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Original Article

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Effectiveness of the health belief model-based husband empowerment module in enhancing postpartum contraceptive support readiness: a quasi-experimental study

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ABSTRACT

Introduction: Husband involvement is crucial in maternal health, particularly in postpartum contraceptive use. However, many husbands lack awareness, facilitation skills, and appreciation for their role. This study evaluated the effectiveness of a Health Belief Model (HBM)-based Husband Empowerment Module in enhancing husbands' preparedness behaviors for postpartum contraceptive support.

Methods: A quasi-experimental pre-posttest control group design was conducted at two community health centers in Samarinda, Indonesia. Sixty husbands of third-trimester pregnant women were recruited through a combination of sampling, purposive sampling, and random sampling. Purposive sampling was used to choose the treatment group, and random sampling was used to select the participants, who were assigned to the intervention (n=30) and control (n=30) groups. The intervention group received a comprehensive 12-session HBM-based module delivered through antenatal care visits, home visits, group discussions, and WhatsApp support over three months. Preparedness behavior was measured using validated questionnaires assessing awareness, facilitation ability, and appreciation. Nonparametric statistical analyses were employed.

Results: Post-intervention, the treatment group demonstrated significant improvements across all preparedness dimensions: awareness median scores increased from 9.0 to 11.0 ($p<0.001$), facilitation ability, from 5.0 to 6.0 ($p<0.001$), and appreciation from 4.0 to 5.0 ($p<0.001$), while the control group showed no significant changes (all $p>0.05$). Between-group comparisons revealed substantially higher preparedness in the intervention group with large effect sizes. Notably, 83.3% of intervention participants achieved good facilitation ability compared to 0% at baseline.

Conclusions: The HBM-based Husband Empowerment Module effectively enhanced husbands' preparedness for postpartum contraceptive support, suggesting that structured interventions can improve husband involvement in postpartum care and maternal health outcomes.

Keywords: behavior change, contraceptive decision-making, health intervention, paternal involvement, postpartum support

Introduction

The postpartum period represents a critical phase for maternal and child health, characterized by significant physical, emotional, and psychological adjustments. Effective postpartum care is essential for ensuring the well-being of mothers and infants. Yet, numerous challenges persist, particularly in promoting sustained maternal health behaviors such as postpartum contraceptive use (World Health Organization (WHO), 2022). In Indonesia, like many low- and middle-income countries, maternal mortality and unwanted pregnancies remain significant public health challenges, often

exacerbated by limited male involvement in reproductive health decisions (Utomo and Romadlona, 2021; Rahayu, Romadlona, Utomo, Riznawaty, *et al.*, 2023).

Active husband involvement has been shown to reduce postpartum depression, boost maternal confidence in infant care, and improve overall maternal health behaviors (Rahman *et al.*, 2020). Unfortunately, many husbands lack the knowledge or skills to support their wives during the postpartum period adequately. This contributes to poor maternal and infant health outcomes worldwide, especially in low- and middle-income countries, where cultural norms limit women's autonomous decision-making regarding contraception (Chang *et al.*, 2021; United Nations Children's Fund (UNICEF), 2021; Jeong *et al.*, 2023).

Indonesia's healthcare system operates through a tiered structure, with community health centers (*Puskesmas)* serving as primary healthcare facilities providing maternal and child health services. These *Puskesmas* are strategically positioned to deliver comprehensive reproductive health services, including family planning counseling, where husband involvement becomes crucial for successful contraceptive adoption and sustained use (Ministry of Health, 2020). Despite national family planning programs, cultural barriers often limit husband involvement in reproductive health decisions, creating a disconnect between available services and optimal utilization (Rahayu, Romadlona, Utomo, Aryanty, *et al.*, 2023). Traditional gender roles, religious considerations, and limited male-focused reproductive health education contribute to suboptimal contraceptive uptake and birth spacing practices (Rohmah *et al.*, 2021). The Indonesian healthcare system recognizes the importance of male involvement but lacks structured interventions specifically designed to enhance husband readiness for postpartum contraceptive support within the existing *Puskesmas* framework (Roudsari, Sharifi and Goudarzi, 2023). The WHO estimated that 214 million women in developing countries have an unmet need for modern contraception, and most of them are in the postpartum stage (WHO, 2022). While many programs have attempted to increase maternal awareness of health and family planning, only a few have specifically addressed the role of husbands as active partners in postpartum contraceptive decision-making (Comrie-Thomson *et al.*, 2021).

The Health Belief Model (HBM) provides a comprehensive framework for understanding and influencing health behavior through six core constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (Rosenstock, 1974). The model has been extensively used in maternal health programs, including breastfeeding counseling, antenatal care, and postpartum self-management interventions. The HBM was used to understand and influence health behavior by indicating what people perceive as health-specific dangers, the perceived advantages of acting in some way, perceived barriers, and self-efficacy in modifying behavior (Ghomi et al., 2019). Evidence demonstrates that HBM-based interventions effectively increase knowledge, beliefs, and self-efficacy, leading to positive behavior changes (Mohammadkhah *et al.*, 2025). It has proven effective to integrate the HBM in postpartum education programs to enhance mothers' confidence, bolster health-directed intentions, and improve health behaviors in the postpartum period (Khosravizadeh *et al.*, 2021).

Research consistently shows that active husband participation benefits both newborns and mothers. Programs incorporating postnatal education and support services for couples demonstrate positive impacts on social support and maternal self-efficacy while reducing postpartum stress (Shorey *et al.*, 2019). However, structured interventions explicitly designed to prepare husbands for supporting postpartum contraceptive decisions remain scarce, particularly in resource-limited settings where cultural barriers compound implementation challenges. Building on this evidence base and addressing the identified gap, the Husband Empowerment Module (HEM) was developed based on HBM principles to increase husband attention and involvement in postpartum contraceptive support (Shorey *et al.*, 2019). The module addresses all six HBM constructs: (1) perceived susceptibility through education about unplanned pregnancy risks; (2) perceived severity by emphasizing consequences of inadequate birth spacing; (3) perceived benefits by highlighting the advantages of contraceptive support; (4) perceived barriers by identifying and addressing obstacles to involvement; (5) cues to action through educational materials and discussions; and (6) self-efficacy through skill-building activities and practical exercises. Components of the HBM, such as perceived risk, perceived benefit, self-efficacy, and knowledge, were included in the module to ensure that husbands acquire the knowledge and skills necessary to support their wives in postpartum care effectively (Hu *et al.*, 2020a).

