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The Effect of Health Promotion Programs on Maternal Health Outcomes

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Abstract

Maternal health remains a major public health concern in Indonesia, particularly in regions experiencing healthcare access disparities and limited maternal health literacy. This study aimed to examine the effect of health promotion programs on maternal health outcomes in Gorontalo. A quantitative quasi-experimental design with pre-test and post-test control groups was employed involving 200 women of reproductive age. The intervention consisted of structured health promotion sessions focusing on maternal nutrition, pregnancy danger signs, birth preparedness, and healthcare utilization. Data were collected through questionnaires and maternal health records and analyzed using descriptive statistics, paired-sample t-tests, independent-sample t-tests, and multiple regression analysis. The findings indicate significant improvements in maternal knowledge, antenatal care attendance, birth preparedness, and facility-based delivery among participants receiving the intervention. Regression results further demonstrate that health promotion was the strongest predictor of maternal health outcomes after controlling for socio-demographic factors. The findings highlight the strategic importance of integrating structured health promotion into primary healthcare systems to improve maternal health performance and reduce healthcare inequalities.

INTRODUCTION

Maternal health remains a fundamental indicator of public health performance, social development, and healthcare system effectiveness worldwide. Despite substantial global progress in reducing maternal mortality over the past two decades, maternal morbidity and mortality continue to pose significant challenges, particularly in low- and middle-income countries (LMICs). According to global health reports, preventable complications during pregnancy, childbirth, and the postpartum period remain among the leading causes of death and disability among women of reproductive age (Ara et al., 2022; Gani et al., 2023; McNestry et al., 2023; Sheikh et al., 2024). These conditions are often exacerbated by inadequate health literacy, delayed utilization of maternal healthcare services, socioeconomic inequalities, and limited access to quality healthcare facilities. Consequently,

improving maternal health outcomes has become a central priority within international development agendas, including the Sustainable Development Goals (SDGs), particularly Goal 3, which aims to reduce the global maternal mortality ratio to less than 70 deaths per 100,000 live births by 2030.

The persistence of maternal health disparities demonstrates that improvements in healthcare infrastructure alone are insufficient to achieve sustainable maternal health outcomes (Adeyemi et al., 2025; Diyaolu, 2025; Aidoo, 2024). Contemporary public health literature increasingly emphasizes the importance of health promotion as a preventive and empowerment-based approach capable of influencing maternal knowledge, attitudes, and behaviors (Pratami et al., 2024; Moreal et al., 2025; Denysyuk et al., 2024). Health promotion interventions seek to enhance individuals' capacity to make informed health decisions, strengthen community engagement, and encourage the utilization of essential maternal healthcare services. Unlike curative interventions that focus primarily on treatment, health promotion addresses underlying behavioral and social determinants that contribute to adverse maternal outcomes. Consequently, health promotion has emerged as a strategic mechanism for reducing preventable maternal complications and improving reproductive health indicators in diverse sociocultural contexts (Anyanwu et al., 2024; Neely & Reed, 2023; Steel et al., 2025).

Empirical evidence suggests that health promotion programs can significantly influence maternal healthcare utilization and health-seeking behavior. Studies conducted across Asia, Africa, and Latin America have demonstrated that educational interventions, community-based counseling, and maternal awareness campaigns increase antenatal care attendance, improve recognition of pregnancy danger signs, encourage facility-based deliveries, and enhance maternal nutrition practices. Community participation interventions in South Asia, for example, have been associated with improved maternal service utilization and reductions in preventable maternal complications (Herwansyah et al., 2022; Mzembe et al., 2023; Hasan et al., 2024). Similarly, culturally sensitive maternal health promotion initiatives in African countries have successfully increased skilled birth attendance and strengthened community trust in formal healthcare systems. These findings indicate that health promotion contributes not only to individual knowledge acquisition but also to broader behavioral and institutional changes that support maternal well-being (Guruge et al., 2022; Lakioti et al., 2025).

