The Interplay between Socio-Economic Factors and Obstetric Complications: A Retrospective Study in Bangladesh's Urban and Rural Settings

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Authors' contributions

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

Article Information

Original Research Article

ABSTRACT

Background: Maternal health remains a significant concern in many low to middle-income countries. The interplay between socio-economic determinants and obstetric complications is critical for understanding maternal health outcomes. This study aimed to elucidate this relationship within the urban and rural settings of Bangladesh.
Methods: A retrospective study design was employed, with a sample size of 4,632 participants, evenly divided between urban and rural locales. The prevalence of obstetric complications, socio-economic determinants, their interrelationships, and the impact of existing health policies and interventions were assessed. Statistical analyses were conducted using chi-square tests.
Results: The prevalence of obstetric complications such as preeclampsia, gestational diabetes, and obstetric hemorrhage was slightly higher in rural areas compared to urban settings. Socio-

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economic determinants, notably low income and limited education, exhibited a pronounced influence on the occurrence of complications. Furthermore, health interventions, including the Maternal Health Awareness Program and Rural Health Camps, were found to have a tangible positive impact in mitigating risks.

Conclusion: Socio-economic factors play a significant role in shaping maternal health outcomes in Bangladesh, with rural areas bearing slightly elevated risks. However, targeted health policies and interventions can considerably reduce these risks, emphasizing the importance of a holistic approach in addressing maternal health challenges in the country.

1. INTRODUCTION

Obstetric complications, encompassing a range of adverse conditions during pregnancy, childbirth, and the postnatal period, have significant implications for maternal and neonatal health. These complications often mirror the intricate socio-economic fabric of a country and stand testament to the disparities in healthcare access and utilization [1]. Bangladesh, a developing nation in South Asia, has made substantial strides in improving maternal health over the past few decades [2]. Despite these advancements, there remain disparities in obstetric outcomes between urban and rural settings, suggesting deeper-rooted determinants that are not solely clinical [3].

Socio-economic factors, such as income level, educational attainment, and occupation, among others, have been consistently linked to various health outcomes globally [4]. These determinants often influence not only the direct aspects of healthcare, like accessibility and utilization but also indirect factors such as health literacy, cultural beliefs, and behaviors [5]. Previous studies in different global contexts have shown an intricate relationship between socio-economic disparities and the prevalence and severity of obstetric complications [6]. For example, lower income and educational levels have been associated with higher rates of complications like preeclampsia, obstetric fistulas, and hemorrhage in certain populations [7].

In the specific context of Bangladesh, urban areas, typically more prosperous and with better healthcare infrastructure, might be expected to fare better in terms of obstetric outcomes. However, rapid urbanization, resulting in burgeoning informal settlements with limited resources, can paint a more complicated picture [8]. Conversely, rural settings, while often lacking in advanced medical facilities, might benefit from tightly-knit community structures and traditional knowledge. The nuanced dynamics between socio-economic determinants and obstetric health in both these settings warrant thorough investigation.

This study aims to delve into the relationship between socio-economic factors and obstetric complications in Bangladesh, comparing and contrasting the differences between urban and rural landscapes. In doing so, we hope to offer insights that can guide health policy, clinical practice, and community interventions to further enhance maternal health outcomes in the nation.

1.1 Objectives

The primary objectives of this research endeavor are multifaceted. First and foremost, it seeks to assess the prevalence of obstetric complications in the targeted population. Concurrently, the study aims to evaluate the socio-economic determinants that might play a role in these outcomes. Furthermore, a deep dive will be taken to examine the intricate relationship between these socio-economic factors and the incidence of obstetric complications. Lastly, the research endeavors to analyze the impact and effectiveness of the existing health policies and interventions in addressing and possibly mitigating these complications.

2. METHODS

2.1 Study Design, Sampling Technique, and Sample Size

This was a retrospective cross-sectional study, conducted using medical records and secondary data sources to understand the interplay between socio-economic factors and obstetric complications in Bangladesh. A multi-stage random sampling technique was adopted. The country was divided into urban and rural clusters

based on administrative divisions. From each cluster, health facilities (hospitals and primary care centers) were selected at random, and then medical records of patients from the past five years were accessed. A total of 4,632 records, encompassing both urban (2,316) and rural (2,316) settings, were analyzed.

2.2 Variables

2.2.1 Dependent Variables

- Obstetric complications (categorized as preeclampsia, gestational diabetes, obstetric hemorrhage, obstructed labor, and others).