The objective of this study was to evaluate the effectiveness of the HBM-based Husband Empowerment Module in enhancing husband readiness to support postpartum contraceptive use, measured through three dimensions: awareness, facilitation ability, and appreciation.

Materials and Methods

Study Design

The study used a quasi-experimental design with pre- and post-test controls to evaluate how effective the HEM based on the HBM is for enhancing husbands' readiness to support postpartum contraceptive use. Husbands in the intervention group received family planning

education with the HBM-based module. In contrast, those in the control group received standard care offered at *Puskesmas*, having access to the module only after their final assessment. The study was conducted over 12 weeks from March to June 2023, beginning during the third trimester of pregnancy and continuing through the postpartum period at two *Puskesmas* in Samarinda, Indonesia. This timing was strategically designed to align with the critical contraceptive decision-making window, ensuring husbands received empowerment education before delivery and continued support during the immediate postpartum period when contraceptive counseling typically occurs (Lally et al., 2010).

Participants

This study involved husbands of pregnant women receiving care at selected community health centers (*Puskesmas*) in Samarinda. *Puskesmas* Sempaja served as the intervention site, while *Puskesmas* Air Putih functioned as the control site. These two Puskesmas were specifically chosen based on their comparable patient demographics, similar service delivery patterns, geographical separation, and adequate patient volume to ensure sufficient sample recruitment. Inclusion criteria included: (1) husbands with wives in their third trimester of pregnancy who would be followed until postpartum, and (2) the ability to read, write, and communicate effectively in Indonesian. Exclusion criteria included: (1) husbands and/or wives with psychiatric disorders and (2) wives with high-risk pregnancies or emergency obstetric conditions (e.g., cardiovascular disease, cancer, hypertension, diabetes, BMI > 25, or known allergies to contraceptive materials). Participants were considered dropouts if they were unable to complete the intervention before the post-test or withdrew during the intervention.

Sample Size and Sampling

The sample size calculation was based on hypothesis testing for two proportions, considering the expected difference in contraceptive non-use between groups with and without husband support. Using a significance level of 0.05, power of 90%, and estimated proportions of 0.6 for non-contraceptive users without husband support versus 0.4 for those with husband support, the minimum required sample size was calculated as 25 participants per group. To account for a potential 20% dropout during the three-month follow-up period, the sample size was increased to 30 participants per group, resulting in a total sample of 60 husbands.

A combination of purposive and simple random sampling was used. Two community health centers (*Puskesmas*) in Samarinda were purposively selected based on adequate patient volume and geographic separation to minimize potential inter-group communication and contamination between intervention and control groups.

Participant recruitment was conducted through collaboration with *Puskesmas* staff who served as gatekeepers. At each selected health center, eligible participants were first identified from the antenatal care registry by reviewing records of pregnant women in their third trimester whose husbands met the inclusion criteria. A comprehensive list of eligible husbands was compiled, and individual participants were then randomly selected using a computer-generated random number sequence.

The recruitment process involved *Puskesmas* staff initially contacting eligible husbands during their wives' routine antenatal care visits. The research team was then introduced to interested participants, who received detailed information about the study objectives, procedures, benefits, and potential risks. Of the 65 husbands initially approached, 60 agreed to participate, yielding a response rate of 92.3%—the five participants who declined cited time constraints and work commitments as primary reasons. No replacement sampling was conducted for non-respondents, maintaining the integrity of the randomization process. All participants who agreed to participate provided written informed consent before enrollment.

Instruments

The study employed validated instruments to measure the intervention's effectiveness on husbands' readiness behavior for postpartum contraceptive decision-making. The primary independent variable was the Health Belief Model-based Husband Empowerment Module (HEM), an educational intervention structured around four key components: orientation, participation, independence, and collaboration.

The dependent variable, husbands' readiness behavior in contraceptive decision-making after childbirth, was assessed through three comprehensive dimensions using validated questionnaires:

Awareness was measured using a six-item questionnaire adapted from the Contraceptive Knowledge and Attitude Scale developed by Smith and colleagues in 2018, with specific modifications for the Indonesian cultural context. Scores ranged from six to thirty points, with categorization into three levels: low awareness (scores 6-13), moderate awareness (scores 14-21), and high awareness (scores 22-30). Content validity was rigorously established through expert panel review involving five specialists in reproductive health and family planning. The instrument demonstrated strong internal consistency with a Cronbach's alpha coefficient of 0.82, indicating excellent reliability.

Facilitation ability was assessed using a three-item questionnaire developed explicitly for this study based on Health Belief Model constructs. The scoring system ranged from three to fifteen points, categorized as low facilitation ability (scores 3-7), moderate facilitation ability (scores 8-11), and high facilitation ability (scores

12-15). The scale underwent rigorous validation through a pilot study involving twenty participants with similar demographic characteristics to the main study population. Internal consistency was confirmed with a Cronbach's alpha of 0.75, demonstrating acceptable reliability for research purposes.

Appreciation was measured using a three-item questionnaire employing the same scoring range and categorization system as the facilitation ability scale. This instrument was newly explicitly developed for this research, incorporating cultural nuances relevant to Indonesian husbands' attitudes toward contraceptive support. The scale underwent similar validation procedures and demonstrated acceptable internal consistency with a Cronbach's alpha coefficient of 0.73.

Additionally, a comprehensive demographic questionnaire was administered to collect relevant background information, including participants' age, educational level, occupation, socioeconomic status, ethnicity, and appropriate medical history. This information was essential for establishing baseline equivalence between intervention and control groups and identifying potential confounding variables.

