education. Sessions lasted one hour weekly for six weeks. Data were collected using questionnaires before and after the intervention and analyzed descriptively and inferentially. The intervention significantly improved knowledge, attitudes, subjective norms, perceived behavioral control, intentions, and preventive behaviors related to postpartum depression ($p < 0.001$). A significant difference in postpartum depression levels was also observed between the groups after intervention ($p < 0.001$), indicating reduced depressive symptoms. These findings demonstrate that TPB-based health education effectively improves psychological and behavioral determinants of postpartum depression prevention. Integrating this approach into postpartum care may strengthen preventive practices and support maternal mental health.

Keywords: Postpartum Depression, Postpartum, Theory of Planned Behavior, Health Education.

ABSTRAK

Depresi postpartum merupakan gangguan kesehatan mental yang berdampak negatif terhadap ibu, bayi, dan keluarga. Pendidikan kesehatan berbasis Theory of Planned Behavior (TPB) berpotensi meningkatkan perilaku pencegahan melalui penguatan sikap, norma subjektif, kontrol perilaku yang dipersepsikan, dan niat. Penelitian ini bertujuan mengevaluasi efektivitas pendidikan kesehatan berbasis TPB dalam meningkatkan perilaku pencegahan depresi postpartum pada ibu nifas di Kabupaten Badung, Bali. Penelitian menggunakan desain kuasi-eksperimental dengan kelompok kontrol nonekuivalen, melibatkan 100 ibu nifas hari ke-0–7 setelah persalinan, masing-masing 50 responden pada kelompok intervensi dan kontrol. Sampel dipilih menggunakan teknik acak sederhana. Kelompok intervensi menerima pendidikan kesehatan berbasis TPB, sedangkan kelompok kontrol menerima pendidikan kesehatan standar. Intervensi diberikan selama satu jam setiap minggu selama enam minggu. Data dikumpulkan menggunakan kuesioner sebelum dan sesudah intervensi, kemudian dianalisis secara deskriptif dan inferensial. Intervensi secara signifikan meningkatkan pengetahuan, sikap, norma subjektif, kontrol perilaku yang dipersepsikan, niat, dan perilaku pencegahan depresi postpartum ($p < 0,001$). Perbedaan signifikan tingkat depresi postpartum juga ditemukan antara kedua kelompok setelah intervensi ($p < 0,001$), yang menunjukkan penurunan gejala depresi. Temuan ini menunjukkan bahwa pendidikan kesehatan berbasis TPB efektif meningkatkan determinan psikologis dan perilaku dalam pencegahan depresi postpartum. Integrasi pendekatan ini dalam pelayanan nifas berpotensi memperkuat praktik pencegahan dan mendukung kesehatan mental ibu.

Kata Kunci: Depresi Pascapersalinan, Pascapersalinan, Teori Perilaku Terencana, Pendidikan Kesehatan.

INTRODUCTION

Postpartum depression is a mental health disorder that occurs in mothers after childbirth, characterized by feelings of deep sadness, anxiety, and other emotional disturbances (Rupanagunta et al., 2023). A literature review indicates that the global prevalence of postpartum depression is 13%, and the incidence is quite high and varies in Asian countries, ranging from 26-85%, while in Indonesia it ranges from 50-70% (Anggaraini & Setiyowati, 2024; Amandya et al., 2021). A survey conducted in Bali Province in 2019 showed that the prevalence of postpartum depression symptoms among mothers in Denpasar City was 25.4% of 67 respondents (Lindayani & Marhaeni, 2019). Meanwhile, in Badung Regency, 33.3% of mothers experienced symptoms of postpartum depression ranging from mild to moderate (Udayani et al., 2023).

Postpartum depression has a negative impact on mothers, including reducing their quality of life, increasing the risk of mental disorders, and reducing their ability to care for themselves and their babies (Eskitzis et al., 2025). The impact on babies can cause delays in emotional and cognitive development. In addition, negative impacts are also felt by the family, such as increased stress in the household, the emergence of conflicts with partners or other family members, and disruption of the role and function of the family as a whole (Veri & Lajuna, 2024; Zeleke et al., 2021).

Risk factors for postpartum depression can be divided into two categories: biological genetics and psychosocial factors (Salimian et al., 2024). Biological genetics include neurobiological factors, epigenetic factors, inflammatory mediators, and neuroendocrine hormones. Psychosocial factors include a history of depression, life stress, social support, economic and cultural status, low self-efficacy, and a lack of maternal preparedness for the postpartum phase due to a lack of maternal knowledge (Norazman & Lee, 2024; Sendas & Freitas, 2024; Moreira et al., 2023).

