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Original Research

Inequality in utilization of cesarean delivery in Bangladesh: a decomposition analysis using nationally representative data

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ABSTRACT

Objective: This study examined the inequality in cesarean section (CS) utilization and its socio-economic contributors.
Study design: Retrospective two-stage stratified sample design.
Methods: Data were extracted from two rounds of the Bangladesh Demographic and Health Survey conducted in 2004 and 2014. Concentration Index of CS utilization was calculated using the wealth quintile. Regression-based decomposition method was applied to assess the socio-economic contributors of inequality in CS utilization.
Results: The rate of CS utilization increased from 4.98% in 2004 to 24.21% in 2014. The utilization of CS was highly concentrated among the women of higher socio-economic status (SES) in both rounds of the survey. Results of the decomposition models revealed wealth quintile, higher education, higher number of antenatal visits, and being overweight or obese as the critical factors contributing to the inequalities of CS utilization.
Conclusion: Bangladesh is now observing a rapid rise in CS utilization and women with higher SES are the main client group of this life saving procedure. There may have inadequate access for those who are relatively less advantaged, even when CS is necessary. Strong initiative from the government is necessary to ensure proper access to this service regardless of women's SES.

Introduction

Cesarean section (CS) is a medical procedure, which is usually performed to deliver a baby when a vaginal delivery would put the baby or mother at risk. The World Health Organization (WHO) recommends the rate of CS utilization to be 10%–15% in population level.[1] Globally, around 19% of total births are now delivered by CS—ranging from 6.0% to 27.2% in the least

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and more developed regions, respectively.[2] This considerable variation in CS utilization rate and available evidence[3–7] suggest that CS is being utilized excessively by a subset of women, while others, despite life-saving necessity, cannot access this procedure.[8,9] This inequality is substantially high in developing countries[10,11] and often determined by the major socio-economic variables including level of education, place of residence, maternal working status, and household income.[3–6] In most countries, the rate of CS utilization among women of the lowest tier of socio-economic status (SES) often lies below the national mean, and in some countries, this rate is lower than 1%.[12,13] Although existing literature demonstrates the utilization of CS by SES, assessment of inequalities and contribution of various SES factors to the inequalities have been rarely researched.[3,11,13,14]

Bangladesh has achieved a remarkable success on the reduction of maternal and neonatal mortality.[15] However, the rates are still as high as 194 maternal deaths per 100,000 live births.[16] This rate is lower than the WHO-estimated global maternal mortality rate of 216 deaths per 100,000 live births.[17] Notably, almost two-thirds of these deaths occur due to the direct obstetric complications,[15] and the rates are disproportionately high among the poor.[3,18] Ensuring safe delivery practice, therefore, would be a major contributor in reducing these maternal and neonatal deaths. Although the rates of CS utilization have been increasing in Bangladesh, previous studies found mainly educated urban women with better SES were the beneficiaries of this potentially life-saving procedure.[3,7,19] Given that the SES is the commonest feature of inequalities in CS utilization, in existing literature, there is a focus on describing the inequalities across socio-economic groups. However, there is inadequate information about the effect of the factors that make the 'SES,' thereby have incomplete understanding of the inequalities. Moreover, most studies addressing this question employ conventional regressions, which are not well suited to estimate the impact of determinants on inequalities. Therefore, this study was conducted to assess the SES inequalities in utilization of CS and to calculate the relative contribution of different socio-economic factors on such inequalities.

Methods

The study utilized data from two rounds of the Bangladesh Demographic and Health Survey (BDHS) conducted in 2004 and 2014. Details of the survey design and data collection procedure have been published elsewhere.[20,21] In brief, BDHS collected nationally representative data every 3 years on a broad range of issues including fertility, reproductive and maternal health, nutrition, and child health. In each round, a nationally representative sample of households was obtained using two-stage stratified cluster sampling approach. In the first stage of the sampling, a fixed number of primary sampling units (areas) were selected, with probability proportional to their size.[22,23] In the second stage, 30 households were selected within each primary sampling unit by using systematic random sampling. Overall response rates in both rounds were around 98%. The National Institute of Population Research and Training conducted these surveys with the support of the United States Agency for International Development. The survey protocol was approved by the National Research Ethics Committee in Bangladesh and ORC Macro (Macro International Inc) Institutional Review Board. Informed consent was obtained from all participants.

Outcome variable

The outcome variable for this study was the method of delivery of the last pregnancy occurred within 3 years before the survey. The data on delivery methods were collected by asking the respondents 'was (name of the last child) delivered by caesarian section?' The responses were recorded either 'Yes' or 'No.' Responses regarding delivery methods were the outcome variable.

Exposure variables

In the estimation of SES inequalities in CS utilization, the scale of economic status (wealth quintile) of the households was the key variable. BDHS constructed wealth quintile using statistical procedure—the principle component analysis—developed by Filmer and Pritchett.[24] The wealth index was developed based on the responses regarding household characteristics, household assets, and possession of durable goods as well as access to clean water and improved sanitation.[20,21] Once the index was computed, national-level wealth quintiles (from lowest to highest) were obtained by assigning the household score to each household member, ranking each person in the population by his or her score and then dividing the ranking into five equal categories, each comprising 20% population.[20]

Statistical analysis

We calculated the absolute and relative differences in the number of women who reported CS utilization in 2004 and 2014. Two-sample proportion test was used to compare and test the significance. We also calculated variation in CS utilization across wealth quintiles around national mean. Concentration curve and concentration index were used to measure the socio-economic inequality in CS utilization. Details of these methods to measure the inequalities of health were published in a book by the World Bank.[25] Briefly, concentration index represents the magnitude of inequality by measuring the area between the concentration curve and line of perfect equality. It is calculated as twice the weighted covariance between the outcome and fractional rank in the wealth distribution divided by the variable mean,[25] using the formula:

$C = \frac{2}{\mu \mathrm{cov}_w(y_{ir_i})}$, where y_i and r_i are, respectively, the health status of the *ith* individual and the fractional rank of the *ith* individual (for weighted data) regarding the index of household economic status; μ is the (weighted) mean of the health variable in the sample; and cov_w denotes the weighted covariance. The index value lies between −1 and 1.

We then decomposed the concentration index to understand the relative contribution of various socio-economic factors to the utilization of CS. To do this, we used