Within Indonesia, maternal health continues to represent a critical public health concern despite sustained governmental efforts to improve reproductive healthcare services. Indonesia's maternal mortality ratio remains among the highest in Southeast Asia, reflecting persistent inequalities in healthcare access, service quality, and health literacy across regions Sriyanto et al., 2023; Wahyuningsih et al., 2023; (Feng et al., 2025). National programs such as Program Indonesia Sehat and various maternal and child health initiatives have sought to integrate health promotion into primary healthcare delivery. Nevertheless, implementation challenges remain evident, particularly in rural and peripheral areas characterized by geographic isolation, limited healthcare infrastructure, shortages of healthcare personnel, and deeply rooted cultural practices influencing maternal health behaviors. These challenges often contribute to delays in recognizing obstetric complications, seeking healthcare services, and receiving appropriate treatment, thereby increasing the risk of adverse maternal outcomes (Bauer et al., 2023; Gesese et al., 2023).

Gorontalo Province represents a particularly important setting for examining the effectiveness of health promotion programs in improving maternal health outcomes (Rohimi et al., 2024; Nurlaily & Agustini, 2025). As a region characterized by uneven healthcare accessibility, socioeconomic disparities, and varying levels of maternal

health literacy, Gorontalo continues to experience challenges associated with maternal healthcare utilization and safe childbirth practices (Damayanti et al., 2023; Ningrum et al., 2024). Although community-based initiatives such as posyandu and maternal counseling programs have been implemented to improve awareness and service utilization, evidence regarding their measurable impact on maternal health outcomes remains limited. Existing studies have predominantly focused on descriptive assessments of maternal health conditions, healthcare access barriers, or socioeconomic determinants of maternal mortality. Consequently, there is insufficient empirical evidence demonstrating the causal relationship between structured health promotion interventions and measurable improvements in maternal health indicators within the Gorontalo context.

The existing body of literature has established the importance of maternal education and community engagement in promoting positive maternal health behaviors. However, several limitations remain apparent. First, previous studies frequently examine health promotion as one of many explanatory variables rather than evaluating its independent effect through intervention-based research designs. Second, many investigations rely on cross-sectional approaches, limiting the ability to assess behavioral changes over time and establish causal inferences. Third, relatively few studies have simultaneously examined multiple dimensions of maternal health outcomes, including maternal knowledge, antenatal care utilization, and facility-based delivery practices, within a single analytical framework. Finally, evidence from eastern Indonesian regions remains underrepresented in the international maternal health literature, creating a contextual gap that limits the development of region-specific policy recommendations.

These limitations reveal a clear research gap concerning the effectiveness of structured health promotion interventions in improving maternal health outcomes in underserved Indonesian settings. Addressing this gap is essential because maternal health outcomes are influenced not only by healthcare availability but also by the capacity of women and communities to understand, access, and utilize healthcare services effectively. Therefore, rigorous empirical evaluation of health promotion programs is needed to identify whether such interventions can generate measurable and sustainable improvements in maternal health behaviors and outcomes.

The novelty of this study lies in its examination of health promotion as a strategic intervention using a quasi-experimental design that enables a more robust assessment of causal effects. Unlike previous studies that primarily focus on descriptive analyses or correlational relationships, this research evaluates the impact of a structured health promotion program on multiple maternal health indicators, including maternal knowledge, antenatal care attendance, and facility-based delivery practices. Furthermore, the study contributes context-specific evidence from Gorontalo, a region that remains underrepresented in international maternal health research. By integrating behavioral, service utilization, and delivery outcome dimensions within a single analytical model, this study provides a more comprehensive understanding of how health promotion influences maternal health performance.

Accordingly, this study aims to analyze the effect of health promotion programs on maternal health outcomes among women of reproductive age in Gorontalo. The research contributes to the literature by providing empirical evidence regarding the effectiveness of structured health promotion interventions, advancing theoretical understanding of health behavior change in maternal healthcare, and offering practical recommendations for policymakers and healthcare managers seeking to strengthen maternal health systems in resource-constrained settings.