Research highlights the importance of providing health education to postpartum mothers to prevent postpartum depression. A lack of understanding about postpartum conditions can lead to delays in recognizing symptoms and seeking appropriate care. Through appropriate education, postpartum mothers can understand the risk factors, early signs of postpartum depression, and steps to prevent it. Education can also increase mothers' confidence in navigating emotional changes after childbirth and encourage them to more actively seek help and support from family and healthcare professionals (Unno et al., 2023; Shimpuku et al., 2022; Sabry Shehta et al., 2023; Abd et al., 2023; Adams et al., 2023; Syamson, 2023).

Health education to prevent postpartum depression can use an approach based on the Theory of Planned Behavior (TPB). This theory explains that a person's intention to perform a behavior is influenced by three main factors: attitude, subjective norm, and perceived behavioral control. Health education using TPB enables mothers to develop better coping strategies, allowing them to face the postpartum period more calmly and effectively (Saad et al., 2023). In the context of preventing postpartum depression, TPB-based education can help postpartum mothers engage in depression-preventing behaviors by developing positive attitudes during the postpartum period, increasing social support from husbands, family, and healthcare providers through subjective norms, and strengthening mothers' confidence in controlling risk factors contributing to postpartum depression. These preventive behaviors will reduce the level of depression experienced by mothers (Ashifa et al., 2024).

These results are consistent with the findings of (Khademi et al., 2023), which examined the effectiveness of TPB-based education in preventing postpartum psychological disorders and found that this type of intervention significantly improved the intention and behavior components of mental health among new mothers in Iran. Research has shown that TPB-based interventions can significantly improve attitudes, subjective norms, perceived behavioral control, and intentions, leading to improved safety behaviors (Jafaralilou, 2019).

Therefore, education should include information on the risk factors and symptoms of postpartum depression, the negative impact of postpartum depression on the mother, baby, and family, the benefits of preventative measures such as stress management, physical activity, and maintaining emotional balance, as well as relaxation techniques and coping strategies to address postpartum anxiety. Unlike previous studies, which may have focused only on standard health education, Theory of Planned Behavior (TPB) enables a more systematic and comprehensive intervention by identifying the key constructs that influence mothers' behavior in preventing

postpartum depression. By increasing mothers' understanding of the importance of preventing postpartum depression, mothers will have a more positive attitude and intention to undertake preventive behavioral efforts (Adams et al., 2023; Fonseca et al., 2019). This research is very important because research related to preventing postpartum depression is still limited. The purpose of this study was to evaluate the effectiveness of TPB-based health education on behaviors to prevent postpartum depression among postpartum mothers in Badung Regency, Bali.

RESEARCH METHODS

The research method used a quasi-experimental non-equivalent control group design. The sample in this study was postpartum mothers between days 0 and 7 postpartum. The number of subjects in this study was calculated using the comparison formula for two independent means with the assumption that the variance is the same and the number of samples in each group is balanced. The sample size was calculated using the formula :

$$n1 = n2 = \frac{2\sigma^2(Z_{1-\alpha} + Z_{1-\beta})^2}{(\mu_1 - \mu_2)^2}$$

From the calculations using the formula above, the sample size obtained was 50 postpartum mothers in the control group and 50 in the intervention group. The sampling technique used in this study was simple random sampling. The criteria for sample selection consisted of inclusion criteria, which included: 1) postpartum women with no history of mental illness, 2) postpartum women who could communicate well both verbally and in writing and understood Indonesian, and 3) postpartum women who were willing to participate as respondents. The exclusion criteria for this study were postpartum women with a history of postpartum complications.

The researchers used standardized questionnaires. The first step involves administering a pre-test to the control group and the treatment group. Once the pre-test has been administered, the next step is to provide the treatment group with a TPB-based health education intervention and the control group with standard health education. A post-test is administered after the intervention.

The treatment group received health education using a module developed by the research team based on the TPB. In contrast, the control group received standard health education. The intervention was conducted once a week for 6 weeks. Data were collected through pre- and post-intervention questionnaires, followed by descriptive and inferential analyses. This study has received ethical approval from the Bina Usada Bali Health Ethics Commission under No. 266/EA/KEPK-BUB-2025.

RESULTS

Respondent characteristics were analyzed based on age, education level, and occupation. These characteristics are important for understanding individual backgrounds that could potentially influence the acceptance and effectiveness of health education based on the Theory of Planned Behavior (TPB). Data were obtained from 100 postpartum mothers, consisting of 50 respondents in the intervention group and 50 respondents in the control group. The distribution of characteristics shows variations in age, education level, and occupation between the two groups.

Table 1. Demographic Characteristic of Subject.