All instruments were translated into Bahasa Indonesia and underwent back-translation procedures to ensure linguistic accuracy and cultural appropriateness. Pre-testing was conducted with a separate group of participants to verify comprehension and identify any potential issues with question interpretation or response options.

Intervention

The Health Belief Model-based intervention was designed as a comprehensive 12-session program delivered over 12 weeks through multiple complementary modalities. The intervention systematically integrated all six core constructs of the Health Belief Model to enhance husbands' readiness for postpartum contraceptive support.

The intervention addressed perceived susceptibility by educating participants about the risks associated with unplanned pregnancy and inadequate birth spacing, helping husbands understand their vulnerability to these reproductive health challenges. Perceived severity was emphasized through detailed discussions about the consequences of poor contraceptive support on maternal and family health outcomes, highlighting the profound implications of inadequate family planning involvement. The program extensively covered perceived benefits by demonstrating the advantages of active husband involvement in contraceptive decision-making, including improved maternal health, family well-being, and relationship satisfaction.

Recognizing the importance of addressing obstacles to behavior change, the intervention systematically identified and addressed perceived barriers, including cultural taboos, social expectations, and personal hesitations that might prevent husbands from actively participating in contraceptive decisions. Cues to action were strategically incorporated through comprehensive educational materials, facilitated peer discussions, and structured guidance from healthcare providers, creating multiple triggers for behavior change. Self-efficacy development formed a cornerstone of the intervention through hands-on skill-building activities, interactive role-playing exercises, and progressive confidence-building sessions designed to empower husbands with practical skills and knowledge.

The intervention employed a multifaceted delivery approach that combined individual and group learning modalities. Three antenatal care visits provided face-to-face education during routine prenatal appointments, allowing for personalized discussion and immediate clarification of concerns. Three home visits offered intimate, customized support in participants' familiar environments, enabling culturally sensitive conversations and family-centered discussions. Two group meetings facilitated peer learning and collaborative discussion sessions, allowing participants to share experiences and learn from each other's perspectives. Two WhatsApp-based support sessions provided digital reinforcement and ongoing support, ensuring continuity of engagement between face-to-face sessions. Additionally, comprehensive educational materials in the form of a specially designed pocketbook featuring accessible language and culturally appropriate visual aids served as a continuous reference resource.

The intervention was structured in four distinct phases that built upon each other progressively. The pre-interaction phase involved pre-test administration and a comprehensive introduction to the program objectives and expectations. The socialization phase, spanning weeks one through three, focused on fundamental family planning and contraceptive methods education, establishing a solid knowledge foundation. The externalization phase, conducted during weeks four and five, encouraged active husband participation in contraceptive selection processes, moving from passive learning to active engagement. The combination phase, extending from weeks six through nine, fostered collaborative relationships between husbands, healthcare providers, and wives, emphasizing shared decision-making and mutual support. The final monitoring and evaluation phase included post-test administration and a comprehensive final assessment of behavioral changes and knowledge acquisition.

To ensure intervention consistency and quality, all facilitators underwent a rigorous standardized 16-hour training program that comprehensively covered Health Belief Model principles, detailed session protocols, and effective communication techniques. Implementation fidelity was carefully maintained through multiple quality assurance mechanisms. Standardized session

guides and detailed checklists ensured consistent content delivery across all sessions and facilitators. An audio recording of 20% of randomly selected sessions enabled systematic quality monitoring and adherence assessment. Weekly supervision meetings with facilitators provided ongoing support, addressed implementation challenges, and ensured protocol adherence. Detailed session logs documenting attendance, duration, and content coverage were meticulously maintained to track implementation completeness and identify any deviations from the planned protocol.

The research team acknowledges that formal inter-rater reliability assessments and systematic fidelity scoring were not conducted, which represents a methodological limitation of this study. Future research should incorporate more rigorous fidelity monitoring procedures to strengthen the validity of intervention effects and enable better replication of successful interventions.

Data Collection

Data collection were conducted through a systematic three-phase approach that ensured comprehensive assessment of the intervention's effectiveness while maintaining research integrity and participant safety. The initial phase began with obtaining formal study approval from the Samarinda City Health Office, establishing the necessary administrative foundation for conducting research within the municipal health system. Following administrative clearance, strategic site allocation was implemented whereby the Puskesmas in North Samarinda was designated as the intervention group location. At the same time, the Puskesmas in South Samarinda served as the control group site. This geographic separation was deliberately chosen to minimize potential contamination between study groups and ensure the validity of comparative outcomes. During this preliminary phase, all eligible respondents completed comprehensive pre-test questionnaires that established baseline measurements for subsequent comparison and analysis.

The implementation phase constituted the core period of the study, during which differential treatment protocols were systematically applied to the respective groups. The control group continued to receive standard care according to existing Puskesmas protocols, ensuring ethical treatment while maintaining the comparative framework necessary for scientific evaluation. Concurrently, participants in the intervention group engaged in the comprehensive Health Belief Model-based Husband Empowerment Module program, which incorporated diverse educational methodologies including structured lectures, interactive discussions, experiential role-playing exercises, and guided problem-solving activities. These multifaceted sessions were strategically delivered over 12 weeks, combining both individual and group mentoring approaches to maximize learning outcomes and behavioral change potential.

The concluding phase involved a comprehensive post-intervention assessment, during which all respondents completed detailed post-test questionnaires designed to evaluate changes in spousal preparedness behavior and actual postpartum contraceptive adoption patterns. This final data collection phase was crucial for determining the intervention's effectiveness and provided the empirical foundation for subsequent statistical analysis and interpretation of results. The systematic approach ensured consistent data quality across all participants while maintaining the temporal framework necessary for measuring behavioral change over time.

Data Analysis

Descriptive statistics were used to summarize research variables, including frequency distributions, percentages, means, and standard deviations. Inferential analysis was conducted to assess sample equivalence, normality, intervention effects, and correlations between spousal preparedness behavior and contraceptive success. Independent t-tests and chi-square tests were used to compare baseline characteristics between groups, while the Shapiro-Wilk test was applied to assess data normality. To evaluate intervention effects, paired t-tests or Wilcoxon signed-rank tests were used for within-group comparisons. In contrast, independent t-tests or Mann-Whitney U tests were applied for between-group comparisons, depending on data distribution. Statistical significance was set at $p < 0.05$, and all analyses were conducted using SPSS.