METHODS

Research Design

This study employed a quantitative approach using a quasi-experimental design with a pre-test and post-test control group structure. The quasi-experimental approach was selected because it enables the examination of causal relationships between interventions and outcomes in real-world community settings where random assignment is often impractical (Keith et al., 2023). The design allowed for the comparison of maternal health outcomes between participants who received a structured health promotion intervention and those who received routine maternal healthcare services. By measuring outcomes before and after the intervention, the study assessed the extent to which health promotion programs contributed to changes in maternal knowledge, healthcare utilization, and delivery practices.

Research Setting and Participants

The research was conducted in Gorontalo Province, Indonesia, a region characterized by substantial disparities in healthcare access, maternal health literacy, and socioeconomic conditions. Gorontalo represents a relevant setting for maternal health research because rural communities continue to experience barriers related to healthcare infrastructure, transportation, and cultural beliefs surrounding pregnancy and childbirth.

The target population consisted of women of reproductive age (15–49 years) who were either pregnant or had delivered within the previous six months. A multistage sampling technique was applied to ensure adequate representation. Initially, districts with varying levels of maternal healthcare accessibility were purposively selected. Subsequently, villages were randomly chosen, followed by systematic random sampling of eligible participants. Based on statistical power considerations and recommendations for intervention studies, a total of 200 participants were recruited and equally allocated into intervention (n = 100) and control (n = 100) groups.

Health Promotion Intervention and Data Collection

The intervention was implemented over a three-month period and consisted of structured maternal health promotion sessions delivered by trained midwives and community health workers. Educational topics included maternal nutrition, identification of pregnancy danger signs, birth preparedness, antenatal care utilization, and the importance of facility-based delivery. Various communication methods, including lectures, group discussions, visual educational materials, and home visits, were employed to reinforce learning and encourage behavioral change.

Primary data were collected using structured questionnaires administered before and after the intervention. The instrument measured socio-demographic characteristics, maternal health knowledge, health-seeking behaviors, and maternal healthcare practices. Secondary data were obtained from community health centers (puskesmas) and integrated health service posts (posyandu), including records of antenatal care attendance, delivery locations, and maternal health service utilization.

Variables and Measurement

The independent variable was participation in the health promotion program. The dependent variables comprised maternal health outcomes measured through three dimensions: maternal health knowledge, antenatal care utilization, and facility-based delivery practices. Maternal knowledge was assessed using a standardized questionnaire scored according to the number of correct responses. Healthcare

utilization was measured by the frequency of antenatal care visits, while delivery outcomes were assessed based on whether childbirth occurred in a healthcare facility attended by skilled birth personnel. Socio-demographic variables, including age, education, household income, and parity, were included as control variables.

Data Analysis

Data analysis was performed using SPSS version 26. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize participant characteristics and baseline conditions. To evaluate intervention effects within groups, paired-sample t-tests were conducted. Independent-sample t-tests were used to compare post-intervention outcomes between intervention and control groups. Furthermore, multiple regression analysis was employed to examine the independent contribution of health promotion programs to maternal health outcomes while controlling for potential confounding variables. Statistical significance was determined at a threshold of $p < 0.05$.

Validity and Reliability

To ensure content validity, the questionnaire was developed based on established maternal health indicators and reviewed by three experts in maternal and public health research. A pilot study involving 30 participants outside the main sample was conducted to assess instrument clarity and consistency. Reliability testing using Cronbach's Alpha demonstrated satisfactory internal consistency, with coefficients exceeding the recommended threshold of 0.70. In addition, enumerators received standardized training to minimize measurement bias and ensure consistency during data collection. These procedures enhanced the credibility, reliability, and methodological rigor of the study findings.

RESULTS AND DISCUSSION

This section presents the empirical findings concerning the effectiveness of health promotion programs on maternal health outcomes in Gorontalo. The results are organized into four stages. First, the demographic characteristics and baseline comparability of participants are presented. Second, changes in maternal knowledge before and after the intervention are examined. Third, differences in maternal healthcare utilization and delivery practices between the intervention and control groups are analyzed. Finally, a multiple regression model is employed to identify the independent contribution of the health promotion intervention while controlling for socio-demographic characteristics. This structure enables a comprehensive assessment of the intervention's effectiveness across multiple dimensions of maternal health outcomes.