Variable	Groups		p-value
	Control n=50	Intervention n=50	
Age			
Mean±SD	27.88±3.83	28.18±2.80	
Median	28.0	30.0	0.257*
Range	21-35	21-35	
Occupation			
Housewives	25 (50.0%)	27 (54.0%)	0.689**

Employee	25 (50.0%)	23 (46.0%)
Total	50 (100.0%)	50 (100.0%)
Education		
Primary	12 (24.0%)	13 (26.0%)
secondary	12 (24.0%)	16 (32.0%)
Junior High School	15 (30.0%)	10 (20.0%)
Associate degree	11 (22.0%)	11 (22.0%)
Total	50 (100.0%)	50 (100.0%)

0.657**

Based on Table 1 regarding the characteristics of respondents, it is known that the average age of postpartum mothers in the control group was 27.88 years (SD ± 3.83), while in the intervention group it was 28.18 years (SD ± 2.80), with the same age range of 21 to 35 years and there was no statistically significant difference ($p = 0.257$). The distribution of occupations showed that the majority of respondents in both groups were housewives, 50% in the control group and 54% in the intervention group, with a p-value of 0.689 indicating no significant difference. In terms of education, the majority of respondents had a primary to secondary education background, with a balanced proportion between the two groups, and there was no statistically significant difference ($p = 0.657$). This indicates that the basic characteristics between the control and intervention groups were relatively homogeneous, thus supporting the validity of the comparison of the effects of the TPB-based health education intervention on the two groups

Table 2. The Effect of Health Education Based on Planned Behavior (TPB) Theory on knowledge, attitudes, subjective norms, perceived behavioral control, intentions and behaviors to prevent postpartum depression in postpartum mothers in Badung Regency, Bali.

Variable	Group		p-value
	Control n=50	Intervention n=50	
Knowledge pre			
Mean $\pm$ SD	4.48 $\pm$ 1.85	4.44 $\pm$ 1.71	0.950*
Median	4.50	4.0	
Range	2-7	2-7	
Knowledge post			
Mean $\pm$ SD	6.94 $\pm$ 1.51	8.12 $\pm$ 0.77	0.000*
Median	7.0	8.0	
Range	4-9	7-9	
Delta Knowledge			
Mean $\pm$ SD	2.46 $\pm$ 1.78	3.68 $\pm$ 1.85	0.002*
Median	2.0	4.0	
Range	0-7	0-7	
Attitude pre			
Mean $\pm$ SD	7.44 $\pm$ 2.13	7.98 $\pm$ 2.53	0.227*
Median	7.0	8.0	
Range	4-12	4-12	
Attitude Post			
Mean $\pm$ SD	10.40 $\pm$ 1.94	12.96 $\pm$ 2.11	0.000*
Median	10.50	13.0	
Range	7-15	10-16	
Attitude Delta			
Mean $\pm$ SD	2.96 $\pm$ 2.13	4.99 $\pm$ 3.0	0.000*
Median	3.0	5.0	
Range	0-8	2-12	
Subjective Norm pre			
Mean $\pm$ SD	8.56 $\pm$ 1.75	8.72 $\pm$ 2.21	0.856*
Median	9.0	8.0	
Range	8-12	6-12	

Subjective Norm post			
Mean±SD	12.18±2.0	16.22±2.43	0.000*
Median	12.0	16.0	
Range	8-15	12-20	
Subjective Norm delta			
Mean±SD	3.62±1.98	7.50±3.01	0.000*
Median	3.0	7.50	
Range	0-9	1-14	
Perceived Behavioral Control pre			
Mean±SD	9.08±1.98	9.58±1.89	0.262*
Median	9.0	9.0	
Range	6-12	6-12	
Perceived Behavioral Control Post			
Mean±SD	12.06±1.98	15.04±2.72	0.000*
Median	12.0	15.0	
Range	9-16	9-20	
Perceived Behavioral Control Delta			
Mean±SD	2.99±2.92	6.46±3.20	0.000**
Median	3.0	6.50	
Range	-3 – 9	2-14	
Intention pre			
Mean±SD	9.44±2.13	8.64±2.10	0.067*
Median	10.0	9.0	
Range	6-12	6-12	
Intention post			
Mean±SD	12.46±1.90	14.78±2.95	0.000**
Median	12.0	15.0	
Range	9-16	9-20	
Intention Delta			
Mean±SD	3.02±2.97	6.14±3.99	0.000**
Median	3.0	7.0	
Range	-3-10	3-14	
Postpartum Depression Prevention Behavior Pre			
Mean±SD	35.78±11.90	37.24±10.06	0.398*
Median	34.0	36.0	
Range	19-54	20-54	
Postpartum Depression Prevention Behavior Post			
Mean±SD	66.04±8.11	80.98	0.000*
Median	64.50	81.50	
Range	54-80	72-90	
Postpartum Depression Prevention Behavior Delta			
Mean±SD	30.26±15.25	43.74±10.44	0.000**
Median	30.0	44.0	
Range	2-59	21-61	

