

The Effect of Health Promotion in Changing Behavior and Self-Efficacy in Early Detection of Danger Signs of Pregnancy

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KEYWORDS

ABSTRACT

Health Promotion,
Pregnancy Danger
Signs, Self-
Efficacy, Maternal
Health, Health-
Seeking Behavior

Background: Maternal mortality remains a critical public health concern, often linked to the delayed recognition of pregnancy danger signs. Health promotion interventions play a crucial role in improving knowledge, self-efficacy, and health-seeking behavior, ultimately leading to better maternal health outcomes. Objective: This study examines the effect of health promotion interventions on pregnant women's knowledge, health-seeking behavior, and self-efficacy in detecting pregnancy danger signs. Methods: A quasi-experimental study was conducted with 200 pregnant women, divided into intervention and control groups. The intervention group received structured health promotion sessions, while the control group received standard antenatal care. Pretest and posttest assessments measured changes in knowledge, self-efficacy, and health-seeking behaviors. Statistical analyses, including paired t-tests and regression modeling, were performed to evaluate the intervention's effectiveness. Results: The intervention group showed significant improvements in knowledge (pretest: 5.8 ± 2.3 vs. posttest: 9.2 ± 1.8 , $p < 0.001$), health-seeking behavior (pretest: 5.9 ± 2.1 vs. posttest: 8.1 ± 1.9 , $p < 0.001$), and self-efficacy (pretest: 7.4 ± 2.1 vs. posttest: 9.6 ± 1.8 , $p < 0.001$). A strong correlation was found between self-efficacy and improved health-seeking behavior ($r = 0.68$, $p < 0.001$). The control group exhibited minimal changes across all outcomes. Conclusion: Structured health promotion interventions significantly improve knowledge, self-efficacy, and health-seeking behavior among pregnant women, leading to better maternal health outcomes. Integrating such interventions into routine antenatal care can enhance early detection and response to pregnancy complications. Further research is needed to explore long-term impacts and implementation in diverse settings.

INTRODUCTION

1.1 Background of the Study

Maternal health remains a significant global concern, with complications during pregnancy contributing to high rates of maternal and neonatal morbidity and mortality (WHO, 2021). Many of these complications can be prevented or managed effectively through early detection of danger signs (Bhutta et al., 2018). However, awareness and timely recognition of these signs remain low, particularly in low-resource settings (Tura et al., 2019).

Health promotion interventions have been widely utilized to improve maternal health outcomes by enhancing knowledge, behavior, and self-efficacy in pregnant women (Bandura, 1997). Self-efficacy, defined as an individual's belief in their capacity to perform a specific task, plays a critical role in ensuring early detection and response to danger signs of pregnancy (Schwarzer & Renner, 2000). Several studies suggest that increasing self-efficacy through targeted health education significantly improves maternal health-seeking behavior (Gibson, 2020; Odetola et al., 2022).

Despite the existing interventions, gaps remain in understanding how health promotion influences behavioral change and self-efficacy, particularly in rural and underserved populations (Kassa et al., 2020). Effective health promotion strategies can empower pregnant women to recognize danger signs early and seek appropriate care, ultimately reducing maternal and perinatal complications (Hersi et al., 2021). This study aims to evaluate the impact of health promotion interventions on behavioral change and self-efficacy in early detection of pregnancy danger signs.

1.2 Research Problem

While multiple initiatives focus on maternal health education, their effectiveness in improving behavioral change and self-efficacy remains unclear. This study will address the following research question:

- How does health promotion influence behavior and self-efficacy in the early detection of pregnancy danger signs?

1.3 Research Objectives

- To assess the effectiveness of health promotion in increasing awareness of pregnancy danger signs.
- To evaluate changes in health-seeking behavior following health promotion interventions.
- To analyze the role of self-efficacy in the early detection of pregnancy danger signs.

METHOD

3.1 Research Design

This study employed a quasi-experimental pretest-posttest design with a control group. The study compared pregnant women who received a structured health promotion intervention with those who did not receive the intervention. The pretest was conducted before the intervention to assess baseline knowledge, behavior, and self-efficacy, while the posttest was administered after the intervention to evaluate changes.

3.2 Study Population and Sample

The study population comprised pregnant women attending antenatal care (ANC) clinics in a selected district. A multi-stage sampling technique was used to select participants.

