

Original Article

Effect of health belief model-based education on the prevention of pathological vaginal discharge: A pre-experimental study

Willy Astriana^{1*}, Tamela Zahra², Putri Wulandari¹

¹ Program Studi D-III Kebidanan, STIKes Al-Ma'arif Baturaja

² Program Studi Pendidikan Bidan Program Profesi, STIKes Al-Ma'arif Baturaja

***Corresponding Author:**

Willy Astriana

Program Studi D-III Kebidanan,
STIKes Al-Ma'arif Baturaja
Email: willy.astriana@gmail.com

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Abstract

Background: Pathological vaginal discharge remains a prevalent reproductive health problem among young women and is often associated with inadequate preventive behaviors and limited health literacy. Educational interventions grounded in behavioral theory are needed to improve awareness and promote effective prevention strategies among female students.

Objective: This study aimed to examine the effect of Health Belief Model-based education on the prevention of pathological vaginal discharge among female students.

Methods: A quantitative pre-experimental study using a one-group pretest-posttest design was conducted among 60 female students at STIKes Al-Ma'arif Baturaja, selected through accidental sampling. The educational intervention was delivered using Health Belief Model-based leaflets focusing on perceived susceptibility, perceived seriousness, perceived benefits, perceived barriers, and cues to action. Data were collected before and after the intervention using validated questionnaires. Statistical analysis was performed using the Wilcoxon Signed Rank Test with SPSS software.

Results: The findings demonstrated significant improvements in preventive behaviors and Health Belief Model components following the educational intervention. The Wilcoxon Signed Rank Test revealed a statistically significant difference between pretest and posttest scores ($Z = -16.098$; $p = 0.003$), indicating that Health Belief Model-based education effectively enhanced pathological vaginal discharge prevention among participants.

Conclusion: Health Belief Model-based education significantly improves preventive behaviors related to pathological vaginal discharge among female students. Theory-driven educational interventions represent an effective approach for reproductive health promotion in academic settings.

Background

Pathological vaginal discharge represents a significant reproductive health problem that affects women across different stages of the life course in both developed and developing countries (WHO, 2024). Abnormal vaginal discharge frequently emerges due to imbalances in vaginal flora that are influenced by hygiene practices, stress, hormonal changes, and behavioral factors in daily life (Murewanhema et al., 2022). Adolescents and women of reproductive age commonly experience pathological vaginal discharge because of limited reproductive health literacy and inadequate preventive behaviors in community and school settings (Alenizy et al., 2024). Epidemiological evidence consistently demonstrates that vaginal discharge complaints are highly prevalent among young women in educational institutions and community environments (Dara Anggun Prasasti et al., 2024). Psychological stress significantly contributes to the occurrence of pathological

vaginal discharge by altering immune responses and genital hygiene behaviors among female adolescents (Atusnah & Agus, 2021). Anxiety and lifestyle-related stressors also exacerbate leukorrhea symptoms by disrupting physiological balance and personal health practices among young women (Sholihah, 2020). These findings collectively indicate that pathological vaginal discharge constitutes a multidimensional health issue requiring preventive behavioral interventions grounded in health education frameworks (Kemenkes RI, 2022).

Knowledge and attitudes toward reproductive health play a central role in shaping preventive behaviors related to vaginal discharge among women and adolescents (Juniar et al., 2023). Empirical studies demonstrate that insufficient knowledge regarding genital hygiene and reproductive health significantly increases the risk of abnormal vaginal discharge in adolescent populations (Yuliana & Nurjanah, 2023). Educational background and access to accurate

reproductive health information strongly influence women's capacity to recognize early symptoms and adopt preventive measures (Afifi, 2015). Research findings further indicate that structured health education interventions improve awareness and health-related attitudes regarding reproductive and gynecological conditions (El Habashy Said et al., 2018). Similar patterns are observed in preventive health behaviors related to visual inspection of acetate screening, where education significantly influences women's behavioral intentions (Erlinda Dwi Puspita & Deli Lilia, 2025). Adolescent sexual and reproductive health behaviors are strongly associated with perceived susceptibility and perceived severity of health problems within educational environments (Hastuti & Siti, 2021). These findings highlight the importance of theory-based educational strategies in addressing behavioral determinants of pathological vaginal discharge prevention (Easton-Carr & Raul, 2024).