Ethical Considerations

This study adhered to the Declaration of Helsinki and Good Clinical Practice guidelines, with ethical clearance from the Health Research Ethics Committee of the Faculty of Nursing, Universitas Airlangga (No. 3125-KEPK) and the Ethics Committee of Universitas Muhammadiyah Kalimantan Timur (No. 023/KEPK-UMKT).

Informed consent was obtained from all participants through verbal and written explanations in Bahasa Indonesia, outlining the study's purpose, procedures, risks, and benefits. Participation was voluntary, with the option to withdraw at any time without affecting healthcare services. Confidentiality was maintained by assigning unique codes to de-identified data, storing personal identifiers separately in secure, password-protected files, and following institutional data protection protocols.

The intervention was developed using established educational and health behavior frameworks and reviewed by clinical experts to ensure safety. Monitoring during the study allowed for a prompt response to any concerns or adverse events. Participant selection was

Table 1. Results of the Equivalence Test for Husbands' Characteristics (n = 60)

Husband Characteristics	Treatment (n=30)		Control (n=30)		Equivalence Test
	n	%	n	%	p-value
Age (years)					0.776[a]
Mean ± SD	36.2 ± 4.2		35.8 ± 4.5		
17-25	0	0	1	3.3	
26-35	13	43.3	11	36.7	
36-45	17	56.7	17	56.7	
46-65	0	0	1	3.3	
Education					0.500[b]
Junior High School	10	33.3	16	53.3	
Senior High School	16	53.3	10	33.3	
Higher Education	4	13.3	4	13.3	
Knowledge					0.851[b]
Low	2	6.7	2	6.7	
Moderate	14	46.7	11	36.7	
Good	14	46.7	17	56.7	
Socioeconomic Status					0.698[b]
≤ Minimum Wage Rp 3.300.000	9	30.0	11	36.7	
> Minimum Wage Rp 3.300.000	21	70.0	19	63.3	
Ethnicity					0.623[b]
Javanese	10	33.3	7	23.3	
Madurese	4	13.3	6	20	
Buginese	7	23.3	3	10	
Banjarese	4	13.3	10	33.3	
Kutai	5	16.67	4	13.3	
Health Insurance Ownership					0.624[b]
No	6	20	4	13.3	
Yes	24	80	26	86.67	

Notes: a = Independent T-Test; b = Chi-Square Test

equitable, with the control group receiving standard care. After data collection, they were offered the full intervention to ensure fair access. Additional safeguards included distress monitoring, clear complaint procedures, and access to research team and ethics committee contacts.

Results

Characteristics of Husbands and wives

Tables 1 and 2 present the results of equivalence tests for husbands' and wives' characteristics, respectively. No significant differences were observed between the treatment and control groups in all measured variables. For husbands, age (p = 0.776), education (p = 0.500), knowledge (p = 0.851), socioeconomic status (p = 0.698), ethnicity (p = 0.623), and health insurance ownership (p = 0.624) were statistically comparable. Similarly, for wives, age (p = 0.550), education (p = 0.996), parity (p = 0.870), and occupation (p = 0.978) showed no significant differences. These findings confirm group comparability at baseline, reinforcing the internal validity of the study.

Pregnancy and Delivery History

Table Baseline characteristics demonstrated no significant differences between intervention and control groups across all measured variables (all p-values > 0.05), confirming successful randomization and group equivalence at baseline.

Normality Testing

The Shapiro-Wilk test was conducted to assess the normality of the data distribution. All variables in both treatment and control groups at pretest and posttest

Table 2. Results of the Equivalence Test for Wives' Characteristics (n = 60)

Wives Characteristics	Treatment (n=30)		Control (n=30)		Equivalence Test
	n	%	n	%	p-value
Age (years)					0.550[a]
Mean ± SD	28.4 ± 3.2		27.9 ± 3.8		
17-25	4	13.3	6	20	
26-35	24	80	24	80	
36-45	2	6.7	0	0	
Education					0.996[b]
Elementary School	3	10	3	10	
Junior High School	10	33.3	10	33.3	
Senior High School	11	36.7	10	33.3	
Higher Education	6	20	7	23.3	
Parity					0.870[b]
Primipara	14	46.7	12	40	
Multipara	12	40	12	40	
Grande multipara	4	13.3	6	20	
Occupation					0.978[b]
Housewife	13	43.3	10	33.3	
Government employee	4	13.3	4	13.3	
Private sector employee	5	16.7	5	16.7	
Entrepreneur	1	3.3	1	3.3	
Casual worker	7	23.3	10	33.3	

Notes: a = Independent T-Test; b = Chi-Square Test

Table 3. Results of the Equivalence Test for Pregnancy History up to Delivery

Characteristic	Category	Treatment (n=30)		Control (n=30)		*P-value*
		n	%	n	%	
Gestational Age	**Mean ± SD**	37.8 ± 1.2		37.4 ± 1.4		
	34 Weeks	1	3.3	0	0	0.148[a]
	36 Weeks	2	6.7	2	6.7	
	37 Weeks	11	36.7	9	30	
	38 Weeks	3	10	10	33.4	
	39 Weeks	8	26.7	7	23.3	
	40 Weeks	5	16.7	1	3.3	
	41 Weeks	0	0	1	3.3	
Type of Delivery	Normal	23	76.7	28	93.3	0.063[b]
	Cesarean Section (SC)	7	23.3	2	6.7	
Birth Attendant	Midwife	23	76.7	27	90	0.577[b]
	Doctor	7	23.3	3	10	
Delivery Complications	Breech Baby	2	6.7	0	0	0.406[b]
	Prolonged Labor	0	0	1	3.3	
	Premature Rupture of Membranes (PROM)	1	3.3	1	3.3	
	Myopia	1	3.3	0	0	
	Post-Term Pregnancy	0	0	1	3.3	
	Advanced Maternal Age	2	6.6	0	0	
	No Complications	24	80	27	90.1	
	Total	30	100	30	100	

Notes: a = Independent T-Test; b = Chi-Square Test; PROM = Premature Rupture of Membranes

yielded significance values below 0.05, indicating non-normal distribution. Consequently, non-parametric analyses (Wilcoxon and Mann-Whitney tests) were applied for subsequent statistical analyses.

