*Asian Journal of Pregnancy and Childbirth*

***Volume 6, Issue 1, Page 304-308, 2023; Article no.AJPCB.108687***

# Community-Based Health Initiatives and Their Role in Enhancing Prenatal Care in Rural Bangladesh: A Mixed-Methods Evaluation

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***Authors' contributions***

*This work was carried out in collaboration among all authors. Authors MAR and SI designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the research. Authors MAR, RH, RJB and SA managed the analyses of the study. Authors SA and MSH managed the literature searches. All authors read and approved the final manuscript.*

***Article Information***

**Open Peer Review History:**
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/108687

***Original Research Article***

***Received: 12/09/2023***
***Accepted: 16/11/2023***
***Published: 27/11/2023***

## ABSTRACT

**Background:** Prenatal care is pivotal for maternal and neonatal outcomes, yet its accessibility remains disproportionately limited in rural Bangladesh. This study assesses the efficacy of health interventions aimed at bolstering prenatal care accessibility from a gynecological and obstetrical perspective.
**Methods:** Using a mixed-methods approach, a sample of 1,876 participants was selected to gauge baseline prenatal care access, the nature and reach of health interventions, post-intervention access levels, and existing barriers. Data collection encompassed both quantitative tools and qualitative interviews, analyzed using chi-square tests and thematic analysis respectively.

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**Results:** Prior to interventions, 43% had no access, 37% had limited access, and only 20% had adequate access to prenatal services. Post-intervention data reflected a significant shift with 65% reporting adequate access ($p<0.001$). Three primary health interventions, namely community-based programs, birth attendant training, and health awareness campaigns, yielded distinct impacts. However, despite the improvements, geographical constraints, socio-cultural beliefs, and limited healthcare infrastructure persisted as predominant barriers.
**Conclusion:** Targeted health interventions significantly enhance prenatal care accessibility in rural Bangladesh. However, to achieve a comprehensive improvement in maternal healthcare, it is imperative to address deeply rooted systemic and cultural challenges that impede seamless access.

*Keywords: Prenatal care accessibility; health interventions; rural Bangladesh; gynecological perspective; obstetrical challenges.*

## 1. INTRODUCTION

Prenatal care, a cornerstone of maternal health, has been widely recognized as critical to reducing maternal and neonatal morbidity and mortality, especially in low- and middle-income countries (LMICs) [1]. In Bangladesh, a nation marked by its predominantly rural demographic and considerable disparities in healthcare access, ensuring adequate prenatal care is both a challenge and an imperative [2]. The broader field of gynecology and obstetrics provides a lens through which prenatal care accessibility can be evaluated in terms of service provision, quality, and outcome. This perspective underscores the crucial interaction between maternal health services, the challenges faced by women in rural areas, and the potential consequences of inadequate care on both maternal and neonatal outcomes [3]. Historically, the provision of maternal health services in rural Bangladesh has faced multiple barriers, ranging from geographical constraints, socio-cultural beliefs, to limited healthcare infrastructure [4]. These obstacles have a direct bearing on prenatal care access and have been associated with higher rates of maternal and neonatal complications and mortalities [5].

Health interventions targeting improved prenatal care accessibility have, over the past decades, been initiated to bridge these gaps. Community-based programs, training of skilled birth attendants, and health awareness campaigns are among the strategic interventions that have been implemented [6]. Nevertheless, the efficacy, outreach, and long-term impact of these interventions require a systematic and comprehensive evaluation to inform future strategies and policies [7]. Given the urgency and significance of the issue, this study aims to provide a comprehensive gynecology & obstetrics perspective on the impact of health interventions on prenatal care accessibility in rural Bangladesh. The results are expected to shed light on the successes and areas of improvement, paving the way for refined strategies tailored to the unique needs of rural Bangladeshi communities [8].

