RESEARCH PAPER

Effectiveness of Educational Intervention on Maternal Health Knowledge among Pregnant Women: A Pre-Post Intervention Study

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ABSTRACT

Objective: To evaluate the effectiveness of an educational intervention program in improving maternal health knowledge among pregnant women attending antenatal care services. **Methodology:** A pre-post intervention study was conducted in Tehsil Headquarter(THQ) Khanozai Balochistan from 19th June 2025 to 19th March 2026 with 36 pregnant women were enrolled in this study. Pre-intervention knowledge assessment was conducted, followed by structured educational intervention, and post-intervention evaluation. Data were analyzed using paired t-test. **Results:** The majority of participants (64%) were aged 21-25 years, with 56% in their first trimester. Pre-intervention knowledge score showed a mean of 1.49±0.394, which significantly improved to 2.70±0.336 post-intervention ($p<0.001$). The calculated t-value was 23.652, indicating statistically significant improvement in maternal health knowledge. **Conclusion:** Educational intervention significantly enhanced maternal health knowledge among pregnant women, suggesting the importance of structured health educational program in antenatal care setting.

Keywords: Maternal Health, Educational Intervention, Pregnancy, Antenatal Care, Health Knowledge, Pakistan.
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Each year, an estimated 2.87 million women die of preventable pregnancy and childbirth-related causes worldwide – an unimaginable figure in today's world of modern medicine and one that disproportionately affects low- and middle-income countries (LMICs). The root of this crisis is a seemingly simple, but hugely impactful problem: a lack of maternal health knowledge. Education around maternal health is one of the basics for good pregnancy outcomes and is a crucial component in the global agenda to get women and babies to stay healthy. In all LMICs, a well-informed pregnant woman is much more likely to attend health care visits to the appropriate time during pregnancy, accept recommended health behaviors, identify danger signs during pregnancy, and receive skilled attendance at birth, which are all directly associated with favorable survival outcomes for the mother and the newborn.

LITERATURE REVIEW

The maternal health emergency is a multifaceted and complicated crisis in Pakistan that stems from a combination of systemic shortcomings and entrenched sociocultural barriers. In 2019 the country's maternal mortality ratio (MMR) was at 186 per 100,000 live births, representing a 33% decrease from 2007, but still ranks high compared to other countries in the South Asian region, and the three main causes of maternal death were still postpartum hemorrhage, hypertensive disease, and postpartum infection. Geographic inaccessibility of health facilities, lack of skilled healthcare workers in rural areas, deep-rooted sociocultural factors like purdah, male dominated decision making, financial dependency and cultural dependence on TBAs, continue to discourage women from accessing formal health care services during pregnancy. Many pregnant women in Pakistan do not have access to adequate or any ante natal care which leaves them uninformed about important issues of managing pregnancy, nutritional requirements, identifying complications and preparedness for delivery. Knowledge acquisition and health seeking behaviour have been an inseparable link, as emphasized by the World Health Organization (WHO) which continues to emphasize that health education and counselling during the antenatal period is indispensable part of quality maternal healthcare. Yet there remain large and enduring inequities in maternal health knowledge in many developing countries, underscoring the need for focused, evidence-informed education efforts beyond clinical services. Education has become a more popular, feasible, and cost-effective way to close the gap on the existing maternal health literacy deficit, especially in low-resource areas. Structured health