Table 2 shows that before the intervention, there were no significant differences between the control and intervention groups in all measured variables, including knowledge, attitudes, subjective norms, perceived behavioral control, intentions, and postpartum depression prevention behaviors ($p>0.05$). This indicates that both groups had equivalent baseline characteristics and psychosocial conditions before treatment. After six weeks of TPB-based education, the intervention group experienced statistically significant improvements in all domains. Knowledge, a baseline cognitive variable, increased from a mean of 4.44 (± 1.71) to 8.12 (± 0.77) in the intervention group, compared to the control group, which only increased to 6.94 (± 1.51), with a p-value of 0.000. This improvement indicates that the educational materials

provided improved mothers' understanding of postpartum depression, including its symptoms, risks, and prevention.

Regarding attitude, there was a significant improvement in the intervention group, with an average delta of 4.99 points, higher than the control group (2.96 points). This indicates that education not only increased knowledge but also successfully shaped mothers' positive attitudes toward the importance of preventing postpartum depression, a key foundation of TPB theory for shaping behavioral intentions.

The subjective norm variable also showed a substantial increase, from a mean of 8.72 to 16.22 (delta 7.5), indicating that the education successfully increased mothers' perceptions that their social environment (husband, family, and healthcare workers) supports preventive behavior. This effect is important because subjective norms play a significant role in motivating mothers to take actions consistent with social expectations.

Furthermore, the perceived behavioral control score increased from 9.58 to 15.04, a difference of 6.46, indicating increased maternal confidence in their ability to manage stress and implement preventive strategies. This component is important because, in the TPB, perceived self-efficacy is a strong predictor of actual behavior.

Mothers' intention to take preventive measures also increased significantly, from an average of 8.64 to 14.78 in the intervention group (delta 6.14), compared to the control group, which only achieved a delta of 3.02. This increase indicates that education not only addresses cognitive and affective aspects but also significantly influences motivational aspects.

Most significantly, the increase occurred in actual behaviors related to postpartum depression prevention, which rose from 37.24 to 80.98 (delta 43.74) in the intervention group. This indicates that the intervention was truly effective in changing postpartum mothers' actual practices in caring for their emotional well-being. The highest score reached 90 points, indicating that some mothers were very actively implementing the strategies taught.

Table 3. The Effect of Health Education Based on Planned Behavior (TPB) Theory on Postpartum Depression in Postpartum Mothers in Badung Regency, Bali.

Score EPDS	Group		p-value
	Control n=50	Intervention n=50	
Mean±SD	9.98±2.59	3.52±1.69	0.000*
Median	10.0	4.0	
Range	6-14	1-6	

Table 3 shows a statistically significant difference in postpartum depression levels between the control and intervention groups after receiving health education based on the Theory of Planned Behavior (TPB). The average EPDS (Edinburgh Postnatal Depression Scale) score in the control group was 9.98 (SD ±2.59), while in the intervention group it was only 3.52 (SD ±1.69), with a p value of 0.000. This difference indicates the effectiveness of the intervention in reducing postpartum depression symptoms in postpartum mothers.

Table 4. The Effectiveness of Health Education Based on Planned Behavior (TPB) Theory on Postpartum Depression Prevention Behavior in Postpartum Mothers in Badung Regency, Bali.

Variable	p-value	R Squared	Adjusted R Squared
Delta Knowledge	0.001	0.013	0.093
Delta Attitude	0.000	0.133	0.124
Delta Subjective Norm	0.000	0.370	0.364
Delta Perceived Behavioral Control	0.000	0.240	0.240
Delta zintention	0.000	0.167	0.158
Postpartum Depression Prevention Behavior	0.000	0.213	0.205
Postpartum Depression	0.000	0.689	0.686

Table 4 shows that health education based on the Theory of Planned Behavior (TPB) significantly impacted various psychological and behavioral variables in postpartum mothers, contributing to the prevention of postpartum depression. All variables had p-values <0.05,

indicating that changes in knowledge, attitudes, subjective norms, perceived behavioral control, and intentions were statistically significant in influencing maternal behavior and emotional status after delivery. This reflects the success of the theory-based educational approach in producing measurable changes.