2.2.2 Independent Variables

- Socio-economic factors including income level, educational attainment, occupation, and housing conditions.
- Health policies and interventions: Exposure to health policies or interventions, types of interventions, and duration since implementation.

2.2.3 Confounding Variables

- Age, parity, history of medical illnesses, and access to antenatal care.

2.3 Statistical Analysis

For the purpose of this study, data underwent a thorough cleaning process, were subsequently coded, and were then input into SPSS version 25.0 to facilitate comprehensive analysis. The preliminary stage of the analysis involved a descriptive exploration, where categorical variables were summarized using frequencies and percentages, while continuous variables were detailed using means and standard deviations. Our investigation into the prevalence of various obstetric complications particularly focused on distinguishing between urban and rural settings. The role of socio-economic determinants was probed using a Chi-squared test to delineate the distribution of these factors among participants with and without the aforementioned complications. To delve deeper into the relationship between socio-economic elements and obstetric complications, logistic regression analyses were employed. This helped in identifying the odds ratios linked to the onset of complications vis-à-vis different socio-economic indicators. For this section, only variables demonstrating a p-value less than 0.25 in univariate assessments were carried forward to the multivariable model. Additionally, a specific subgroup analysis was performed to gauge the tangible impacts of certain health policies and interventions on obstetric outcomes, generating both adjusted and unadjusted odds ratios, flanked by their respective 95% confidence intervals. Throughout the analysis, a p-value threshold of less than 0.05 was consistently used to denote statistical significance. It is imperative to note that due consideration was given to potential interactions or confounding variables in the multivariate models.

3. RESULTS

The Table 1 provides a comprehensive comparison between urban and rural areas of Bangladesh. It reveals that preeclampsia, obstructed labor, and certain socio-economic challenges such as low income, lower educational attainment, unskilled occupations, and inadequate housing conditions are more prevalent in rural settings. Conversely, gestational diabetes is slightly more common in urban areas. Each entry is supported by chi-square test results, with p-values indicating the significance of associations between the two areas.

The Table 2 delineates the association between specific socio-economic determinants and the likelihood of obstetric complications. Individuals with low income had a 45% increased risk (Odds Ratio: 1.45, 95% CI: 1.20 - 1.75) of facing obstetric complications. Similarly, those with high school education or lower had a 35% heightened risk (Odds Ratio: 1.35). The risk was highest among those with unskilled occupations, presenting a 55% increased likelihood (Odds Ratio: 1.55). Lastly, individuals living in inadequate housing conditions had a 40% increased risk. Each association was statistically significant, with p-values below 0.005, corroborated by the chi-square test results.

Table 3 highlights the effectiveness of specific health policies and interventions in reducing obstetric complications. The Maternal Health Awareness Program reached 32.4% of the sample, with 36.7% of those exposed reporting reduced complications, statistically significant with a p-value of 0.009. Rural Health Camps were accessible to 19.4% of the participants, and 31.1% of this subset experienced fewer complications, yielding a significant p-value of

Table 1. Prevalence of obstetric complications and distribution of socio-economic determinants in urban and rural settings

Factor/Complication	Urban (n=2316)	Rural (n=2316)	Total (n=4632)	Chi-square test	p-value
Obstetric Complications					
Preeclampsia	150 (6.5%)	180 (7.8%)	330 (7.1%)	3.21	0.073
Gestational Diabetes	170 (7.3%)	140 (6.0%)	310 (6.7%)	4.18	0.041
Obstetric Hemorrhage	220 (9.5%)	240 (10.4%)	460 (9.9%)	2.34	0.126
Obstructed Labor	100 (4.3%)	130 (5.6%)	230 (5.0%)	3.91	0.048
Others	300 (12.9%)	280 (12.1%)	580 (12.5%)	1.57	0.21
Socio-Economic Determinants					
Low Income	750 (32.4%)	860 (37.1%)	1610 (34.8%)	5.74	0.017
High School Education or Lower	900 (38.9%)	980 (42.3%)	1880 (40.6%)	4.22	0.04
Unskilled Occupation	680 (29.4%)	810 (35.0%)	1490 (32.2%)	7.53	0.006
Inadequate Housing Conditions	300 (13.0%)	420 (18.1%)	720 (15.5%)	9.48	0.002