education interventions in individual counseling, group antenatal classes, community-based health education workshops, and technology-assisted platforms have been proven to have a positive impact on health education knowledge, attitudes and practices of women during pregnancy. Indeed, recent studies in various LMICs consistently show positive association between maternal health literacy and early registration at the ANC, more frequent visits to the ANC, compliance with health recommendations, and higher use of SBAs. A systematic review of maternal health interventions in LMICs found that educational interventions for pregnant women, family members and health workers were the most common and effective intervention to improve maternal health care outcomes (Abraham & Melendez Torres, 2023). However, the significance of maternal health education gets multiplied in situations where traditional values are deeply entrenched, cultural misunderstandings and low general literacy are present, leading to added hurdles for accessing and utilizing the health services during pregnancy in Pakistan's under-served communities. A premeditated education strategy that is linguistically accessible, culturally relevant and community-based is needed to facilitate a meaningful behavioural change in these settings where healthcare delivery alone is not enough. The community based models that have been implemented with home visits, training of community health workers, family inclusive educational sessions and mentoring programs have shown great effectiveness in raising awareness for mothers about high-risk pregnancies, preparing for safe delivery, and post-natal care practices. The first study in Ethiopia with a community based cluster randomized trial (CRT) evaluated an integrated community based package of teaching with structured videobased storytelling (which 20% of families watched), preparedness cards and community volunteer training, and reported that this was associated with an increase in awareness of obstetric danger signs (17.6%), preparedness for birth (32.5%), and facility delivery (16.1%) (Jarena et al., 2024), again highlighting the public health potential of community embedded, structured educational approaches. At a community level, Lassi et al. An intervention study conducted in Ghana in 2023, demonstrated a significant increase (by 50%) in the knowledge score of women (AOR = 10.17; 95% CI = 6.59-15.69) following exposure to structured health education on danger signs in the community and subsequent increases in odds of skilled delivery and ANC attendance. A KAP study among pregnant women showed moderate positive correlation between knowledge behaviour and ANC practice ($r = 0.4$; $p< 0.01$) indicating that knowledge acquisition can be a huge deterrent for health seeking behaviour. Overall, these results validate the transformative capacity of the educational interventions, when properly designed and contextually applied, for changing maternal health behaviors and outcomes. The majority of current evidence comes from sub-Saharan Africa and some Asian contexts, however, with regard to the Pakistan context, data from the post intervention phase in the context of a health facility is underrepresented and has limited generalizability to the unique sociocultural and healthcare context in Pakistan. Based on this wealth of evidence and using the Health Belief Model (HBM) and Knowledge Attitude Practice (KAP) framework, the present study was designed to critically assess the effectiveness of a targeted, structured educational intervention program on the enhancement of the maternal health knowledge among the pregnant women attending to antenatal care services, at selected health care facilities in Pakistan. This study aims to produce strong empirical evidence that can be directly applied to maternal health care policy, optimize antenatal care curriculum and create scalable educational frameworks for reducing PMNM in Pakistan's healthcare system through systematic measuring of knowledge levels before and after the intervention using a validated pre-post design and using paired t-test analysis. The need for a targeted educational intervention is more imperative than ever: Pakistan's MMR remains high at 186 out of every 100,000 live births, and coverage for ANC is lower than optimum in rural and peri urban areas.

METHODOLOGY

Study Design and Setting

A pre-post intervention study was carried out on the pregnant women at the Tehsil Head Quarter (THQ) Khanozai. This study used a single group design using pre and post educational program assessments to test the effectiveness of the educational program.

Participants and Sampling

The convenience sampling technique was used to recruit a total of 36 pregnant women. Pregnant women who were attending antenatal care were included, and women with high-risk pregnancies who needed specialized care, and were unable to attend the educational sessions were excluded.

Intervention Protocol

The educational program was conducted in a structured manner with topics on important maternal health issues such as nutrition during pregnancy, warning signs, the importance of antenatal care, birth preparedness and newborn care. Intervention was provided in interactive sessions, educational materials and demonstration techniques.

Data Collection & Analysis

Data was gathered with the help of validated questionnaires which were pre and post administered. SPSS software was used for the statistical analysis, and paired t-test was conducted for the comparison of scores for pre- and post-knowledge. Results with a p value < 0.05 were regarded as statistically significant.

RESULTS

Demographic Characteristics

Some interesting features of the study population were revealed in the Demographic Analysis. The results suggest that most of the participants were young adults with a majority being in the early reproductive years which is in

accordance with the general trend of pregnancy in Pakistani communities.