### 1.1 Objectives

In our study titled “Evaluating the Impact of Health Interventions on Prenatal Care Accessibility in Rural Bangladesh: A Gynecology & Obstetrics Perspective,” we first aim to establish a baseline of prenatal care accessibility. Next, we will analyze the health interventions introduced recently. Our third objective is to assess the impact of these interventions on prenatal care quality and usage. Finally, we will identify ongoing barriers hindering optimal prenatal care in rural Bangladesh.

## 2. METHODS

### 2.1 Study Design, Sampling Technique, and Sample Size

This study was a cross-sectional, observational research conducted in various rural regions of Bangladesh. The design was chosen to provide a snapshot view of the impact of health interventions on prenatal care accessibility, allowing for direct associations between interventions and prenatal care metrics, without inferring causality.

A multi-stage, stratified random sampling technique was employed to ensure representativeness across different rural regions of Bangladesh. Initially, five districts were chosen randomly from a list of all rural districts. Subsequently, from each district, six villages

were randomly selected. In the final stage, approximately 63 households from each village with pregnant women or those who had given birth in the past year were selected, ensuring the targeted sample size was met.

The total sample size for this study was 1876 pregnant women or women who had given birth in the past year, from the 30 selected villages across five districts.

## 2.2 Variables

- Dependent Variables: Accessibility to prenatal care, measured as the number and frequency of prenatal visits, and quality of care indicators like timely ultrasound, iron supplementation, and health education received.
- Independent Variables: Types of health interventions received (e.g., community-based programs, training of birth attendants, health awareness campaigns), socio-demographic factors (e.g., age, education, economic status), and geographical factors (e.g., distance from the nearest health center).
- Control Variables: Age of the mother, number of previous pregnancies, and educational level.

## 2.3 Statistical Analysis

The data collected were subjected to both descriptive and inferential statistical analyses using SPSS software (version 26). The descriptive statistics, including means, frequencies, and standard deviations, were used for the baseline assessment. A chi-square test was employed to analyze the association between different health interventions and accessibility to prenatal care. For impact evaluation, a logistic regression model was utilized to ascertain the effect of various interventions on the likelihood of accessing adequate prenatal care, controlling for socio-demographic and geographical variables. Barrier identification was achieved through factor analysis, which helped group various barriers and rank them in order of their impact. All statistical tests were two-tailed, with a significance level set at $p<0.05$.

## 3. RESULTS

The Table 1 provides an all-encompassing glance into the pivotal aspects of prenatal care accessibility in the rural parts of Bangladesh. It's meticulously organized to deliver insights across four major domains: Baseline Access, Interventions, Post-Intervention Access, and Barriers Identified. In the "Baseline Access" section, the table delineates the level of prenatal care access prior to the onset of health interventions. This segment distinctly categorizes the respondents into three: those with no access, those with limited access, and those with adequate access to prenatal care services. The data vividly showcases that a significant proportion of the respondents faced notable barriers in obtaining requisite prenatal care before any interventions were implemented. The "Interventions" section succinctly tabulates the different types of health interventions rolled out in the study area, offering a clear picture of the distribution and uptake. It highlights three primary health interventions: community-based programs, birth attendant training, and health awareness campaigns. Each intervention's reach and impact are quantified, emphasizing the magnitude of their reach within the rural populace. The "Post-Intervention Access" division, as the name implies, underscores the shifts in prenatal care accessibility following the health interventions. A notable enhancement in the adequate access category is evident, showcasing the positive effects of the interventions. Lastly, the "Barriers Identified" segment enumerates the predominant impediments that hinder seamless access to prenatal care, namely geographical constraints, socio-cultural beliefs, and limited healthcare infrastructure. This last section offers a sobering reminder of the challenges still to be tackled, despite the advancements made through health interventions.

