Factors Affecting Health and Morbidity of Women in Bangladesh

Dr. Md. Roshidul Islam [1], Syed Md. Ali Ahsan [2]

[1]Assistant Professor, Department of Statistics, Begum Rokeya University, Rangpur-5400, Bangladesh,
[2]Research student, Department of Statistics, Begum Rokeya University, Rangpur-5400, Bangladesh,

Abstract: *Women health and morbidity study in developing countries is an important issue in public health programs. In recent years, it becomes increasingly important to determine the general context of women health and morbidity levels and policy implications. With respect to this issue, this study aims to determine the influential factors that affect health and morbidity of women in Bangladesh. Body Mass Index (BMI) is considered as the dependent variable and all other possible characteristics that may influence the women health and morbidity is considered as independent variable. Different statistical techniques such as chi- square test and logistic regression analysis were used for analytical purposes. The binary logistic regression was used to find the strength and direction of association. From the stepwise logistic regression analysis , Type of place of residence, Age at marriage, Marital duration, Wealth index , Educational level, Respondents Weight, Height, Vaccination, Diseases, Place of delivery and Delivery by caesarean have significant effect on health and morbidity. The data for the study has been taken from Bangladesh Demographic and Health Survey (BDHS) 2014. Finally it was concluded that proper education and knowledge regarding asset quartile can solve the health and morbidity problems.*
Keywords: Health, Morbidity, Statistical modeling, significant factors, Logistic Regression.

I.   Introduction

In developing world, population growth is an increasing challenge for local health authorities. Bangladesh is one of the most densely populated countries all over the world, facing major health and economic challenges. Health and education levels are relatively low in our country, although they have improved recently as poverty levels have decreased. One of the callous areas of investigation in health condition is that morbidity or the rate of incidence of disease in a population .Along with many others variables morbidity determines any physical or mental illness or disability behavior of people. The situation is worse in developing countries like Bangladesh due to inadequate access to modern health services and lack of educational opportunity of women. It is well recognized that women's current age plays an important role in the utilization of medical services .Now a days Women health and morbidity have a burning issue of a day. These are not necessarily life-threatening but can have a significant impact on the quality of life. Influential factors that contribute women health and morbidity are too numerous to enumerate. The main reasons are multiple, interrelated and are deeply rooted ambivalent social, cultural, political and economic environment of societies and especially the environment that societies create for women (Fortney and Smith, 199; Okolocha etal.,1998).There are several groups of morbidities according to the age group. They are Infant (<1 year) morbidity, Child (<2 years) morbidity, under five (<5 years) morbidity, Adolescent (10-19) morbidity, Reproductive age (15-49 years) morbidity, Working age morbidity (15-64 years) morbidity and Elderly (64+ years) morbidity. In these pepper, we have used the women questionnaire data from BDHS 2014 for reproductive health and morbidity of women in Bangladesh. Now days, It is often found that use of health services is related to the availability, quality and cost of services, as well as to social structure, health beliefs and personal characteristics of the users.

Social factors like Wealth index , Educational level, Vaccination, Diseases and Demographic factors like Type of place of residence, Age at marriage, Marital duration, Respondents Weight, Respondents Height, Place of delivery and Delivery by caesarean were found to have significant effect on health and morbidity of women in Bangladesh. The women's health and wellbeing during pregnancies are influenced by unwanted pregnancies (Ray, 1995).Due to the male dominated social structure in Bangladesh, many of the working and earning women have little liberty to spend even their own earnings. Poor economic, social status, lack of proper education prevents women to take better charge of themselves.

The main purpose of this paper, therefore, is to examine the factors that influence the health and morbidity of women in Bangladesh by using the prospective data obtained from Bangladesh Demographic and Health Survey (BDHS) 2014.

II. Data Sources

In the estimation of factors for Health and Morbidity of women in Bangladesh, we have mainly used the data extracted from the response of Children record questionnaire of 2014 Bangladesh Demographic and Health Survey (BDHS), during the period from 28th June 2014 to 9th November 2014 .The survey was conducted under the authority of the National Institute for Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare. The sample for the 2014 BDHS is nationally representative and covers the entire population residing in no institutional dwelling units in the country. The survey used the list of enumeration areas (EAs) prepared for the 2011 Population and Housing Census (PHC) of the People's Republic of Bangladesh, provided by the Bangladesh Bureau of Statistics (BBS), as a sampling frame. The primary sampling unit (PSU) for the survey is an EA created to have an average of about 120 households. Bangladesh is divided into seven administrative divisions: Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Rangpur, and Sylhet. Each division is divided into zilas, and each zila into upazilas. Each urban area in an upazila is divided into wards, which are further subdivided into mohallas. A rural area in an upazila is divided into union parishads (UPs) and, within UPs, into mouzas. These divisions allow the country as a whole to be separated into rural and urban areas. The survey is based on a two-stage stratified sample of households. In the first stage, 600 EAs were selected with probability proportional to the EA size, with 207 EAs in urban areas and 393 in rural areas. A complete household listing operation was then carried out in all the selected EAs to provide a sampling frame for the second-stage selection of households. In the second stage of sampling, a systematic sample of 30 households on average was selected per EA to provide statistically reliable estimates of key demographic and health variables for the country as a whole, for urban and rural areas separately, and for each of the seven divisions. Finally for our study 4630 ever-married women have been considered out of 43772 respondents. Detailed information about the survey can be found in the 2014 BDHS report [NIPORT *et al.,* 2014].The most remarkable feature of different surveys conducted in Bangladesh is that the towering majority of respondents undergo some identifiable problem or illness during reproductive age group.