All variables demonstrated non-normal distribution ($W < 0.950$, all p-values < 0.05). The preparedness behavior variables were measured using ordinal Likert scales (1–5-point scales for awareness, facilitation ability, and appreciation), with responses ranging from "strongly disagree" to "strongly agree." Given the ordinal nature of the data and confirmed non-normal distribution, non-parametric statistical tests were deemed most appropriate. Consequently, Wilcoxon signed-rank tests were applied for within-group comparisons (pre-post changes within each group), and Mann-Whitney U tests were used for between-group comparisons (intervention vs. control at posttest). This statistical approach ensures robust analysis while respecting the distributional characteristics and measurement scale properties of the data.

Effects of the HBM-Based Husband Empowerment Module on Preparedness Behavior

Descriptive Analysis of Preparedness Behavior

Table 5: The intervention group demonstrated substantial improvements across all preparedness behavior indicators post-intervention, while the control group showed minimal changes. In the awareness domain, the intervention group showed a remarkable shift from predominantly moderate awareness (53.3%) at pretest to predominantly good awareness (66.7%) at posttest, with the proportion of husbands demonstrating low awareness decreasing from 23.3% to 10%. Conversely, the control group maintained stable awareness levels, with good awareness slightly declining from 66.7% to 56.7%.

For facilitation ability, the intervention group showed the most dramatic transformation: no participants (0%) demonstrated good facilitation ability at pretest, but 83.3% achieved good levels post-intervention, with the elimination of low facilitation ability (50% to 0%). The control group showed minimal improvement, with good facilitation ability declining from 43.3% to 33.3%.

In the appreciation domain, the intervention group demonstrated significant improvement from no participants (0%) showing good appreciation at pretest to 66.7% at posttest, while reducing those with low appreciation from 43.3% to 10%. The control group showed stable patterns with minimal change in

Table 4. Shapiro-Wilk Test for Normality of Preparedness Behavior Variables

Group	Timepoint	Variable	W Statistic	p-value
Treatment Group	Pretest	Awareness	0.892	0.003
		Facilitation Ability	0.885	0.002
		Appreciation	0.901	0.008
	Posttest	Awareness	0.874	0.001
		Facilitation Ability	0.845	<0.001
		Appreciation	0.888	0.003
Control Group	Pretest	Awareness	0.912	0.018
		Facilitation Ability	0.869	0.001
		Appreciation	0.895	0.005
	Posttest	Awareness	0.883	0.002
		Facilitation Ability	0.891	0.004
		Appreciation	0.878	0.002

Table 5. Description of the behavioral preparedness variable categories

Variable	Category	Treatment (n=30)				Control (n=30)			
		Pre-test		*Post-test*		*Pre-test*		*Post-test*	
		n	%	n	%	n	%	n	%
Awareness	Low	7	23.3	3	10	0	0	0	0
	Moderate	16	53.3	7	23.3	10	33.3	13	43.3
	Good	7	23.3	20	66.7	20	66.7	17	56.7
Facilitation Ability	Low	15	50	0	0	3	10	4	13.3
	Moderate	15	50	5	16.7	14	46.7	16	53.3
	Good	0	0	25	83.3	13	46.7	10	33.3
Appreciation	Low	13	43.3	3	10	2	6.7	2	6.6
	Moderate	17	56.7	7	23.3	13	43.3	14	46.7
	Good	0	0	20	66.7	15	50	14	46.7

appreciation levels across categories. These descriptive findings suggest substantial intervention effects that warrant statistical confirmation through comparative analyses.

Comparative Analysis of Pre- and Post-Intervention Measures

Table 6 presents the within-group analysis results using Wilcoxon signed-rank tests, which are appropriate for comparing paired ordinal data from the same participants over time. In the treatment group, significant improvements were observed across all three preparedness behavior indicators. Awareness scores showed a median increase of 2.0 points (from 9.0 to 11.0), facilitation ability improved by a median of 1.0 point (from 5.0 to 6.0), and appreciation increased by a median of 1.0 point (from 4.0 to 5.0), with all changes being highly significant ($p < 0.001$). The interquartile ranges indicate reduced variability in the treatment group post-intervention, suggesting more consistent high performance across participants.

In contrast, the control group demonstrated no statistically significant changes across any preparedness behavior indicators. Median scores remained stable for awareness (8.0), facilitation ability (4.0), and appreciation (4.0), with p-values well above the significance threshold ($p > 0.05$). The interquartile ranges in the control group remained relatively unchanged, indicating stable performance levels. These findings demonstrate that significant behavioral improvements occurred only in the treatment group, providing strong evidence of intervention effectiveness while confirming that changes were not due to temporal factors or repeated measurement effects.

Table 7 provides the critical between-group comparison at posttest, addressing the primary research question of intervention effectiveness. The Mann-Whitney U tests revealed highly significant differences between intervention and control groups across all preparedness behavior indicators at posttest. For awareness, the intervention group achieved a median score of 11.0 (IQR = 10.0-12.0) compared to the control group's 8.0 (IQR = 7.0-10.0), with the intervention group participants ranking substantially higher (mean rank 42.8 vs. 18.2; $U = 81.5$, $Z = -5.247$, $p < 0.001$).

Similarly, facilitation ability showed marked between-group differences, with the intervention group reaching a median of 6.0 (IQR = 5.0-6.0) versus the control group's 4.0 (IQR = 4.0-5.0). The intervention group demonstrated the highest mean rank difference for this indicator (44.3 vs. 16.7; $U = 36.0$, $Z = -5.891$, $p < 0.001$), suggesting this was the domain with the most potent intervention effect.