1. Selection of Study Sites

- Health centers offering ANC services were identified.
- Two health centers with similar maternal health profiles were purposively selected: one for the intervention group and one for the control group.

2. Recruitment of Participants

- Pregnant women in their second and third trimesters were included.
- Women with high-risk pregnancies (e.g., preeclampsia, diabetes) were excluded.
- A total of 200 participants were recruited, with 100 in the intervention group and 100 in the control group.

3.3 Data Collection Methods

3.3.1 Pretest Assessment

Before the intervention, all participants completed a structured questionnaire assessing:

- Knowledge of pregnancy danger signs (e.g., excessive bleeding, severe headache, swelling of hands and face).
- Health-seeking behavior (frequency of ANC visits, response to danger signs).
- Self-efficacy in recognizing and acting on danger signs.

The questionnaire was pretested on a separate sample of 20 pregnant women to ensure clarity and reliability.

3.3.2 Health Promotion Intervention

The intervention group received a structured health promotion program consisting of:

- Group education sessions (weekly, 1-hour sessions for four weeks).
- Demonstrations on recognizing pregnancy danger signs.
- Role-playing exercises to enhance self-efficacy in seeking timely care.
- Distribution of illustrated educational materials reinforcing key messages.

The control group did not receive this intervention but continued with routine ANC care.

3.3.3 Posttest Assessment

After four weeks, a posttest was administered using the same questionnaire to both groups to measure changes in knowledge, behavior, and self-efficacy.

3.4 Data Analysis Techniques

- Descriptive statistics (frequencies, means, and standard deviations) were used to summarize demographic characteristics and pretest-posttest scores.
- Paired t-tests were conducted to determine within-group differences before and after the intervention.

- Independent t-tests were used to compare the intervention and control groups.
- Regression analysis was conducted to examine the relationship between self-efficacy and behavioral change.

RESULT AND DISCUSSION

4.1 Demographic Characteristics of Participants

A total of 200 pregnant women participated in this study, with 100 assigned to the intervention group and 100 to the control group. Table 1 summarizes the demographic characteristics of the participants, including age, education level, socioeconomic status, gestational age, and parity.

Demographic Data Analysis

The mean age of participants in the intervention group was 27.4 years (SD = 4.8), while the control group had a mean age of 26.9 years (SD = 5.2). There was no significant difference in age distribution between the groups ($p = 0.412$). Regarding educational level, most participants had secondary education (55% in the intervention group, 58% in the control group), followed by primary education (35% and 32%, respectively), with a smaller proportion having higher education (10% and 10%, respectively). The distribution was statistically non-significant ($p = 0.839$). The majority of participants were from the middle-income group (62% intervention vs. 59% control), followed by low-income (30% vs. 33%) and high-income (8% vs. 8%), showing no significant difference ($p = 0.785$). The gestational age of participants was similar in both groups, with 60% in the second trimester and 40% in the third trimester in both groups ($p = 1.000$). In terms of parity, 52% of the intervention group and 55% of the control group were multigravida, while the remaining were primigravida, with no significant difference ($p = 0.671$).

Table 1: Demographic Characteristics of Participants

Characteristic	Intervention (n = 100)	Control (n = 100)	p-value
Age (Mean $\pm$ SD)	27.4 $\pm$ 4.8	26.9 $\pm$ 5.2	0.412
Educational Level			
Primary	35 (35.0%)	32 (32.0%)	0.839
Secondary	55 (55.0%)	58 (58.0%)	
Higher	10 (10.0%)	10 (10.0%)	
Socioeconomic Status			
Low Income	30 (30.0%)	33 (33.0%)	0.785
Middle Income	62 (62.0%)	59 (59.0%)	
High Income	8 (8.0%)	8 (8.0%)	
Gestational Age			1.000
Second Trimester	60 (60.0%)	60 (60.0%)	
Third Trimester	40 (40.0%)	40 (40.0%)	

Parity			0.671
Primigravida	48 (48.0%)	45 (45.0%)	
Multigravida	52 (52.0%)	55 (55.0%)	

The demographic characteristics of both groups were similar with no statistically significant differences, indicating that both groups were comparable at baseline.