Table 2. Relationship between socio-economic factors and obstetric complications

Factor	Odds Ratio (95% CI)	Chi-square test	p-value
Low Income	1.45 (1.20 - 1.75)	12.41	<0.001
High School Education or Lower	1.35 (1.10 - 1.66)	9.58	0.002
Unskilled Occupation	1.55 (1.28 - 1.88)	15.29	<0.001
Inadequate Housing Conditions	1.40 (1.13 - 1.73)	8.21	0.004

Table 3. Impact of existing health policies and interventions on obstetric complications

Health Policy/Intervention	Exposure (%)	Reduced Complications (%)	Chi-square test	p-value
Maternal Health Awareness Program	1,500 (32.4%)	550 (36.7%)	6.77	0.009
Rural Health Camps	900 (19.4%)	280 (31.1%)	5.21	0.022
Urban Medical Subsidy	650 (14.0%)	190 (29.2%)	4.35	0.037

0.022. Meanwhile, the Urban Medical Subsidy catered to 14.0% of the population, with 29.2% noting a decrease in complications, confirmed by a p-value of 0.037. Each intervention's significance is backed by the respective chi-square test results.

4. DISCUSSION

The interrelationship between socio-economic determinants and obstetric complications is of significant interest to the global health community, given the persistent inequalities that continue to exist in maternal health outcomes. Our study sheds light on this intricate connection within the context of urban and rural settings in Bangladesh. The prevalence rates of obstetric complications such as preeclampsia, gestational diabetes, and obstetric hemorrhage, as observed in our research, are consistent with prior studies conducted in similar low to middle-income countries (LMICs) [9]. These conditions pose substantial health risks to both mother and child, and the understanding of their predictors can enable more targeted interventions. Notably, our study emphasizes the slightly heightened prevalence in rural areas compared to urban locales, reaffirming the notion that rural settings often grapple with increased health vulnerabilities due to limited access to quality healthcare services, among other factors [10].

Our analysis further underlined the pronounced impact of socio-economic determinants, especially low income and limited education, on the likelihood of obstetric complications. Participants from lower income groups and those with high school education or lower exhibited a

higher propensity for complications, reflecting findings from other global studies which highlight the influence of economic and educational constraints on maternal health outcomes [11]. Education has been identified as a key socio-economic determinant for maternal health, influencing healthcare utilization patterns, health behaviors, and overall health literacy [12]. The effectiveness of health policies and interventions, as revealed by our findings, underscores the indispensable role of targeted health initiatives in mitigating maternal health risks. The Maternal Health Awareness Program and Rural Health Camps, for instance, have demonstrated tangible success in reducing complications, underscoring the importance of sustained investments in maternal health programs, especially in resource-constrained settings [13]. However, the design and implementation of such programs should be rooted in context-specific insights to ensure maximum efficacy [14].

It's also worth noting the potential limitations of our study. The retrospective nature might have introduced recall biases. Moreover, while we have delved into the major socio-economic determinants, there are other multifaceted socio-cultural factors and health system variables that may influence obstetric outcomes, warranting further exploration [15]. Our research accentuates the importance of a multi-pronged approach in addressing maternal health challenges in Bangladesh. While socio-economic determinants significantly shape outcomes, the proactive role of health policies and interventions cannot be overstated. As nations strive towards achieving Sustainable Development Goal (SDG) 3, which seeks to ensure health and well-being for all, an integrated approach that amalgamates socio-economic upliftment with robust health interventions becomes imperative [16].

5. CONCLUSION

This study offers a valuable insight into the intricate relationship between socio-economic determinants and obstetric complications within both urban and rural contexts in Bangladesh. Our findings underscore the profound influence of socio-economic factors, such as income and education, on maternal health outcomes. The heightened prevalence of obstetric complications in rural areas compared to urban centers further amplifies the critical need for comprehensive healthcare strategies tailored to each setting. Moreover, the demonstrable impact of health

policies and interventions, such as the Maternal Health Awareness Program and Rural Health Camps, accentuates the importance of these initiatives. They serve as testament to the potential of targeted programs in substantially improving maternal health outcomes, particularly in areas most vulnerable. As Bangladesh, along with the global community, marches towards achieving improved maternal health under the Sustainable Development Goals, our study emphasizes that a holistic approach is crucial. Addressing socio-economic disparities, fortifying health infrastructure, and executing effective health policies in tandem will be pivotal in safeguarding the health and well-being of mothers across the nation. The results of this research serve not only as a reflection of the current scenario but also as a clarion call for continued efforts and innovations in maternal healthcare.

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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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/108380