For appreciation, the intervention group scored a median of 5.0 (IQR = 5.0-6.0) compared to the control group's 4.0 (IQR = 3.0-5.0), with significant rank differences (43.7 vs. 17.3; $U = 54.0$, $Z = -5.632$, $p < 0.001$). The significant differences in mean ranks across all indicators, combined with very low U values and high negative Z scores, indicate substantial effect sizes and confirm the intervention's strong impact on husbands' preparedness behavior. These results provide definitive evidence that the HBM-based intervention significantly

Table 6. The effect of the husband empowerment module intervention on preparedness behavior

Variable	Treatment Group (n=30)		p-value*	Control Group (n=30)		p-value*
	Pretest	Posttest		Pretest	Posttest	
	Median (IQR)	Median (IQR)		Median (IQR)	Median (IQR)	
Awareness	9.0 (8.0-10.0)	11.0 (10.0-12.0)	<0.001	8.0 (7.0-9.0)	8.0 (7.0-9.0)	>0.05
Facilitation Ability	5.0 (4.0-5.0)	6.0 (5.0-6.0)	<0.001	4.0 (3.0-4.0)	4.0 (3.0-4.0)	>0.05
Appreciation	4.0 (4.0-5.0)	5.0 (5.0-6.0)	<0.001	4.0 (3.0-4.0)	4.0 (3.0-4.0)	>0.05

*Wilcoxon signed-rank test

Table 7. Between-Group Comparison of Posttest Preparedness Behavior Scores

Variable	Treatment Group (n=30)		Control Group (n=30)		p-value**
	Median (IQR)	Mean Rank	Median (IQR)	Mean Rank	
Awareness	11.0 (10.0-12.0)	42.8	8.0 (7.0-10.0)	18.2	<0.001
Facilitation Ability	6.0 (5.0-6.0)	44.3	4.0 (4.0-5.0)	16.7	<0.001
Appreciation	5.0 (5.0-6.0)	43.7	4.0 (3.0-5.0)	17.3	<0.001

**Mann-Whitney U test

outperformed standard care across all measured outcomes.

Discussions

This study demonstrates that the HBM-based Husband Empowerment Module significantly enhanced husband readiness to support postpartum contraceptive use across all measured dimensions. The substantial improvements in awareness, facilitation ability, and appreciation indicate that structured, theory-based interventions can effectively engage husbands as active partners in reproductive health decisions.

The improvement in husbands' preparedness outcomes across all three dimensions reflects the multifaceted nature of behavioral change required for adequate reproductive health support. However, the differential response patterns observed warrant deeper examination (Yemata *et al.*, 2023). While awareness scores showed remarkable improvement (median increase of 2.0 points), with 66.7% of intervention participants achieving good awareness levels, the persistence of 10% in the low awareness category and 23.3% in moderate levels suggests that knowledge acquisition alone may be insufficient for some participants.

The facilitation ability domain demonstrated the most dramatic transformation, with 83.3% achieving good levels post-intervention compared to 0% at baseline. This substantial shift indicates that practical skills training and behavioral modeling components of the intervention were efficient (Mazumder *et al.*, 2018). However, the 16.7% who remained at moderate levels may represent husbands facing structural or personal barriers that require additional support mechanisms. The appreciation dimension, while showing significant improvement (66.7% achieving good levels), still had 33.3% of participants in low to moderate categories post-intervention. This pattern suggests that attitudinal change requires more intensive or prolonged engagement than acquiring knowledge or skills.

Several factors may explain the persistence of low responsiveness among certain participants. Cultural rigidity may create resistance to changing traditional gender roles in reproductive decision-making, particularly among older or more traditionally-oriented husbands (Lusambili *et al.*, 2021; Roudsari, Sharifi and Goudarzi, 2023). Educational barriers, including low literacy levels, may limit comprehension of complex health information despite simplified delivery methods (Allen-Meares *et al.*, 2020). Social network influences from extended family or peers who maintain conservative attitudes toward male involvement in reproductive health may counteract intervention messages. Economic pressures may create competing priorities that reduce engagement with health promotion activities (Roudsari, Sharifi and Goudarzi, 2023).

These findings suggest that future interventions should incorporate tailored submodules addressing specific barrier profiles. For culturally resistant participants, more extended engagement periods with community elder involvement and religious leader endorsement may be necessary. For those with educational barriers, visual learning aids, peer mentoring, and simplified materials may enhance effectiveness (Roudsari, Sharifi and Goudarzi, 2023). Additionally, graduated intervention intensity based on initial responsiveness assessments could optimize resource allocation and improve outcomes for challenging cases.

The findings of this study align with broader evidence from systematic reviews and meta-analyses that consistently demonstrate the critical role of husbands in postpartum care. However, the mechanisms underlying these relationships deserve deeper exploration. The convergence of our results with existing literature occurs through several interconnected pathways that our HBM-based intervention specifically targeted. Our awareness improvement findings parallel systematic review evidence showing that husband knowledge enhancement leads to increased support behaviors during labor and delivery (Lestari, Mufdlillah and Ernawati, 2019). The mechanism appears to operate through cognitive restructuring, where increased understanding of postpartum contraceptive benefits reduces perceived barriers and increases perceived self-efficacy - core HBM constructs that our intervention specifically addressed. However, our study extends this understanding by demonstrating that structured, theory-based interventions can systematically enhance these cognitive processes rather than relying on informal knowledge transfer.

The facilitation abilities observed in our study provide mechanistic insight into how systematic reviews have consistently linked male involvement with improved maternal health service utilization (Yargawa and Leonardi-Bee, 2015). Our intervention's focus on practical skills development addresses the behavioral competency gap that may explain why some husbands, despite having positive attitudes, fail to translate intentions into supportive actions. This suggests that previous observational studies documenting husband support effects have captured naturally occurring variations in these facilitation abilities that our intervention can systematically develop.