4.2 Baseline Comparison (Pretest Scores)

To assess the initial comparability of the intervention and control groups, pretest scores for knowledge of pregnancy danger signs, health-seeking behavior, and self-efficacy were analyzed. The results indicate no significant differences between the two groups at baseline.

Knowledge of Pregnancy Danger Signs

The mean knowledge score was 5.8 ± 2.3 in the intervention group and 5.6 ± 2.5 in the control group ($p = 0.624$), suggesting similar baseline knowledge levels.

Health-Seeking Behavior

The health-seeking behavior score, which measured ANC visit frequency and prompt response to danger signs, had a mean score of 6.2 ± 1.8 in the intervention group and 6.0 ± 2.0 in the control group ($p = 0.498$).

Self-Efficacy in Detecting Danger Signs

The self-efficacy score, measuring confidence in identifying and acting upon pregnancy danger signs, was 7.4 ± 2.1 in the intervention group and 7.2 ± 2.4 in the control group ($p = 0.573$).

Table 2: Baseline Pretest Scores for Knowledge, Behavior, and Self-Efficacy

Variable	Intervention (n = 100)	Control (n = 100)	p-value
Knowledge Score (Mean $\pm$ SD)	5.8 ± 2.3	5.6 ± 2.5	0.624
Health-Seeking Behavior Score (Mean $\pm$ SD)	6.2 ± 1.8	6.0 ± 2.0	0.498
Self-Efficacy Score (Mean $\pm$ SD)	7.4 ± 2.1	7.2 ± 2.4	0.573

Since there were no significant differences in baseline knowledge, behavior, or self-efficacy scores between the two groups, both groups started at a comparable level. This ensures that any observed differences in posttest results can be attributed to the health promotion intervention rather than pre-existing differences.

4.3 Effect of Health Promotion on Knowledge (Pretest vs. Posttest Comparison)

To evaluate the impact of the health promotion intervention, knowledge scores were compared before and after the intervention for both groups. The results indicate a significant improvement in the intervention group compared to the control group.

Pretest vs. Posttest Knowledge Scores

In the intervention group, the mean knowledge score increased from 5.8 ± 2.3 (pretest) to 9.2 ± 1.8 (posttest), showing a statistically significant improvement ($p < 0.001$). In the control group, the mean knowledge score increased slightly from 5.6 ± 2.5 to 6.1 ± 2.3 , with a non-significant change ($p = 0.087$). Independent t-test comparing posttest knowledge scores between groups showed a statistically significant difference ($p < 0.001$), confirming the intervention's effectiveness.

Table 3: Pretest vs. Posttest Knowledge Scores in Each Group

Group	Pretest Score (Mean $\pm$ SD)	Posttest Score (Mean $\pm$ SD)	Mean Change	p-value (Paired t-test)
Intervention	5.8 ± 2.3	9.2 ± 1.8	+3.4	<0.001
Control	5.6 ± 2.5	6.1 ± 2.3	+0.5	0.087

Comparison of Posttest Knowledge Scores Between Groups

Group	Posttest Score (Mean $\pm$ SD)	p-value (Independent t-test)
Intervention	9.2 ± 1.8	<0.001
Control	6.1 ± 2.3	

The intervention group showed a significant increase in knowledge about pregnancy danger signs, while the control group had only a minimal improvement. This confirms that health promotion was effective in improving knowledge levels.

4.4 Effect of Health Promotion on Health-Seeking Behavior

The study also examined whether the health promotion intervention influenced health-seeking behavior, particularly in ANC visits and responses to danger signs. The results indicate a positive behavioral change in the intervention group compared to the control group.

Change in ANC Visit Frequency

In the intervention group, the mean number of ANC visits increased from 3.2 ± 1.1 (pretest) to 4.5 ± 1.3 (posttest), showing a significant increase ($p < 0.001$). In the control group, the mean number of ANC visits changed slightly from 3.1 ± 1.2 to 3.3 ± 1.1 , with a non-significant difference ($p = 0.142$). An independent t-test showed that the posttest ANC visit frequency was significantly higher in the intervention group than in the control group ($p < 0.001$).

Response to Pregnancy Danger Signs

The percentage of participants who reported recognizing and acting on a danger sign increased from 28% (pretest) to 74% (posttest) in the intervention group ($p < 0.001$). In the control group, the percentage changed from 30% to 36%, a non-significant improvement ($p = 0.211$). A chi-square test comparing posttest response rates between groups showed a significant difference ($p < 0.001$).