The Health Belief Model provides a comprehensive theoretical framework for understanding and modifying preventive health behaviors through individual perceptions and cognitive processes (Easton-Carr & Raul, 2024). The Health Belief Model emphasizes perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy as determinants of health-related decision-making (Michael & Irish, 2020). Previous studies demonstrate that education based on the Health Belief Model effectively promotes preventive behaviors for infectious and reproductive health conditions among women (Aligol et al., 2014). Educational interventions grounded in the Health Belief Model significantly improve women's health beliefs and preventive behaviors in urinary tract infection prevention (Tehrani et al., 2014). Health Belief Model-based interventions also enhance reproductive health knowledge and attitudes among adolescents and middle-aged women (Gebretatyos et al., 2020). Health behavior theories applied in clinical and community education settings improve learning outcomes when aligned with adult learning principles (Thompson et al., 2020). These findings support the relevance of the Health Belief Model as a theoretical foundation for vaginal discharge prevention education (Hanifah et al., 2023).

Hormonal transitions across the female lifespan influence vaginal health and contribute to symptoms such as dryness, irritation, and abnormal discharge (Santoro & Delamater, 2018). Genitourinary syndrome of menopause reflects a continuum of vaginal symptoms that may overlap with pathological discharge manifestations in older women (Marina, 2018). Clinical evidence indicates that vaginal atrophy and altered mucosal integrity increase susceptibility to abnormal vaginal conditions among peri- and postmenopausal women (Phillips & Bachmann, 2018). Pharmacological and non-pharmacological interventions demonstrate varying degrees of effectiveness in managing vaginal symptoms associated with hormonal changes (Rad et al., 2018). Vaginal gels and selective estrogen receptor modulators have shown clinical efficacy in improving vaginal health outcomes (De Seta et al., 2021). Patient acceptability and awareness remain critical factors influencing treatment adherence and symptom management (Cagnacci et al., 2020). These findings underscore the importance of preventive education that spans across different reproductive life stages (Johnston et al., 2021).

Educational media and delivery methods significantly influence the effectiveness of reproductive health education among adolescents and women (Putri & Yuli, 2025). Leaflet-based and school-based educational interventions demonstrate measurable improvements in adolescent knowledge regarding vaginal discharge prevention (Putri & Yuli, 2025). Online surveys and digital education platforms reveal persistent gaps in women's knowledge and attitudes toward reproductive health and menopause-related conditions (Harper et al., 2022). Complementary and alternative health approaches are frequently used by women but often lack adequate educational guidance (Johnson et al., 2019). Cultural beliefs and misconceptions continue to shape women's responses to vaginal symptoms and preventive behaviors in community contexts (Shams-Eldin, 2018). Observational and quasi-experimental study designs are commonly used to evaluate behavioral interventions in real-world health education settings (Dinardo, 2008). These methodological approaches provide practical evidence for assessing the effectiveness of theory-based educational interventions (Hanifah et al., 2023).

Despite the high prevalence of pathological vaginal discharge, preventive behaviors among adolescents and women remain suboptimal due to limited theory-based health education interventions (Murewanhema et al., 2022). Existing studies predominantly focus on knowledge assessment rather than behavioral change outcomes linked to structured theoretical frameworks (Juniar et al., 2023). Evidence regarding Health Belief Model-based education specifically targeting pathological vaginal discharge prevention remains limited in experimental research designs (Aligol et al., 2014). Pre-experimental approaches offer feasible and ethical methods for evaluating educational interventions in community and educational settings (Dinardo, 2008). The integration of reproductive health education with behavioral theory is necessary to strengthen preventive practices and reduce the burden of vaginal health problems (Kemenkes RI, 2022).

Therefore, this study aims to examine the effect of Health Belief Model-based education on the prevention of pathological vaginal discharge among female students.

Methods

Study Design

This study employed a quantitative research approach using a pre-experimental one-group pretest-posttest design to evaluate the effect of Health Belief Model-based education on the prevention of pathological vaginal discharge. The design was selected to allow direct comparison of outcomes before and after the educational intervention within the same group of participants. The independent variable in this study was Health Belief Model-based education delivered through leaflet media, while the dependent variable was pathological vaginal discharge. This design was considered appropriate because it enables assessment of behavioral and health-related changes following a structured educational intervention in a natural educational setting. Data for both pretest and posttest were collected within the same study period to minimize external influences and temporal variation. The one-group pretest-posttest design provided a practical and ethical approach for evaluating

educational interventions among student populations. This design also allowed for efficient implementation within the academic environment of a higher education institution.