Demographic Characteristics of Participants

A total of 200 women of reproductive age participated in the study, consisting of 100 respondents in the intervention group and 100 respondents in the control group. The demographic characteristics of participants are presented in Table 1.

Table 1. Demographic Characteristics of Participants (n = 200)

Variable	Intervention (n=100)	Control (n=100)	Total (%)
Age 15–24 years	22	20	21.0
Age 25–35 years	69	67	68.0
Age >35 years	9	13	11.0
Primary Education	18	20	19.0
Junior High School	41	39	40.0
Senior High School	33	31	32.0
Higher Education	8	10	9.0

Income Below Provincial Average	58	62	60.0
Income Above Provincial Average	42	38	40.0
Primiparous	37	35	36.0
Multiparous	63	65	64.0

Source: Primary survey data, 2025

Table 1 demonstrates that the demographic composition of the intervention and control groups was relatively balanced. The majority of participants (68%) were between 25 and 35 years old, representing the most active reproductive age group. Approximately 72% had completed at least junior secondary education, while 60% reported household incomes below the provincial average. Multiparous mothers accounted for 64% of the sample. The similarity of participant characteristics across both groups suggests that the intervention and control groups were comparable prior to the implementation of the health promotion program.

Baseline Equivalence Between Groups

To ensure that post-intervention differences could be attributed to the health promotion program rather than pre-existing differences, baseline comparisons were conducted between the intervention and control groups.

Table 2. Baseline Comparison of Participants Before Intervention

Variable	Intervention Mean (SD)	Control Mean (SD)	p-value
Maternal Knowledge Score	11.2 (2.3)	11.0 (2.4)	0.563
Maternal Age (Years)	29.4 (5.8)	29.9 (6.1)	0.614
Years of Education	9.1 (2.8)	8.9 (2.9)	0.721
Monthly Household Income (Log Scale)	6.78 (0.42)	6.74 (0.46)	0.589
Parity	2.3 (1.1)	2.4 (1.2)	0.667

Source: Primary survey data, 2025

The baseline comparison indicates no statistically significant differences between the intervention and control groups before the intervention was implemented ($p > 0.05$). This finding supports the internal validity of the study and suggests that subsequent differences observed after the intervention are likely attributable to the health promotion program rather than demographic or socioeconomic disparities.

Maternal Knowledge Improvement Following Health Promotion

One of the principal objectives of the intervention was to improve maternal health knowledge regarding nutrition, antenatal care, pregnancy danger signs, and birth preparedness. Changes in maternal knowledge were evaluated using a paired-sample t-test.

Table 3. Paired Sample t-Test Results for Maternal Knowledge (Intervention Group, n = 100)

Variable	Pre-test Mean (SD)	Post-test Mean (SD)	Mean Difference	t-value	p-value
Maternal Knowledge Score (0–20)	11.2 (2.3)	16.5 (1.8)	+5.3	14.62	<0.001

Source: Research survey data, 2025

The results reveal a substantial increase in maternal knowledge following participation in the health promotion program. The mean knowledge score increased from 11.2 before the intervention to 16.5 after the intervention, representing an average gain of 5.3 points. The paired-sample t-test confirmed that the difference was statistically significant ($t = 14.62$, $p < 0.001$).