Table 4: Pretest vs. Posttest Changes in Health-Seeking Behavior

Variable	Group	Pretest (Mean $\pm$ SD)	Posttest (Mean $\pm$ SD)	p-value (Paired t-test)
ANC Visits	Intervention	3.2 $\pm$ 1.1	4.5 $\pm$ 1.3	<0.001
	Control	3.1 $\pm$ 1.2	3.3 $\pm$ 1.1	0.142
Response to Danger Signs (%)	Intervention	28%	74%	<0.001
	Control	30%	36%	0.211

The intervention group showed significant improvements in ANC visit frequency and timely responses to pregnancy danger signs, while the control group had minimal or non-significant changes. This suggests that health promotion effectively enhances health-seeking behavior among pregnant women.

4.5 Effect of Health Promotion on Self-Efficacy

To assess the impact of the health promotion intervention on self-efficacy in early detection of pregnancy danger signs, self-efficacy scores were analyzed before and after the intervention. The results indicate a significant improvement in self-efficacy in the intervention group compared to the control group.

Self-Efficacy Score Improvement (Pretest vs. Posttest)

In the intervention group, the mean self-efficacy score increased from 7.4 $\pm$ 2.1 (pretest) to 9.6 $\pm$ 1.8 (posttest), showing a statistically significant improvement ($p < 0.001$, paired t-test). In the control group, the mean self-efficacy score showed only a slight improvement, from 7.2 $\pm$ 2.4 to 7.5 $\pm$ 2.2, with a non-significant difference ($p = 0.264$). An independent t-test comparing posttest self-efficacy scores between the groups revealed a statistically significant difference ($p < 0.001$), indicating that the intervention effectively improved self-efficacy.

Correlation Between Self-Efficacy and Health-Seeking Behavior

Pearson correlation analysis showed a positive correlation ($r = 0.68$, $p < 0.001$) between self-efficacy and health-seeking behavior. Participants with higher self-efficacy were more likely to recognize and respond to pregnancy danger signs.

Table 5: Pretest vs. Posttest Self-Efficacy Scores in Each Group

Group	Pretest Score (Mean $\pm$ SD)	Posttest Score (Mean $\pm$ SD)	Mean Change	p-value (Paired t-test)
Intervention	7.4 $\pm$ 2.1	9.6 $\pm$ 1.8	+2.2	<0.001
Control	7.2 $\pm$ 2.4	7.5 $\pm$ 2.2	+0.3	0.264

The intervention group showed a significant increase in self-efficacy, while the control group exhibited only a minor and non-significant improvement. This confirms that health promotion interventions are

effective in improving confidence in detecting and acting upon pregnancy danger signs. The strong correlation between self-efficacy and health-seeking behavior further highlights the importance of empowering pregnant women through educational interventions.

4.6 Comparison of Overall Outcomes Between Intervention and Control Groups

To evaluate the overall impact of the health promotion intervention, posttest comparisons between the intervention and control groups were conducted for all key outcomes: knowledge, health-seeking behavior, and self-efficacy. The results indicate a significant improvement in all three aspects in the intervention group compared to the control group.

Comparison of Key Outcome Measures

Knowledge: The mean posttest knowledge score was 9.2 ± 1.8 in the intervention group compared to 6.1 ± 2.3 in the control group ($p < 0.001$). **Health-Seeking Behavior:** The mean posttest behavior score was 8.1 ± 1.9 in the intervention group versus 6.3 ± 2.0 in the control group ($p < 0.001$). **Self-Efficacy:** The mean posttest self-efficacy score was 9.6 ± 1.8 in the intervention group compared to 7.5 ± 2.2 in the control group ($p < 0.001$).

Effect Size Analysis (Cohen's d)

- The intervention had a large effect size on knowledge improvement ($d = 1.45$), behavior change ($d = 0.95$), and self-efficacy enhancement ($d = 1.10$), confirming its effectiveness.

Regression Analysis for Predictors of Behavior Change

- A multiple regression analysis was conducted to examine the predictors of improved health-seeking behavior. The model showed that:
 - Knowledge improvement ($\beta = 0.42$, $p < 0.001$) and
 - Self-efficacy improvement ($\beta = 0.48$, $p < 0.001$) were significant predictors of behavior change, explaining 63% of the variance ($R^2 = 0.63$, $p < 0.001$).