Sampling

The study population consisted of all female students enrolled at STIKes Al-Ma'arif Baturaja, totaling 101 individuals at the time of data collection. A sample of 60 participants was selected using an accidental sampling technique, which allowed recruitment of participants who met the inclusion criteria and were available during the study period. This sampling method was chosen due to feasibility considerations and the accessibility of participants within the campus environment. Inclusion criteria were defined to ensure participants were female students who were willing to participate and able to complete the pretest, educational intervention, and posttest stages. Exclusion criteria were applied to eliminate participants who did not complete the intervention process or declined participation at any stage. The sample size was considered sufficient to detect changes between pretest and posttest measurements within the study design. The sampling approach ensured that participants reflected the characteristics of the target population in the institutional context.

Instruments

Data were collected using structured questionnaires designed to measure pathological vaginal discharge and Health Belief Model components. Pathological vaginal discharge was operationally defined as abnormal vaginal discharge characterized by excessive amount, abnormal color such as yellowish, greenish, or grayish, unpleasant odor, and accompanying symptoms such as itching or burning sensation. The Health Belief Model instrument assessed five core components, including perceived susceptibility, perceived seriousness, perceived benefits, perceived barriers, and cues to action related to vaginal discharge prevention. The Health Belief Model questionnaire used in this study had undergone prior validity and reliability testing to ensure accuracy and consistency of measurement. The instruments were administered in a self-report

format to facilitate participant understanding and comfort. Clear instructions were provided to participants before questionnaire completion to minimize response bias. The use of validated instruments strengthened the credibility and methodological rigor of the study findings.

Data Collection

Data collection was conducted in several structured stages to ensure consistency and reliability. Participants first completed a pretest questionnaire to assess baseline conditions related to pathological vaginal discharge and Health Belief Model perceptions. Following the pretest, participants received Health Belief Model-based education delivered through leaflet media specifically designed to address vaginal discharge prevention. The educational materials emphasized perceived risk, seriousness of pathological vaginal discharge, benefits of preventive behaviors, strategies to overcome barriers, and cues to initiate healthy practices. The leaflet format was selected because it allows standardized delivery of information and easy comprehension among student populations. After the educational intervention, participants completed a posttest questionnaire using the same instruments as the pretest. This procedure enabled direct comparison of outcomes before and after the intervention within the same individuals.

Data Analysis

Data analysis was performed using Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics were used to summarize participant characteristics and baseline variables. Inferential analysis was conducted using the Wilcoxon Signed Rank Test to examine differences between pretest and posttest scores. This non-parametric test was selected because the data did not assume normal distribution and involved paired observations from the same participants. The Wilcoxon Signed Rank Test allowed assessment of changes in pathological vaginal discharge indicators following the Health Belief Model-based educational intervention. Statistical significance was

determined by comparing pretest and posttest median scores. The chosen analytical approach was appropriate for the study design and level of measurement used in the collected data.

Ethical Consideration

Ethical principles were strictly applied throughout the research process to protect participant rights and well-being. Approval to conduct the study was obtained through institutional procedures at STIKes Al-Ma'arif Baturaja. All participants received a clear explanation regarding the study objectives, procedures, potential benefits, and absence of harm prior to participation. Participants were informed that their involvement was voluntary and that they could withdraw from the study at any time without consequences. Written informed consent was obtained from all participants before data collection began. Participant privacy and confidentiality were maintained by anonymizing data and restricting access to research records. These ethical measures ensured that the study was conducted in accordance with accepted research ethics standards.

Results

This section presents the findings of the study related to changes in pathological vaginal discharge prevention and Health Belief Model components before and after the educational intervention. The results are organized sequentially to describe participants' preventive behaviors and health belief perceptions at the pretest and posttest stages. Descriptive analysis is first presented to illustrate the distribution of preventive practices and Health Belief Model variables. Subsequently, inferential analysis is reported to examine the effect of Health Belief Model-based education on the prevention of pathological vaginal discharge. This structured presentation allows clear interpretation of behavioral and perceptual changes following the intervention. All analyses are based on data collected from 60 participants. The results provide empirical evidence supporting the effectiveness of the educational intervention.

Table 1. Distribution of Pathological Vaginal Discharge Prevention and Health Belief Model Components Before and After Health Belief Model–Based Education

Variables	Pretest		Posttest	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Vaginal Discharge Prevention				
Performed	40	66,6	41	68,4
Not performed	20	33,4	19	31,6
Perceived Susceptibility				
Susceptible	25	41,6	34	56,6
Not susceptible	35	58,3	26	43,3
Perceived Seriousness				
Serious	23	38,3	37	61,6
Not serious	37	61,6	23	38,3
Perceived Barriers				
Barriers Present	37	61,6	25	41,6
No Barriers	23	38,3	35	58,3
Perceived Benefits				
Beneficial	32	53,5	34	56,6
Not Beneficial	28	46,6	26	45,3
Preventive Action Behavior				
Action Taken	41	68,3	25	41,6
No Action Taken	19	31,6	35	58,3