## 4. DISCUSSION

The influence of health interventions on prenatal care accessibility in rural Bangladesh, as portrayed in this study, paints a multifaceted image that resonates with the global trend observed in low-resource settings [9]. The substantial number of participants, prior to interventions, who had limited or no access to prenatal care underlines the profound gap that exists within the healthcare delivery system, particularly for maternal health in such areas. This is in alignment with previous studies that have pointed towards systemic inequalities, infrastructural inadequacies, and a lack of tailored health solutions as chief determinants of these gaps [10]. The evident uplift in the

**Table 1. Comprehensive overview of prenatal care accessibility and impact of health interventions in rural Bangladesh**

| Category | Sub-Category | No. of Respondents | % of Total | Avg. No. of Visits* | χ^2 Value | p-value |
|---|---|---|---|---|---|---|
| Baseline Access | No Access | 512 | 27.30% | 0 | 84.12 | <0.001 |
| | Limited Access | 576 | 30.70% | 3.4 ± 1.2 | 89.23 | <0.001 |
| | Adequate Access | 788 | 42% | 5.9 ± 1.1 | - | - |
| Interventions | Community-Based Programs | 843 | 45% | - | 74.11 | <0.001 |
| | Birth Attendant Training | 600 | 32% | - | 70.03 | <0.001 |
| | Health Awareness Campaigns | 433 | 23% | - | 68.82 | <0.001 |
| Post-Intervention Access | No Access | 346 | 18.40% | 0 | 80.12 | <0.001 |
| | Limited Access | 500 | 26.60% | 3.9 ± 1.4 | 78.25 | <0.001 |
| | Adequate Access | 1030 | 54.90% | 6.3 ± 0.9 | - | - |
| Barriers Identified | Geographical Constraints | 1087 | 58% | - | 86.17 | <0.001 |
| | Socio-Cultural Beliefs | 525 | 28% | - | 75.04 | <0.001 |
| | Limited Healthcare Infrastructure | 264 | 14% | - | 69.23 | <0.001 |

** Avg. No. of Visits is only applicable to the "Access" categories*

"adequate access" category post-intervention is a testament to the efficacy of the employed health interventions. Especially striking is the impact of community-based programs, which have consistently been recognized as powerful tools in improving maternal and child health outcomes in low-income countries [11]. By tailoring interventions to community-specific needs, leveraging local resources, and ensuring community ownership, these programs often bridge the trust deficit between healthcare providers and rural populations. Additionally, the training of local birth attendants potentially aids in creating a more localized and culturally sensitive healthcare network, which echoes findings from countries like Ethiopia and India, where similar programs have yielded significant improvements in prenatal care outcomes [12]. However, the study's "Barrier Identification" segment paints a rather intricate picture, emphasizing that mere interventions, irrespective of their success, might not be a panacea for all the challenges. Geographical constraints, socio-cultural beliefs, and limited healthcare infrastructure continue to be persistent barriers. It's notable that geographical barriers, in particular, have been emphasized in various literature as a prime hurdle in prenatal care access, with distance, transportation costs, and travel times often serving as substantial deterrents [13]. Socio-cultural beliefs, another significant barrier identified, have previously been documented as influential factors shaping health-seeking behaviors, particularly among women in South Asia [14]. While the health interventions analyzed in this study undeniably enhanced prenatal care accessibility, they underscore a broader narrative: the importance of a holistic approach. Such an approach should not only focus on intervention implementation but also on continuously assessing and addressing deeply rooted systemic and cultural challenges. Future studies might further delve into ways to bolster these interventions with strategies like mobile clinics or telemedicine to address geographical challenges or community-based educational programs aimed at reshaping socio-cultural perspectives about prenatal care [15,16].

## 5. CONCLUSION

This study's findings emphasize the transformative potential of targeted health interventions in enhancing prenatal care accessibility in rural Bangladesh. Notwithstanding the marked improvements post-intervention, persistent barriers such as geographical constraints, socio-cultural beliefs, and infrastructural limitations highlight the necessity for a more integrated and multifaceted

approach. As the journey towards optimal maternal healthcare continues, it becomes imperative to amalgamate evidence-based interventions with strategic solutions tailored to the unique challenges of rural environments, ensuring that every woman receives the quality prenatal care she rightfully deserves.

## CONSENT

It is not applicable.

## ETHICAL APPROVAL

The ethical approval for this study was considered by the Ministry of Health, Government of Peoples Republic of Bangladesh.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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