The adjusted R-squared value shows that the highest contribution to postpartum depression prevention came from changes in subjective norms (adjusted $R^2 = 0.364$) and perceived behavioral control (adjusted $R^2 = 0.240$). This suggests that the mother's perceived social support from her environment, as well as her self-confidence in her ability to manage stress, play a significant role in shaping preventive behaviors. This aspect is crucial in midwifery practice because it confirms the powerful role of community-based psychosocial interventions in preventing postpartum mental disorders.

Interestingly, the postpartum depression variable itself had an adjusted R^2 value of 0.686, meaning that nearly 69% of the variation in postpartum depression scores could be explained by this model. This indicates that the components of the TPB are highly relevant in understanding and preventing postpartum depression. This means that interventions targeting maternal knowledge, attitudes, social support, and self-efficacy have been scientifically proven to be effective in influencing maternal mental health.

DISCUSSION

The Effect of Health Education Based on the Planned Behavior Theory (TPB) on Postpartum Depression Prevention Behavior in Postpartum Women in Badung Regency, Bali

The results of this study indicate that health education based on the Planned Behavior Theory (TPB) can produce meaningful changes in various psychosocial domains of postpartum women. Significant improvements occurred in the intervention group in terms of knowledge, attitudes, subjective norms, perceived behavioral control, intentions, and especially actual behaviors related to postpartum depression prevention. The increase in scores in the intervention group was consistently higher than in the control group and was statistically significant ($p < 0.001$). Ajzen (1991) developed the Planned Behavior Theory, which explains that intentions significantly influence behavioral change. The three main components of intention are attitudes toward behavior, subjective norms, and perceived behavioral control. In this study, changes in these three constructs formed a strong foundation for postpartum women's intentions to take action to prevent postpartum depression. Changes in actual behavior then followed.

The TPB-based health education intervention has successfully increased knowledge about postpartum psychological disorders. For example, a study conducted in Jempong Baru Village showed that pregnant women had significantly increased knowledge about postpartum psychological disorders after receiving health education, enabling them to self-identify symptoms and prevent more serious disorders (Pratiwi et al., 2024).

These results align with findings from (Khalajinia et al., 2021) that examined the effectiveness of TPB-based education on preventing postpartum psychological disorders and found that this intervention significantly improved the intention and behavior components of mental health in new mothers in Iran. This theory has been effectively applied in educational programs to modify behavior, such as improving safety practices among workers. Research has shown that TPB-based interventions can significantly improve attitudes, subjective norms, perceived behavioral control, and intentions, leading to improved safety behaviors (Khalajinia et al., 2021).

In this study, increased knowledge was one of the initial outcomes indicating the success of the intervention. Knowledge serves as the foundation for developing positive attitudes toward postpartum depression prevention. A systematic review found a positive association between mental health literacy and help-seeking behavior, suggesting that higher literacy levels lead to increased help-seeking behaviors (Khalajinia et al., 2021). The education program was conducted over six weeks using a combination of methods: face-to-face, digital media (WhatsApp and Instagram), and family involvement. This strategy was designed to strengthen subjective norms and increase social support. In TPB theory, subjective norms are highly dependent on how individuals perceive the views of those closest to them regarding a behavior. Therefore, family support is a critical aspect in strengthening mothers' commitment to prevention.

Educational interventions that incorporate subjective norms have been shown to effectively increase participation in health-related behaviors, such as Pap smear tests and group parenting education, by aligning individual intentions with perceived social expectations (Khalajinia et al., 2021).

Research by (Khademi et al., 2023) found that family social support is a significant predictor of postpartum quality of life (PQOL). It improves physical, mental, and parenting performance, helping women navigate the postpartum period more effectively. These findings confirm that family involvement is not merely complementary, but rather central to TPB-based interventions. Perceived behavioral control significantly increased in the TPB intervention group for postpartum mothers. This indicates increased maternal self-efficacy in their ability to implement coping strategies and prevent postpartum depression. A meta-analysis by (Hagger et al., 2022) confirmed that perceived behavioral control moderates the intention-behavior relationship in health behaviors, suggesting that higher perceived behavioral control may lead to better implementation of health-related intentions, such as coping strategies for postpartum depression.

However, the control group also experienced an increase, albeit at a lower rate. The researchers hypothesize that this phenomenon is because the control group continued to receive standard education from the community health center and may have also been indirectly exposed to similar information through social interactions or media about preventing postpartum depression. Dissemination of information among postpartum mothers can occur, even without formal intervention. The control group often received conventional postpartum care, which includes basic health education. This standard care can still provide valuable information that helps reduce postpartum depression, although it is less effective than targeted interventions (Di et al., 2024).

