# Factors influencing Antenatal Health Care Utilization in Bangladesh: Evidence from Multivariate Techniques.

## Introduction

According to the WHO, every year half a million women die as a consequence of complications during pregnancy, childbirth or the 6 weeks following delivery and 99% of these deaths occur in developing countries. Parent's education level, labor force participation of mother, community characteristics, and index parity report were found to be significant differential of ANC seeking behavior. Logistical barriers to seeking ANC for women are pointed for those in communities with higher socio-economic status and a more developed health infrastructure; however, the presence of health facilities in a community alone does not essentially result in a raise in maternal health care. The main aim of this paper is to obtain underlying factor behind ANC seeking behavior for Bangladesh, instead of searching for individual differentials. Rationale behind using these sorts of techniques are simplicity of explanation and explaining the confounded effect of determinants more elaborately which was not so rigidly possible in case of usual multivariate regression models.

### Data and Methods

The data for this study is obtained from Bangladesh Demographic and Health Survey 2011 which is a nationally representative survey. Stratified multi-stage cluster sampling design was used to collect data. The survey interviewed 17749 women of childbearing age from seven divisions in the country. In this paper, currently married women aged 15-49 and have last child birth in survey preceding 5 years are considered for analysis; which gave a total sample size of 8957.

Factor analysis used to identify the significant factors of antenatal care seeking behavior of Bangladeshi women, based on principal components analysis. Principal component analysis (PCA) is used for extraction of factors and orthogonal rotation (varimax option) to derive non-correlated factors. Adequacy of factors was verified by Kaiser-Meyer-Olkin (KMO) measurement of adequacy. Factor loadings greater than 0.5 and cross-loading (loadings with negative value) less than -0.4 are taken into account to explain the relationship between the covariates and factors. The factor analysis arranges the latent roots by diminishing order that facilitates identification of the dominant structural factors. Besides Scree plot (Eigen plot); Kaiser Criterion (factor with eigenvalue greater than 1.0) is used for the choice of the number of factors in factor analysis. Linear Discriminant Analysis (LDA) is used to express one dependent variable as a linear combination of other features or measurements.

## Results

Almost 50% women were below 25 years old. Every four in five (22%) women live in rural areas. The socio-economic data also show that 30 percent of women had no education and only 11 percent were employed. Thirty five percent women were member of a NGO. Figure 1 presents the scree plot of factor analysis for ANC seeking behavior of Bangladeshi women. The adequacy of data was evaluated based on the value of KMO and homogeneity of variance; the

parallel line to horizontal at Eigen value equaling to one in scree plot are the significant factors for ANC.

Rotated component matrix of factor analysis is presented in the Table 1. Here components are the significant components obtained from PCA, and the factors are named later according to the value of loadings and cross-loadings described in methodology section. Factor analysis obtains total 14 components, from which only 5 components were significant according to Kaiser Criterion. The components are numbered in ascending scale according to amount of variance explained. Obtained factors are quite hypothetical in nature, as the factors are obtained from several types of socio-economical, biological and birth history variables. These five factors extracted from factor analysis, explain the variation of ANC seeking behavior of Bangladeshi women by 19.78, 12.18, 8.71, 7.73 and 7.58 percentages respectively. These factors can explain about 56.0% of the observed variation in the possible socio-economical/health/biological variables determining ANC seeking behavior of Bangladeshi women (Table-2). Table 2 illustrates the eigenvalues, percentage of variation explained by each eigenvalue and the cumulative percentage of variation explained by those eigenvalues.

The first extracted factor (the factor which explained highest variation) have high factor loadings (positively correlated) with parental education, wealth index, mass media exposure status of mother and high cross loadings (negatively correlated) with place of residence. With increase of educational level and mass media exposure ANC seeking behavior increases; also the rural people are less ANC seeker than urban women which is associated with level of consciousness about ANC. So, this factor may be named as 'consciousness factor'. Second factor have high loadings with mother's age and birth order of index child. Thus, this factor may be assigned as 'age and reproductive experience factor'.