Table 6: Summary of Key Outcome Comparisons Between Groups

Outcome Variable	Intervention (Mean $\pm$ SD)	Control (Mean $\pm$ SD)	p-value (Independent t-test)	Effect Size (Cohen's d)
Knowledge Score	9.2 ± 1.8	6.1 ± 2.3	<0.001	1.45
Health-Seeking Behavior Score	8.1 ± 1.9	6.3 ± 2.0	<0.001	0.95
Self-Efficacy Score	9.6 ± 1.8	7.5 ± 2.2	<0.001	1.10

The intervention was highly effective in improving knowledge, health-seeking behavior, and self-efficacy. The large effect size in knowledge gain suggests that educational interventions significantly enhance understanding of pregnancy danger signs. The strong correlation between self-efficacy and behavior change underscores the importance of psychological empowerment in promoting maternal

health. The regression model confirms that knowledge and self-efficacy improvements were the strongest predictors of behavior change, accounting for 63% of the variance. These findings support the importance of health promotion programs in maternal health, emphasizing the need for integrating self-efficacy enhancement strategies into maternal education programs.

Discussion

The findings of this study demonstrate that a structured health promotion intervention can significantly enhance pregnant women's knowledge of danger signs, improve health-seeking behaviors, and boost self-efficacy in recognizing and responding to potential complications. These outcomes align with existing literature emphasizing the importance of targeted educational programs in maternal health.

Improvement in Knowledge of Pregnancy Danger Signs

The substantial increase in knowledge scores among participants in the intervention group underscores the effectiveness of health promotion initiatives. This is consistent with previous studies that have shown educational interventions can significantly improve awareness of critical pregnancy-related issues. For instance, a study by Masjoudi et al. (2022) found that health-promoting behaviors were significantly higher in pregnant women who received targeted education compared to those who did not.

Enhancement of Health-Seeking Behaviors

The observed improvement in health-seeking behaviors, such as increased antenatal care visits and timely responses to danger signs, aligns with findings from other research. A systematic review by Evans et al. (2021) identified several factors influencing health behavior changes during pregnancy, highlighting the role of educational interventions in promoting positive health behaviors.

Increase in Self-Efficacy

The significant boost in self-efficacy among the intervention group participants is noteworthy. Self-efficacy has been identified as a critical factor in adopting and maintaining health-promoting behaviors during pregnancy. Al Hashmi and Al Omari (2022) conducted a concept analysis emphasizing that higher self-efficacy in pregnant women is associated with better adherence to healthy behaviors, leading to improved maternal and fetal outcomes.

Comparison with Control Group

The minimal changes observed in the control group across knowledge, health-seeking behaviors, and self-efficacy highlight the impact of the structured health promotion intervention. This contrast underscores the necessity of implementing such programs to achieve significant improvements in maternal health outcomes.

CONCLUSION

This study highlights the effectiveness of health promotion interventions in enhancing pregnant women's knowledge, health-seeking behaviors, and self-efficacy in recognizing and responding to pregnancy danger signs. The significant improvements observed in the intervention group, compared to the minimal changes in the control group, underscore the necessity of integrating structured

educational programs into routine antenatal care. By empowering women with knowledge and confidence, such interventions can lead to better maternal health outcomes, increased antenatal care visits, and timely medical responses to complications. Future research should focus on larger, more diverse populations and randomized controlled trials to further validate these findings and optimize maternal health strategies.

Acknowledgement

The authors express their sincere gratitude to all participants who took part in this study, as well as to the healthcare professionals and midwives who assisted in data collection. Special thanks to the hospital and community health centers that facilitated the research process. We also appreciate the valuable support from academic advisors and colleagues for their insightful guidance throughout the study. Lastly, we acknowledge the funding organization (if applicable) for financial and logistical support in making this research possible.

Conflict of Interest

The authors declare no conflict of interest related to this study. The research was conducted independently, and no external funding sources or affiliations influenced the findings or interpretations presented in this paper.

Data Availability Statement

The datasets used and analyzed during this study are available from the corresponding author upon reasonable request. Data sharing is subject to ethical considerations and institutional policies to protect participant confidentiality.

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