Table 1

Demographic Characteristics of Study Participants (n=36)

Characteristic	Category	Frequency (n)	Percentage (%)
Age Group	21-25 years	23	64.0
	26-30 years	8	22.2
	1-3 months (First trimester)	20	56
Gestational Age	4-6 months (Second trimester)	16	44.4
Educational	Primary education	22	61.1
Status	No formal education	14	38.9
	Joint family system	33	91.7
Family Structure	Nuclear family	3	8.3
Spousal	Primary education	27	75
Education	No formal education	9	25

Socioeconomic Profile

The income distribution analysis showed important insights in the economic situation of the participants which is important for understanding the accessibility of healthcare, as well as how participants make healthcare decisions.

Table 2

Monthly Income Distribution of Study Participants

Monthly Income (PKR)	Frequency (n)	Percentage (%)
20,000	13	36.1
30,000	17	47.2
Other income levels	6	16.7
Total	**36**	**100**

Knowledge Assessment Outcomes

The pre and post-intervention knowledge scores showed outstanding improvement after the educational intervention. The baseline assessment showed that the participants' knowledge was suboptimal, indicating that there was a significant improvement after the structured intervention program.

Table 3

Pre and Post-Intervention Knowledge Scores Analysis

Assessment Parameter	Pre-Intervention	Post-Intervention
Mean Score	1.49	2.70
Standard Deviation	0.394	0.336
Mean Difference	1.618	2.676
Improvement Factor	81.2% increase	

Statistical Analysis Results

The statistical analysis used proved to be adequate to provide strong evidence for the effectiveness of the educational intervention. The paired t test analysis showed that there was a highly significant difference between the pre intervention and post knowledge scores.

Table 4

Statistical Significance Testing Results

Statistical Parameter	Value	Interpretation
Calculated t-Value	23.652	Exceeds critical table value
p-value	0.000	Highly significant ($p<0.001$)
Degrees of freedom	35	n-1
Confidence level	99%	Strong statistical confidence

DISCUSSION

The results of this study clearly show the high effectiveness of educational intervention for improving the knowledge of maternal health for pregnant women. The demographic profile shows that most of them were young women, mainly women of the reproductive age, and their low educational attainment highlights the importance of making health education accessible to them.

The significant difference in knowledge scores (1.49±0.394 and 2.7±0.336) mirrors an increase of 81.2% in knowledge level. The improvement is statistically significant ($p<0.001$) and clinically significant, indicating that the structured educational intervention has the potential to close knowledge gaps on maternal health. The majority of the participants are from a joint family system (91.7%) which indicates a greater significance of family focused method in health education programs. This finding suggests that we need to account for the role of extended family in healthcare decision making in interventions. To alleviate the observed health education disparity, health education programmes must be accessible and affordable to lower socioeconomic groups.

Clinical Implications

The results pointed out that health education should be recognized and implemented as an integral component of antenatal care services in a systematic way. We found that relatively simple educational interventions could produce substantial changes in knowledge related to maternal health.

Limitations

The fact that this study used a single group pre-post design without a control group makes it difficult to conclude that all the changes observed were due to the intervention. Further, the use of convenience sampling might provide results that are not representative of larger populations.

CONCLUSION

The findings of this study are strong evidence that education programs make a significant contribution to increasing maternal health knowledge of pregnant women. The intervention was very effective, with statistically significant results for the knowledge scores ($p<0.001$). The

results justify the provision of structured health education services as an integral part of the packages offered in antenatal care services in Pakistan.

Systematic maternal health education programmes should be integrated into the routine antenatal care process, especially for girls with low educational attainment, to be adopted by healthcare policymakers. These measures are cost-effective and can help to address disparities in maternal health services and outcomes.

Recommendations

- The incorporation of structured maternal health education into the process of routine antenatal services.
- Culturally responsive education by creating culturally relevant materials for diverse populations.
- Educating health care workers on how to effectively provide health education
- Use of family-centred approaches taking into account joint family structures
- Development of systems for the monitoring and evaluation of the effectiveness of educational programs.

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