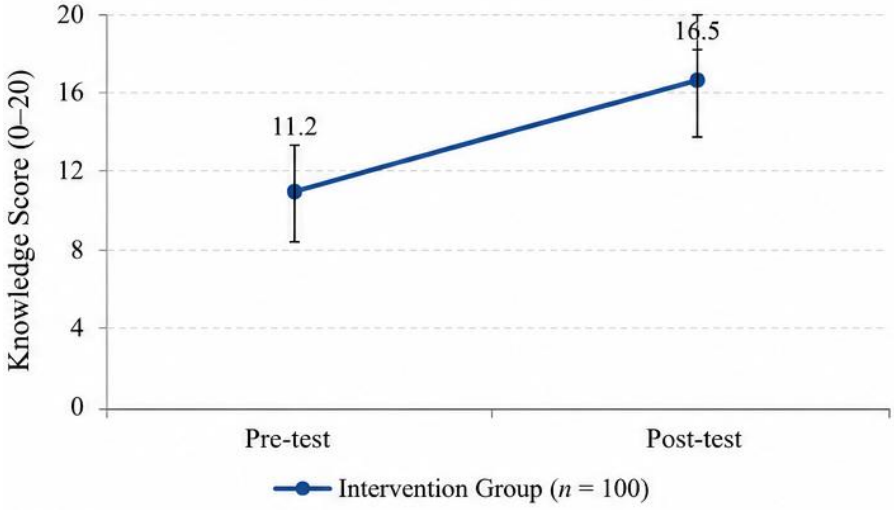

Figure 1. Maternal Knowledge Score Improvement Before and After Intervention

Source: Research survey data, 2025

The increase in scores demonstrates that the educational sessions effectively enhanced participants' understanding of maternal healthcare practices. Improvements were particularly evident in knowledge related to pregnancy danger signs, recommended antenatal care schedules, nutritional requirements, and preparation for institutional delivery.

Comparison of Post-Intervention Maternal Health Outcomes

Following the intervention, maternal health outcomes were compared between the intervention and control groups.

Table 4. Post-Intervention Comparison Between Intervention and Control Groups

Variable	Intervention Mean (SD)	Control Mean (SD)	Mean Difference	t-value	p-value
Maternal Knowledge Score (0–20)	16.5 (1.8)	12.4 (2.1)	+4.1	12.07	<0.001
ANC Visits (Number)	6.2 (1.1)	4.8 (1.4)	+1.4	7.85	<0.001
Birth Preparedness Score (0–10)	8.4 (1.3)	6.2 (1.7)	+2.2	8.94	<0.001
Facility-Based Delivery (%)	88%	63%	+25%	4.32	<0.001

Source: Primary survey data and maternal health records, 2025

Table 4 demonstrates substantial differences between groups after the intervention. Women who participated in the health promotion program achieved significantly higher maternal knowledge scores than those in the control group. Furthermore, they attended more antenatal care visits and demonstrated greater preparedness for childbirth.

Most notably, facility-based delivery rates reached 88% in the intervention group compared with 63% in the control group. This finding indicates that participation in the program substantially increased the likelihood of seeking skilled maternal healthcare services during childbirth.

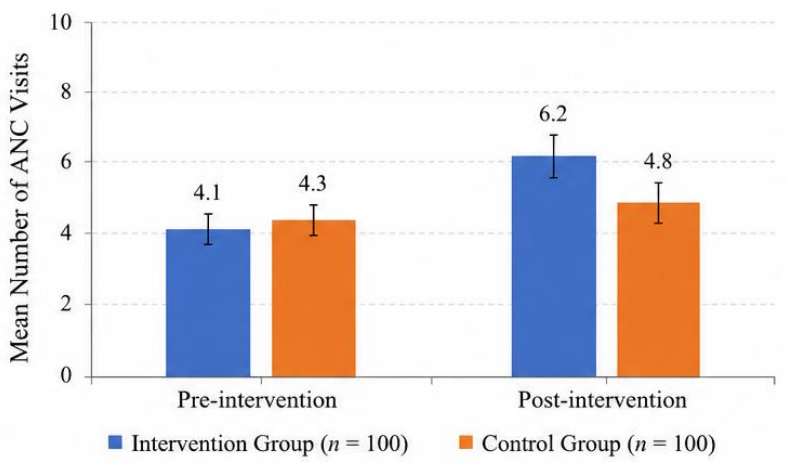

Figure 2. Comparison of ANC Visits Between Groups

Source: Maternal healthcare records from puskesmas and posyandu, 2025

The figure illustrates that women exposed to the intervention consistently demonstrated higher utilization of antenatal care services than women receiving routine maternal healthcare alone.

Descriptive Summary of Maternal Health Outcomes

To provide a broader overview of intervention effectiveness, descriptive statistics for major outcome indicators are presented in Table 5.

Table 5. Summary of Maternal Health Outcome Indicators

Indicator	Intervention	Control
Adequate ANC Attendance (%)	84	61
Knowledge Achievement (%)	82.5	62.0
Birth Preparedness (%)	80	58
Facility-Based Delivery (%)	88	63

Source: Research survey and maternal health records, 2025

The descriptive statistics reinforce previous findings by demonstrating consistently better outcomes among women participating in the intervention. Across all indicators, the intervention group outperformed the control group by margins ranging from 19 to 25 percentage points.