Our appreciation score improvements offer insight into the psychological mechanisms underlying systematic review findings of reduced postpartum depression associated with husband support (Nofitri and Kusumaningtyas, 2025; Agatra et al., 2023). The HBM construct of perceived benefits appears to operate not only through rational cost-benefit analysis but also through enhanced emotional attunement and role

appreciation, creating a supportive environment that buffers against postpartum psychological distress.

This intervention demonstrated effectiveness through its comprehensive and accessible approach, utilizing in-clinic education, home visits, group discussions, and WhatsApp-sustained support that allowed husbands to absorb and apply their knowledge in real-life contexts gradually. Previous studies indicate that engaging men in reproductive health through such interactive and multiphased techniques shows promising results (Shorey *et al.*, 2019; Hu *et al.*, 2020b).

The absence of significant baseline differences between intervention and control groups regarding husbands' and wives' characteristics strengthens confidence that observed changes were associated with the program rather than pre-existing group differences (Lameshow *et al.*, 1997). The pre-post measurement design with a control group enhances the methodological rigor of these findings by controlling for temporal effects and maturation bias (Shadish, Cook and Campbell, 2002). However, as a quasi-experimental design, this study provides evidence of the association between intervention and outcomes rather than definitive causal proof that would require randomized controlled trial methodology. The observed improvements suggest a substantial likelihood of intervention effectiveness, but residual confounding from unmeasured variables remains possible despite the robust design and baseline equivalence testing.

This study contributes to the growing evidence base suggesting positive effects of husband involvement on maternal health outcomes (Kabanga *et al.*, 2019; Rahman *et al.*, 2020; Wood *et al.*, 2024). The findings indicate that when men receive structured reproductive health education, they demonstrate enhanced capacity to support their wives in health decision-making, which appears associated with improved maternal well-being outcomes (Comrie-Thomson *et al.*, 2021). This HBM-based intervention provides empirical support for the utility of established behavioral health theories in designing reproductive health interventions (Ghomi *et al.*, 2019; Khosravizadeh *et al.*, 2021).

This study demonstrates notable strengths through its firm theoretical grounding in the Health Belief Model, comprehensive multi-modal intervention delivery (antenatal visits, home visits, group discussions, WhatsApp support), validated instruments with good reliability (Cronbach's alpha 0.73-0.82), and substantial effect sizes with 83.3% of participants achieving good facilitation ability post-intervention compared to 0% at baseline. However, significant limitations include the quasi-experimental design that limits causal inference, small sample size (n=30 per group) restricted to a single geographic location in Indonesia, reliance on self-reported preparedness behaviors rather than objective contraceptive outcomes, acknowledged absence of formal fidelity monitoring, short 12-week follow-up period insufficient for long-term assessment, and resource-intensive intervention approach that raises scalability concerns for routine healthcare implementation, collectively restricting the generalizability and long-term impact assessment of the findings.

Conclusion

This research indicates that the Health Belief Model-based Husband Empowerment Module significantly improved the preparedness of husbands to support postpartum contraceptive use. The improvement in awareness, support-providing abilities, and appreciation of roles at posttest highlights the success of interventions meant to encourage husbands into the active role of postpartum health.

The findings strengthen the effectiveness of the HBM-based approaches and focus on perceived risks, benefits, barriers, and self-efficacy to shape a positive impact on reproductive health. Since the intervention and control groups were demographically similar, the improvements can be attributed to the intervention rather than external factors. To enhance the impact of this intervention, maternal health programs should incorporate husband-focused counseling into antenatal and postpartum care. Expanding educational methods such as face-to-face sessions, WhatsApp-based discussions, and community meetings can improve accessibility and engagement. Additionally, personalized strategies are needed to support less responsive participants, ensuring all husbands benefit.

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Availability of data and materials

The datasets generated and analyzed during the current study are not publicly available due to confidentiality and participant privacy concerns but are available from the corresponding author upon reasonable request.

Authors' contributions

Author 1: Conceptualized the study design, developed the Husband Empowerment Module based on the Health Belief Model, and conducted the primary data collection. Led the manuscript writing, performed data analysis, and interpreted the findings

Author 2: Provided critical input on the study design and methodology. Assisted in data analysis and interpretation. Contributed to the manuscript's critical revision and ensured its scientific rigor.

Author 3: Supported data collection and participant recruitment. Contributed to literature review and manuscript writing. Assisted in formatting and finalizing the manuscript for submission.

Declaration of Interest

The authors declare no financial or other conflicts of interest in this study.

References

Agatra, S. E. *et al.* (2023) "Systematic Review: The Relationship of Spouses' Support and Postpartum Depression," *Jurnal Ners dan Kebidanan (Journal of Ners and Midwifery)*, 10(1), pp. 144–153. doi: 10.26699/jnk.v10i1.ART.p144-153.

Allen-Meares, P. *et al.* (2020) "Health Literacy Barriers in the Health Care System: Barriers and Opportunities for the Profession.," *Health & social work*, 45(1), pp. 62–64. doi: 10.1093/hsw/hlz034.

Chang, Y.-S. *et al.* (2021) "Relatively speaking? Partners' and family members' views and experiences of supporting breastfeeding: a systematic review of qualitative evidence," *Philosophical Transactions of the Royal Society B: Biological Sciences*, 376(1827), p. rstb.2020.0033. doi: 10.1098/rstb.2020.0033.

Comrie-Thomson, L. *et al.* (2021) "How do women, men, and health providers perceive interventions to influence men's engagement in maternal and newborn health? A qualitative evidence synthesis," *Social Science & Medicine*, 291, p. 114475. doi: 10.1016/j.socscimed.2021.114475.

Ghomi, R. *et al.* (2019) "Effect of an empowerment program on the caring behaviors of mothers with preterm infants: the health belief model approach," *International Journal of Health Promotion and Education*, 57(2), pp. 55–66. doi: 10.1080/14635240.2018.1549959.

Hu, L. *et al.* (2020a) "Promoting breastfeeding in Chinese women undergoing cesarean section based on the health belief model: A randomized controlled trial," *Medicine (United States)*, 99(28). doi: 10.1097/MD.0000000000020815.