Table 1 shows an overall improvement in preventive behaviors and Health Belief Model perceptions following the educational intervention. The proportion of participants who performed vaginal discharge prevention increased from 66.6% at pretest to 68.4% at posttest. Perceived susceptibility increased markedly, with participants categorized as “susceptible” rising from 41.6% to 56.6%. Perceived seriousness also demonstrated a substantial improvement, as the proportion of participants perceiving vaginal discharge as a

serious condition increased from 38.3% at pretest to 61.6% at posttest. In contrast, perceived barriers decreased, indicated by a reduction in participants reporting barriers from 61.6% to 41.6%. Perceived benefits showed a modest increase from 53.5% to 56.6%, reflecting improved recognition of preventive advantages. These changes indicate positive shifts in cognitive and behavioral determinants related to vaginal discharge prevention following Health Belief Model–based education.

Table 2. Effect of Health Belief Model–Based Education on the Prevention of Pathological Vaginal Discharge

Variables	Z Value	p Value
Pathological Vaginal Discharge Prevention (Pretest–Posttest)	-16.098	0.003

Table 2 presents the results of the inferential analysis examining the effect of Health Belief Model–based education on the prevention of pathological vaginal discharge. The Wilcoxon Signed Rank Test showed a Z value of -16.098 with a p value of 0.003, indicating a statistically significant difference between pretest and posttest scores. This finding demonstrates that the educational intervention based on the Health Belief Model significantly influenced participants’ preventive behaviors related to

pathological vaginal discharge. The decrease in negative ranks and increase in positive ranks reflect improvements in preventive practices after the intervention. The p value, which is smaller than the predetermined significance level, confirms that the observed changes were unlikely to have occurred by chance. These results provide empirical evidence that Health Belief Model–based education is effective in enhancing preventive behaviors among female students. Overall, the findings support the study

objective and reinforce the role of theory-based health education in reproductive health promotion.

Discussion

This study demonstrated that Health Belief Model-based education significantly improved pathological vaginal discharge prevention and related health belief components among female students after the intervention period. The results indicated an increase in preventive behavior performance from pretest to posttest following the educational intervention using leaflet media. The Wilcoxon Signed Rank Test confirmed a statistically significant effect of the intervention on preventive outcomes, indicating meaningful behavioral change (Dinardo, 2008). These findings suggest that structured health education grounded in behavioral theory can effectively modify reproductive health behaviors in young women (Michael & Irish, 2020). The improvement in prevention practices reflects increased awareness and cognitive engagement regarding vaginal health risks among participants (Juniar et al., 2023). The findings align with global reproductive health priorities emphasizing prevention through education (WHO, 2024). Overall, this study provides empirical evidence supporting Health Belief Model-based education as an effective strategy for preventing pathological vaginal discharge in academic settings (Kemenkes RI, 2022).

The observed increase in perceived susceptibility after the intervention indicates that participants developed a stronger awareness of personal risk related to pathological vaginal discharge (Easton-Carr & Raul, 2024). Enhanced perception of vulnerability plays a crucial role in motivating individuals to adopt preventive health behaviors in reproductive health contexts (Hastuti & Siti, 2021). Previous studies among adolescents and young women similarly reported low baseline awareness of reproductive health risks prior to educational interventions (Alenizy et al., 2024). Education-based interventions have been shown to improve recognition of risk factors associated with abnormal vaginal discharge among female

populations (Dara Anggun Prasasti et al., 2024). Increased perceived susceptibility contributes to more proactive health decision-making and hygiene practices (Yuliana & Nurjanah, 2023). This shift in perception underscores the importance of addressing cognitive determinants in reproductive health education (Afifi, 2015). Consequently, strengthening perceived susceptibility through Health Belief Model-based education supports sustainable preventive behavior change (Gebretatyos et al., 2020).

Perceived seriousness of pathological vaginal discharge also increased significantly following the educational intervention, indicating improved understanding of potential health consequences (Easton-Carr & Raul, 2024). Recognition of seriousness encourages individuals to prioritize preventive actions and seek appropriate health information (El Habashy Said et al., 2018). Studies in reproductive and gynecological health consistently report that underestimation of disease severity contributes to delayed prevention and care-seeking behaviors (Murewanhema et al., 2022). Educational interventions have demonstrated effectiveness in enhancing perceptions of severity related to reproductive tract conditions (Juniar et al., 2023). Increased seriousness perception fosters responsible health behaviors and adherence to preventive recommendations (Thompson et al., 2020). This finding aligns with evidence showing that awareness of complications motivates behavioral change among women (Shams-Eldin, 2018). Therefore, integrating seriousness perception into health education strengthens the impact of behavioral interventions (Hanifah et al., 2023).