Predictors of Maternal Health Outcomes

To determine whether the intervention remained influential after controlling for demographic and socioeconomic factors, a multiple regression model was estimated.

Table 6. Multiple Regression Analysis Predicting Maternal Health Outcomes (n = 200)

Predictor Variable	B	SE	Beta	t-value	p-value
Health Promotion Intervention	3.87	0.42	0.51	9.21	<0.001
Maternal Age	0.05	0.06	0.04	0.83	0.407
Maternal Education	0.21	0.09	0.15	2.33	0.021
Household Income	0.37	0.14	0.12	2.64	0.009
Parity	-0.18	0.11	-0.07	-1.64	0.102

Model Statistics: $R^2 = 0.42$

Source: SPSS output generated from primary survey data, 2025

The regression model explained 42% of the variance in maternal health outcomes. Among all variables included in the analysis, participation in the health promotion program emerged as the strongest predictor ($\beta = 0.51$, $p < 0.001$). This finding indicates that women exposed to the intervention experienced significantly better maternal health outcomes regardless of age, parity, educational attainment, or income level.

Education and household income also demonstrated statistically significant positive effects, while maternal age and parity did not significantly predict outcomes. These findings suggest that although socioeconomic factors contribute to maternal healthcare utilization, the health promotion intervention exerted the greatest independent influence on maternal health outcomes.

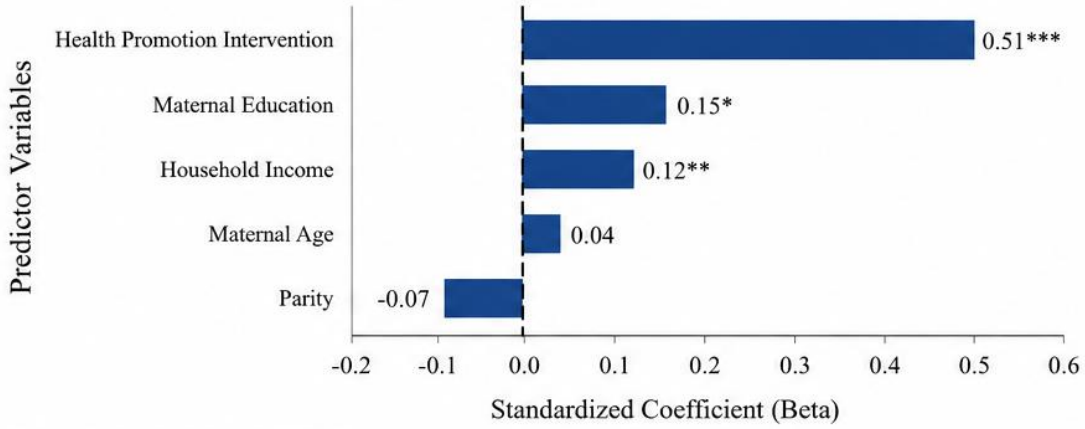

Figure 3. Standardized Regression Coefficients Predicting Maternal Health Outcomes

Source: SPSS regression output, 2025

The figure highlights the dominant contribution of the intervention variable relative to other predictors included in the model.

Health Promotion as a Strategic Determinant of Maternal Health Outcomes

The findings of this study demonstrate that structured health promotion programs significantly improve maternal health outcomes, particularly maternal knowledge, antenatal care (ANC) utilization, birth preparedness, and facility-based delivery practices. These results reinforce the growing body of evidence suggesting that health promotion serves as a critical mechanism for addressing behavioral and informational barriers that contribute to maternal morbidity and mortality. The substantial improvement in maternal knowledge observed among participants is consistent with previous studies indicating that educational interventions enhance women's ability to recognize pregnancy danger signs, understand nutritional requirements, and make informed healthcare decisions (Neely & Reed, 2023; Tahira & Fatima, 2024). Such improvements are particularly important in underserved settings where inadequate health literacy remains a major determinant of delayed healthcare utilization.