Furthermore, regular visits to health facilities provide postpartum mothers with access to health services and information, which can improve their knowledge and attitudes toward postpartum care. For example, a study in North Sumatra found that postpartum visits were significantly associated with maternal knowledge, suggesting that these visits play a crucial role in improving maternal health behaviors (Askinah & Simamora, 2023).

The researchers acknowledged several challenges in implementing the intervention, including mothers' limited time to attend full educational sessions, and the physical exhaustion experienced by postpartum mothers themselves. Furthermore, not all mothers are responsive to digital media, especially those with low education or unfamiliar with using WhatsApp/Instagram as learning tools. There is potential for measurement bias due to self-completion of the questionnaire, where respondents may have socially biased responses (wanting to appear good), particularly in the attitudes and behavior domains. Furthermore, because the study was conducted in only two community health centers in Badung Regency, generalizing the results to all postpartum mothers in Indonesia requires further, larger-scale research.

Nevertheless, the main strength of this study lies in the theoretical and structured intervention design and comprehensive measurement of variables aligned with the components of the SDGs. All variables, from changes in knowledge and attitude formation to improvements in subjective norms, to the emergence of intentions and behavioral changes in postpartum prevention, can be measured and analyzed systematically. Theory-based education, such as the SDGs, has been shown to be more effective than conventional education because it encompasses affective, cognitive, and conative aspects. This research makes an important contribution to community midwifery practice and maternal health promotion with a more scientific and targeted approach, while strengthening the role of midwives in theory-based promotive-preventive efforts.

The researchers' assumption in designing this intervention was that behavioral change cannot be achieved simply by providing information, but must be built through changes in the mother's internal perceptions (attitude and self-efficacy) and strengthening external support (subjective norms). This intervention proved successful in significantly shaping these components. Integrating the TPB approach into postpartum education programs in primary care, particularly by midwives, improves mothers' preparedness in facing the risk of mental disorders such as postpartum depression. This also emphasizes that preventive efforts must be theory-based and community-based to be more effective and sustainable.

The Effect of Health Education Based on Planned Behavior Theory (TPB) on Postpartum Depression in Postpartum Women in Badung Regency, Bali

The results showed that postpartum women who received health education based on Planned Behavior Theory (TPB) had significantly lower postpartum depression scores (EPDS) compared to the control group. The mean EPDS score in the intervention group was 3.52 (SD ± 1.69) compared to 9.98 (SD ± 2.59) in the control group, with a p-value of 0.000. This difference indicates that the TPB intervention is not only effective in improving cognitive aspects and preventive behaviors but also has a direct impact on reducing the risk of postpartum depression.

According to the Edinburgh Postnatal Depression Scale (EPDS) scoring guidelines, a score <10 is considered an indication of low risk for postpartum depression, while a score ≥ 10 indicates possible depression requiring further evaluation or professional intervention. Thus, the majority of mothers in the intervention group were safe from postpartum depression, while most in the control group remained at risk for mild to moderate depression (range 6–14) (Angel & Satyanarayan, 2024; Kahveci et al., 2021).

The Theory of Planned Behavior explains that behavioral change occurs when individuals have positive attitudes toward behavior, perceive supportive subjective norms, and have high behavioral control (Ajzen, 1991). Educational interventions based on the TPB have been shown to significantly improve attitudes toward health behaviors, as evidenced by studies on preconception care and childbearing intentions (Aziz et al., 2022; Kariman et al., 2020). In this study, TPB-based education strengthened these three aspects, ultimately shaping intentions and resulting in protective behaviors against postpartum stress, a crucial factor in preventing postpartum depression.

These findings are reinforced by the fact that psychoeducational interventions based on Watson's model significantly reduced the risk of postpartum depression and increased levels of social support, highlighting the importance of a caring and supportive educational framework in addressing postpartum depression (Dol et al., 2025). The reduction in postpartum depression scores is also inseparable from an educational approach involving digital media (WhatsApp and Instagram), group discussions, and family involvement to reinforce subjective norms. This strategy allows mothers to feel more emotionally and socially supported, as research (Petek & Demir, 2024) indicates that social support is a key protective factor in reducing the risk of postpartum depression.

This study was conducted in two groups, with the intervention group receiving six educational sessions over six weeks, covering topics related to postpartum depression, stress management, social support, and strengthening intentions and self-efficacy. The educational process was delivered in simple language and with a participatory approach, allowing mothers to actively reflect and share their experiences. A study by (Dol et al., 2025) examined the long-term impact of postpartum interventions and found that initial improvements in self-efficacy and anxiety were not maintained at six months postpartum. This suggests that while short-term interventions can be effective, their long-term sustainability may require additional support or an extended intervention period.