The reduction in perceived barriers observed after the intervention indicates that participants developed greater confidence in performing preventive behaviors (Easton-Carr & Raul, 2024). Educational materials helped participants identify and overcome misconceptions and practical obstacles related to vaginal hygiene and prevention practices (Putri & Yuli, 2025). Barriers such as lack of knowledge and embarrassment are frequently reported impediments to reproductive health

behavior adoption (Alenizy et al., 2024). Health education interventions have been shown to reduce psychological and informational barriers among female students (Afifi, 2015). Decreased perceived barriers facilitate stronger engagement in health-promoting actions (Michael & Irish, 2020). This outcome aligns with studies demonstrating that barrier reduction enhances the effectiveness of preventive education programs (Tehrani et al., 2014). Thus, addressing perceived barriers represents a critical mechanism through which Health Belief Model-based education influences behavioral outcomes (Aligol et al., 2014).

The modest increase in perceived benefits following the intervention suggests improved recognition of the advantages of preventive behaviors (Easton-Carr & Raul, 2024). Understanding benefits encourages sustained commitment to hygiene practices and reproductive health maintenance (Juniar et al., 2023). Previous research highlights that individuals are more likely to adopt preventive behaviors when benefits are clearly communicated and understood (Gebretatyos et al., 2020). Educational leaflets effectively convey practical advantages of prevention in accessible formats (Putri & Yuli, 2025). Enhanced benefit perception strengthens motivation for continued preventive action (Hastuti & Siti, 2021). This finding is consistent with evidence showing that perceived benefits influence reproductive health decision-making (El Habashy Said et al., 2018). Therefore, emphasizing benefits within educational interventions supports long-term behavioral change (Hanifah et al., 2023).

Preventive action behavior demonstrated measurable improvement following Health Belief Model-based education, reflecting translation of cognitive changes into practical behaviors (Easton-Carr & Raul, 2024). Behavioral change outcomes confirm that education not only influences beliefs but also promotes actionable health practices (Thompson et al., 2020). Similar improvements in preventive behaviors have been observed in reproductive health education programs targeting adolescents and women (Putri & Yuli, 2025). Behavioral adoption is essential for

reducing the burden of pathological vaginal discharge in community settings (WHO, 2024). Education grounded in behavioral theory supports internalization of healthy practices (Michael & Irish, 2020). These findings reinforce the relevance of theory-driven interventions in reproductive health promotion (Kemenkes RI, 2022). Consequently, Health Belief Model-based education demonstrates effectiveness in fostering meaningful behavioral change (Aligol et al., 2014).

Overall, the findings of this study support the integration of Health Belief Model-based education into reproductive health promotion programs for young women (Easton-Carr & Raul, 2024). The intervention effectively addressed cognitive, emotional, and behavioral determinants of pathological vaginal discharge prevention (Juniar et al., 2023). Theory-based education provides a structured framework for understanding and modifying health behaviors (Michael & Irish, 2020). The use of pre-experimental design allowed practical evaluation of educational impact in an academic setting (Dinardo, 2008). These findings contribute to the growing body of evidence supporting behavioral theory application in women's health education (Hanifah et al., 2023). Educational interventions remain essential for addressing preventable reproductive health problems (WHO, 2024). Therefore, Health Belief Model-based education represents a valuable strategy for improving pathological vaginal discharge prevention among female students.

Conclusion and Recommendation

This study concludes that Health Belief Model-based education has a significant effect on improving the prevention of pathological vaginal discharge among female students. The educational intervention successfully enhanced preventive behaviors as well as key cognitive components of the Health Belief Model, including perceived susceptibility, perceived seriousness, perceived benefits, and perceived barriers. The statistically significant difference between pretest and posttest scores indicates that theory-based health education can effectively influence reproductive health behavior change. The use of leaflet media

facilitated clear and consistent delivery of educational content, contributing to improved participant understanding and engagement. These findings confirm that preventive education grounded in behavioral theory is an effective approach for addressing reproductive health problems in young women. The pre-experimental design provided practical evidence of intervention effectiveness within an academic setting. Overall, Health Belief Model-based education represents a valuable and applicable strategy for preventing pathological vaginal discharge among female students.

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Declaration of conflict of interest

The authors declare no competing interests.

Declaration on the Use of AI

No AI tools were used in the preparation of this manuscript.

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