The positive association between health promotion and increased ANC attendance aligns with findings reported in South Asia and Sub-Saharan Africa, where community-based maternal education programs have been shown to increase the frequency of antenatal visits and strengthen engagement with formal healthcare systems (Tabong et al., 2021; Gwacham-Anisiobi et al., 2024; Abdalla Osman

Mohamed et al., 2025). However, the magnitude of improvement identified in this study appears relatively stronger than that reported in several previous investigations. This difference may be attributed to the integrated nature of the intervention, which combined educational sessions, visual learning materials, and home visits. Such a multifaceted approach likely enhanced message retention and reinforced behavioral change through repeated community-level engagement.

Similarly, the significant increase in facility-based deliveries supports earlier evidence demonstrating that health promotion can reduce delays in seeking professional maternal healthcare services (Bohren et al., 2024; Saffa et al., 2024; Ntawukuriryayo et al., 2024). The findings also support the "three delays" framework, which emphasizes that improved awareness and preparedness can reduce delays in recognizing complications and accessing appropriate healthcare. Unlike many previous studies that primarily examined service utilization outcomes, the present research simultaneously assessed knowledge, healthcare utilization, and delivery practices, thereby providing a more comprehensive evaluation of maternal health promotion effectiveness.

From a theoretical perspective, the study contributes to health behavior and health promotion literature by demonstrating that educational interventions can influence both cognitive and behavioral dimensions of maternal healthcare. The strong predictive effect of the intervention in the regression model suggests that health promotion operates as an independent determinant of maternal health outcomes beyond socioeconomic factors such as income and education. This finding extends existing theoretical assumptions that health-related behaviors are shaped not only by structural determinants but also by targeted interventions that enhance knowledge and self-efficacy.

Practically, the findings provide evidence for policymakers and healthcare managers to strengthen community-based health promotion programs within primary healthcare systems. Integrating structured maternal education into routine services delivered through puskesmas and posyandu may improve maternal healthcare utilization while supporting national strategies aimed at reducing maternal mortality. Such integration is particularly relevant for rural and resource-constrained regions where healthcare accessibility challenges persist.

The novelty of this study lies in its use of a quasi-experimental design to evaluate the causal impact of health promotion programs on multiple maternal health indicators within the underrepresented context of Gorontalo, Indonesia. Unlike previous studies that relied predominantly on cross-sectional data, this research provides stronger empirical evidence regarding the effectiveness of structured interventions in improving maternal health outcomes.

Several limitations should be acknowledged. First, the study was conducted within a single province, limiting the generalizability of findings to other regions with different sociocultural characteristics. Second, the intervention period was relatively short, preventing assessment of long-term behavioral sustainability. Third, some behavioral measures relied on self-reported responses, which may introduce response bias. Future studies should employ longitudinal designs, include broader geographical coverage, and examine the long-term effectiveness of health promotion interventions. Further research could also explore digital health promotion strategies and community-based participatory approaches to strengthen maternal health outcomes in diverse healthcare settings.

CONCLUSION

The results of this study show that health promotion programs have major contributions in improving the health outcomes of mothers in Gorontalo. The results

indicated that the structured maternal health promotion interventions had significant impact on maternal knowledge, uptake of ANC, preparedness for birth and delivery practices in the facility. Furthermore, the intervention was an independent predictor of maternal health outcomes, even when controlling for socio-demographic factors, which further demonstrates the independent role of health promotion in improving maternal health.

In theory this study will add to the health promotion and maternal health literature with empirical evidence that behavior and cognition can be improved with a structured community-based intervention. The results have practical implication for the inclusion of health promotion in primary healthcare services, especially in community health centres and local maternal health services in less accessible areas. This integration could help to address gaps in maternal health and speed up progress towards maternal mortality reduction goals. There are some restrictions to be noted. The study took place in one province only, reducing the generalizability and the short duration of the intervention prevented the evaluation of long term behavioural sustainability. Longitudinal designs, multiple regions and digital and community participatory health promotion models should be used in further studies to assess their effectiveness in enhancing maternal health outcomes in various settings.

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