During implementation, a major challenge faced was mothers' limited time to attend sessions, particularly those with babies with special needs. Furthermore, not all mothers responded to digital approaches, particularly those with low education or living in areas with limited signal reception. However, the involvement of families and village midwives was key to the success of this intervention. Researchers also acknowledged limitations, one of which was the potential for bias in completing the self-reported EPDS questionnaire. Some mothers may have felt uncomfortable disclosing their emotional state honestly. To mitigate this bias, the questionnaire was administered under the guidance of trained and non-discriminatory healthcare professionals.

Meanwhile, the control group also showed EPDS scores that were still in the mild category (mean 9.98), with some even having mild scores. The researchers hypothesized that this phenomenon was due to the mothers' natural interaction with routine postpartum healthcare services, which provided basic information about mental recovery. Furthermore, information diffusion from mothers who attended education sessions to other mothers in the community may also occur informally. Community-based interventions, such as peer support, have been shown

to reduce depressive symptoms and improve quality of life, suggesting that informal support networks can be beneficial (Němcová et al., 2024).

These findings are also relevant to studies suggesting that increasing mental health literacy through education can reduce the risk of postpartum depression. Mothers who understand their emotional state tend to be more proactive in seeking support and taking preventive measures. In a study of pregnant women with depressive symptoms, a significant correlation was found between mental health knowledge and depression scores. This suggests that increased knowledge can lead to better management of depressive symptoms, highlighting the importance of mental health education in reducing the risk of PPD (Latifah et al., 2025).

This research reinforces the importance of a theoretical approach in community midwifery practice. Interventions focused solely on information delivery may not be sufficient in preventing postpartum depression. However, the TPB approach, which strengthens affective, social, and self-control aspects, has proven more effective because it targets all psychosocial dimensions of postpartum mothers. Based on the results obtained, it can be concluded that TPB-based health education can be an effective strategy in significantly reducing symptoms of postpartum depression. This education is not only an informative intervention but also a transformational one, encouraging holistic changes in mothers' perspectives, emotional responses, and behaviors. A behavioral theory-based approach is highly relevant in promotive-preventive midwifery efforts. Through TPB, mothers are equipped not only with knowledge but also with the skills and confidence to manage themselves more adaptively.

TPB-based health education has been shown not only to improve preventive behavior scores but also significantly reduce the risk of postpartum depression. This opens up ample opportunity for midwives and community health workers to develop innovative services based on behavioral theory that are sustainable and have a broad impact.

Effectiveness of Planned Behavior (TPB) Theory-Based Health Education on Postpartum Depression Prevention Behaviors in Postpartum Women in Badung Regency, Bali

The results of the multivariate analysis presented in Table 4 indicate that all measured variables, from knowledge to postpartum depression, changed significantly. The results showed a p-value <0.05 , indicating that TPB-based health education had a significant impact on postpartum depression prevention behaviors in postpartum women. Adjusted R-squared values ranged from 0.093 to 0.686, indicating the significant contribution of each variable to changes in maternal behavior and emotional state.

One of the most striking findings was for the postpartum depression variable, with an adjusted R^2 of 0.686, meaning that 68.6% of the variation in postpartum depression scores could be explained by a model integrating TPB components. This is a very robust finding, both statistically and clinically, confirming that a behavior-based education approach can significantly influence complex psychological aspects such as postpartum depression. Previous studies have shown that cognitive behavioral therapy (CBT) and psychoeducation have been effective in reducing depressive symptoms and improving maternal quality of life, as demonstrated in systematic reviews and controlled studies (Helen et al., 2025).

Subjective norms had the highest contribution to preventive behavior, with an adjusted R^2 of 0.364. This suggests that mothers' perceptions of social support, particularly from partners, family, and healthcare professionals, play a significant role in encouraging intentions and concrete actions to prevent postpartum depression. This finding aligns with evidence that social support is a key protective factor in mental health literacy and depression prevention in postpartum mothers. A meta-analysis revealed that strong social support significantly reduces the risk of postpartum depression. Mothers without adequate social support were more likely to experience PPD, with an odds ratio of 3.12, indicating a threefold increased risk compared to those with strong support (Nugrahaeni et al., 2022).

Perceived behavioral control ranked second (adjusted R^2 of 0.240), indicating that mothers' confidence in their own ability to manage stress, follow health advice, and implement coping techniques significantly influences prevention. This is consistent with Ajzen's (1991) theory, which states that perceived behavioral control is a direct predictor of actual action. Attitude and intention variables also showed significant contributions to behavioral change, with adjusted R^2 of 0.124 and 0.158, respectively. This illustrates that a positive attitude toward postpartum

depression prevention and a strong intention to do so play a significant role, although not as significant as subjective norms or self-control. The education provided successfully influenced the mother's affective aspects, creating emotional awareness and readiness. Attitudes and intentions are important components of the Theory of Planned Behavior (TPB), which states that these factors, along with subjective norms and perceived behavioral control, shape behavioral intentions and actions. In the context of postpartum women, positive attitudes and strong intentions to prevent PPD are associated with higher engagement in preventive behaviors, although they have a lesser impact than subjective norms and self-control (Kariman et al., 2020)(Putri et al., 2021).