Third obtained factor from factor analysis have high factor loadings with freedom of movement and say about own health care of mothers. These variables are key-indicators of women's empowerment, thus 'women's autonomy factor' may be an appropriate term to name this factor. Women's empowerment and rising of autonomy play key role on health care seeking behavior for both women and child. This relation is observed in fourth factor; it has high loadings with employment status of mother and connection with microcredit programs, namely NGOs' and say about child health care. This factor may be named as 'involvement to labor force participation factor'. The fifth extracted factor has high factor loading with divisions. BDHS-2011 report also indicated that, ANC seeking behavior is not same for all the divisions of Bangladesh, highest is observed in Khulna division where 65.4% ANC is observed for medical facility while lowest is observed in Sylhet division as 46.7% ANC is observed from medical facility.

**Conclusion**

The study identified education as main factors for utilization of ANC care. It has a chain of effect on the others factors; it creates consciousness, impress women to get involved in income generating activities, increase awareness regarding health related problems associated with pregnancies and complicacy of high parity. Furthermore, enormous campaigns will be effective to utilize antenatal health care services and empowering women is a nice initiative to improve maternal healthcare coverage. Special focus is needed on women in high risk groups such as

women in higher parities and women from poor families to reduce maternal mortality and to achieve the MDG 5 for maternal mortality.

**Table 1. Rotated Component Matrix for ANC seeking behavior of Bangladeshi women.**

| Variable | Component | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Age (5-year groups) | 0.059 | 0.890 | -0.031 | 0.108 | 0.071 |
| Division | 0.045 | 0.146 | 0.051 | -0.421 | 0.769 |
| Type of place of residence | -0.668 | -0.064 | -0.241 | 0.021 | 0.001 |
| Highest educational level | 0.539 | -0.406 | -0.307 | 0.356 | 0.100 |
| Wealth index | 0.839 | -0.013 | -0.220 | 0.078 | 0.056 |
| Birth order of index child | -0.224 | 0.875 | 0.024 | -0.083 | -0.003 |
| Father's education level | 0.602 | -0.207 | -0.403 | 0.299 | 0.087 |
| Mass media exposure status | 0.594 | -0.110 | 0.199 | -0.171 | -0.123 |
| Final say on own health care | -0.047 | 0.056 | 0.558 | 0.098 | 0.363 |
| Final say on child health care | 0.098 | 0.143 | 0.197 | 0.609 | -0.053 |
| Discussed about family planning with partner | -0.037 | 0.057 | -0.060 | 0.439 | -0.452 |
| Connection to NGO (binary) | -0.101 | 0.006 | 0.093 | 0.663 | -0.190 |
| Goes to a health centre or hospital alone | 0.060 | 0.204 | 0.701 | 0.487 | 0.346 |
| Mother's employment status | 0.149 | -0.025 | 0.364 | 0.676 | 0.232 |

Note: Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization; Rotation converged in 8 iterations.

**Table 2. Total Variance Explained by the obtained factors of ANC seeking behavior of Bangladeshi women.**

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| **1** | 2.8 | 19.8 | 19.8 | 2.8 | 19.8 | 19.8 | 2.3 | 16.1 | 16.1 |
| **2** | 1.7 | 12.2 | 32.0 | 1.7 | 12.2 | 32.0 | 1.9 | 13.4 | 29.5 |
| **3** | 1.2 | 8.7 | 40.7 | 1.2 | 8.7 | 40.7 | 1.3 | 9.3 | 38.8 |
| **4** | 1.1 | 7.7 | 48.4 | 1.1 | 7.7 | 48.4 | 1.3 | 9.1 | 47.9 |
| **5** | 1.1 | 7.6 | 56.0 | 1.1 | 7.6 | 56.0 | 1.1 | 8.1 | 56.0 |

Extraction Method: Principal Component Analysis.

**Table 3: Classification of individual mothers ANC seeking behavior of Bangladeshi women*.**

| | | | Predicted Group Membership | | Total |
|---|---|---|---|---|---|
| | | Having ANC | None | Have at least 1 ANC | |
| Original | Count | None | 802 | 338 | 1140 |
| | | Have at least 1 ANC | 739 | 1738 | 2477 |
| | % | None | 70.4 | 29.6 | 100.0 |
| | | Have at least 1 ANC | 29.8 | 70.2 | 100.0 |

* 70.2% of original grouped cases correctly classified.

**Figure 1. Factors behind ANC seeking behavior of Bangladeshi women.**