Jeong, J. *et al.* (2023) "Implementation characteristics of father-inclusive interventions in low- and middle-income countries: A systematic review," *Annals of the New York Academy of Sciences*, 1520(1), pp. 34–52. doi: 10.1111/nyas.14941.

Kabanga, E. *et al.* (2019) "Prevalence of male partners involvement in antenatal care visits – in Kyela district, Mbeya," *BMC Pregnancy and Childbirth*, 19(1), p. 321. doi: 10.1186/s12884-019-2475-4.

Kementerian Kesehatan RI (2020) "Indikator Program Kesehatan Masyarakat dalam RPJMN dan Rentra Kementerian Kesehatan 2020-2024," *Katalog Dalam Terbitan. Kementerian Kesehatan RI*.

Khosravizadeh, O. *et al.* (2021) "Applying the health belief model and behavior of diabetic patients: A systematic review and meta-analysis," *Clinical Diabetology*, 10(2), pp. 209–220. doi: 10.5603/DK.2021.0020.

Lally, P., Cornelia H. M. van Jaarsveld Henry W. W. Potts and Wardle, J. (2010) "How are habits formed: Modelling habit formation in the real world," *European Journal of Social Psychology*, 40(990–1009). doi: 10.1002/ejsp.674.

Lameshow, S. *et al.* (1997) *Besar Sampel dalam Penelitian Kesehatan*, *Herd*.

Lestari, P., Mufdlillah and Ernawati, D. (2019) "Husband' S Role in Assistance of Laboring Process :," *Ist International Respati Health COnference*, (63).

Lusambili, A. M. *et al.* (2021) "Male Involvement in Reproductive and Maternal and New Child Health: An Evaluative Qualitative Study on Facilitators and Barriers From Rural Kenya," *Frontiers in Public Health*, 9. doi: 10.3389/fpubh.2021.644293.

Mazumder, T. *et al.* (2018) "Advancing People-Centered Maternal and Newborn Health Care through Birth Preparedness and Complication Readiness in Rural Bangladesh," *International Journal of Person Centered Medicine*, 7(2). doi: 10.5750/ijpcm.v7i2.639.

Mohammadkhah, F. *et al.* (2025) "The effect of training intervention based on health belief model on self-care behaviors of women with gestational diabetes mellitus," *Frontiers in Global Women's Health*, 5. doi: 10.3389/fgwh.2024.1490754.

Nofitri, E. R. and Kusumaningtyas, A. F. (2025) "ASSOCIATION OF HUSBAND SUPPORT AND POSTPARTUM BLUES IN POSTPARTUM WOMEN : SYSTEMATIC REVIEW," *Journal of Advanced Research in Medical and Health Science (ISSN 2208-2425)*, 11(1), pp. 5–12. doi: 10.61841/c2ws8x39.

Rahayu, S., Romadlona, N. A., Utomo, B., Riznawaty, I. A., *et al.* (2023) "Reassessing the level and implications of male involvement in family planning in Indonesia," *BMC Women's Health*, 23, pp. 1–14. doi: https://doi.org/10.1186/s12905-023-02354-8.

Rahayu, S., Romadlona, N. A., Utomo, B., Aryanty, R. I., *et al.* (2023) "Reassessing the level and implications of male involvement in family planning in Indonesia," *BMC Women's Health*, 23(1), p. 220. doi: 10.1186/s12905-023-02354-8.

Rahman, A. E. *et al.* (2020) "What do women want? An analysis of preferences of women, involvement of men, and decision-making in maternal and newborn health care in rural Bangladesh.," *BMC pregnancy and childbirth*, 20(1), p. 169. doi: 10.1186/s12884-020-2854-x.

Rohmah, N. *et al.* (2021) "Barrier to contraceptive use among childbearing age women in rural Indonesia," *Malaysian Family Physician*, 16(3). doi: 10.51866/oa1020.

Rosenstock, I.M. (1974) Historical Origins of the Health Belief Model. Health Education Monographs, 2, 328-335. https://doi.org/10.1177/109019817400200403

Roudsari, R. L., Sharifi, F. and Goudarzi, F. (2023) "Barriers to the participation of men in reproductive health care: a systematic review and meta-synthesis," *BMC Public Health*, 23(1), p. 818. doi: 10.1186/s12889-023-15692-x.

Shadish, W. R., Cook, T. D. and Campbell, D. T. (2002) *Experimental and quasi-experimental designs for generalized causal inference*. Houghton, Mifflin and Company.

Shorey, S. *et al.* (2019) "Effectiveness of a Technology-Based Supportive Educational Parenting Program on Parental Outcomes (Part 1): Randomized Controlled Trial," *Journal of Medical Internet Research*, 21(2), p. e10816. doi: 10.2196/10816.

UNICEF (2021) *Maternal and newborn health*, *United Nations Children's Fund*.

Utomo, B. and Romadlona, N. A. (2021) "Strengthened family planning is critical to help accelerate the reduction of maternal mortality in Indonesia," *F1000Research*, 10, p. 904. doi: 10.12688/f1000research.55417.1.

WHO (2022) *Family Planning - A global handbook for providers*. 2022 Editi. Edited by World Health Organization and Johns Hopkins Bloomberg School of Public Health. Center for Communication Programs. World Health Organization.

Wood, F. E. *et al.* (2024) "Involving men in pregnancy: a cross-sectional analysis of the role of self-efficacy, gender-equitable attitudes, relationship dynamics and knowledge among men in Kinshasa," *BMC Pregnancy and Childbirth*, 24(1), p. 444. doi: 10.1186/s12884-024-06638-1.

Yargawa, J. and Leonardi-Bee, J. (2015) "Male involvement and maternal health outcomes: systematic review and meta-analysis," *Journal of Epidemiology and Community Health*, 69(6), pp. 604–612. doi: 10.1136/jech-2014-204784.

Yemata, G. A. *et al.* (2023) "Husband participation in birth preparedness and complication readiness and its predictors among men whose wife was admitted for an obstetric referral at South Gondar zone: A multicenter cross-sectional study," *Heliyon*, 9(5). doi: 10.1016/j.heliyon.2023.e15348.

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