Knowledge, although a foundation for change, had the lowest adjusted R^2 value (0.093), indicating that, while important, knowledge alone is not sufficient to drive behavioral change in postpartum depression prevention. This aligns with the TPB principle, which states that behavior is not solely influenced by knowledge, but rather by intention and perceived control over actions. Knowledge about postpartum depression is crucial but not sufficient by itself to drive behavioral change. Research has shown that while increasing knowledge about PPD can increase awareness, it does not always translate into behavioral change unless accompanied by other factors such as intention and perceived control (Wang et al., 2023).

The study was implemented through a six-week educational intervention that included face-to-face sessions, digital educational media (WhatsApp, Instagram), and support from families and village midwives. Each session was designed to target one or more components of the TPB. For example, the first session emphasized increasing knowledge and awareness, while subsequent sessions focused on building self-confidence and supportive social norms. It was crucial for these sessions to engage participants directly, allowing for interactive discussions and immediate feedback. In a study on childbearing intentions, face-to-face sessions significantly improved knowledge and attitudes, key components of the TPB (Kariman et al., 2020).

Challenges and limitations of this study include the lack of long-term follow-up to assess the sustainability of behavior changes, as well as the potential for bias in self-report questionnaires. However, the use of a quasi-experimental design with a control group and multivariate statistical tests strengthens the internal validity of the results. It is interesting to note that, despite not receiving direct intervention, the control group also experienced a slight increase in behavior scores and a decrease in depression. The researchers hypothesize that this was due to exposure to general education from community health center services, interactions among postpartum mothers in the community, and personal curiosity that led mothers to seek information from other sources.

The TPB education used not only transferred information but also concluded that the TPB-based educational approach is a comprehensive intervention strategy, given that this model systematically shapes preventive behaviors through clear and structured psychosocial mechanisms. This intervention not only changes knowledge but also strengthens internal (attitudes, self-control) and external (social support) aspects of mothers. Therefore, these findings support recommendations to integrate SDG-based education into routine community midwifery care programs, whether through home visits, mothers' classes, or digital maternal and child health services. This model has been shown not only to improve preventive behaviors but also to directly reduce the risk of postpartum depression, a major challenge in maternal health.

CONCLUSION

This study concluded that the baseline characteristics of the control and intervention groups were relatively homogeneous ($p > 0.05$), indicating that both groups were comparable and that the internal validity of the study was maintained. The Theory of Planned Behavior (TPB)-based health education intervention demonstrated a statistically significant and clinically meaningful effect on improving knowledge, attitudes, subjective norms, perceived behavioral control, intentions, and preventive behaviors related to postpartum depression among postpartum women ($p < 0.001$). Furthermore, there was a statistically significant difference in the level of postpartum depression between the control and intervention groups after the implementation of the TPB-based education ($p < 0.001$), confirming the effectiveness of the intervention in reducing depressive symptoms. Overall, health education grounded in the TPB

framework was proven to be significantly effective in influencing key psychological and behavioral determinants associated with postpartum depression prevention ($p < 0.05$).

It is recommended that the TPB framework be utilized as a foundational model in developing educational modules in other areas of midwifery care, such as postpartum complication prevention, exclusive breastfeeding promotion, and postpartum family planning. Future research should explore the interaction between TPB components and maternal cultural and socioeconomic factors to develop more contextually appropriate interventions. Behavioral models in maternal health are also encouraged to integrate mental and emotional dimensions as significant predictors of preventive behavior, and further studies may consider hybrid approaches combining TPB with psychological constructs such as self-compassion, coping strategies, or resilience. In practical settings, village midwives and community health centers (Puskesmas) can establish WhatsApp support groups for postpartum and pregnant women to provide continuous education and psychosocial support through weekly infographics, short videos, or TPB-based messages. A dedicated section on "Preventing Postpartum Depression" should be incorporated into the Maternal and Child Health (KIA) Handbook using simple language and a practical table outlining emotional warning signs, recommended actions, and contact information. Additionally, midwives and community health workers should be trained to administer the Edinburgh Postnatal Depression Scale (EPDS) during home visits at the second and sixth weeks postpartum to facilitate early detection and timely intervention.

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