III. Variables

Though there are numerous factors, we considered only a few selected variables in our study.

3.1 Response Variables

To estimate the associate factors that significantly affects health and morbidity, we used Body Mass Index of women as the response variable in this analysis. The dependent variable used in this analysis was found directly from the BDHS data set which is supported as a dichotomous variable. Body mass index is one measure of obesity (or Non-obesity). A women's height can be used to predict the risk of having difficulty in pregnancy. The risk of giving birth to low-weight babies is also higher among women of shall stature. The cutoff point at which mothers can be considered at risk because of short stature is normally taken to be between 140 and 150 centimeters. Body mass index is calculated by using the formula:

$BMI = \frac{weight}{(height)^2}$ Where weight is in kilograms and height is in maters

For analysis a women is categorized into two categories according to BMI as Underweight if BMI is less than 22 that means poor health and Overweight if BMI is more than 22 (25 and more Body mass index is also known as Quetelet index)that means Good health [NIPORT *et al.,* 2014].

3.2 Independent Variables

A great deal of independent variables is considered is this study. All the independent variables used in the analysis were not found directly from the BDHS data set. Again for the convenience, we computed some new explanatory variables and transformed some original and computed variables that are suitable for study. They were recorded into homogeneous sub-groups where necessary. Some other variables remain unchanged. Most of the variables are coded as categorical and some are in dummy. The independent variables are Type of place of residence, Age at marriage, marital duration, Wealth index, Educational level, Respondents Weight, Respondents Height, Vaccination, Diseases, Place of delivery and Delivery by caesarean.

IV. Methodology

At first bivariate analysis (chi-square test) was used to discover the specific causes those were related to women health and morbidity. After identifying the factors which were found significant in bivariate analysis then we used a binary logistic regression model. Here binary logistic model gave better fit than multinomial logistic regression model since response variable was dichotomous.

4.1 Logistic Regression

Logistic regression is a well-known multivariate technique for identifying correlates and predicting binary response variable. The binary logistic regression model can be used not only to identify risk factors but

also to predict the probability of success according to binary dependent variable given one or more independent variables. It will enable us to determine which of our independent variables have a statistically significant effect on the dependent variable of interest [Bursac *et al.* 2008] .The Logistic regression model is useful for situations in which we want to be able to predict the presence or absence of a characteristic or outcome based on values of a set of predictor variables. The advantage of linear logistic regression model over other related models such as multiple regression analysis and discriminate analysis is that these models pose difficulties when the dependent variable can have only two values, an event occurring and not occurring. When the dependent variable can have only values, the assumption necessary for hypothesis testing in regression analysis are necessarily violated. For example, it is unreasonable to assume that the distribution of error is normal. Analysis with multiple regression analysis is that predicted values cannot be interpreted as probabilities. They are not considered to fall in the interval between 0 and 1. Linear discriminate analysis does not allow direct prediction of group membership, as well as equal variance- covariance matrices in two groups, is required for the prediction rule to be optional. However, linear logistic regression analysis requires far fewer assumption than discriminate analysis, even when the assumption required for discriminate analysis are satisfied , linear regression still performs well. The logistic regression model is a multivariate technique for estimating the probability that an event occurs.

For a single variable, the logistic regression model is of the form

$$\text{Prop(event)} = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x)}}$$

Where β_0 and β_1 are the regression co-efficient estimated from the data. X is the independent variable and **e** is the base of natural logarithm.

For more than one independent variable, the model assumes the form

$$\text{Prop(event)} = \frac{1}{1 + e^{-z}}$$

Where $\mathbf{Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots\cdots + \beta_k X_k}$

The model is to be written in terms of the log odds of event occurring.

$$\ln\left(\frac{\text{Prob(event)}}{1 - \text{Prob(event)}}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots\cdots + \beta_k X_k \qquad (1)$$

The quantity to the left of the equal sign is called a logit. It is the log of the odds that an event occurs. The odds that an event occurs are the ratio of the number of people who experience the event to the number of people who do not. This is what one gets when divides the probability that the event occurs by the probability that the event does not occur since both probabilities have the same denominator and it cancels, leaving the number of events divided by the number no events. The coefficients in the logistic regression model tell us how much the logit changes based on the values of the predictor variables.

V. Results And Discussion

Table 1 shows that the demographic characteristics of respondents. It was seen that 31.6% women were from urban and 68.4% were from rural area. The majority of respondents were age group 21 to 29 that was 53.1%.In this study 72.6% women got married in the age group less than or equal to 18 years. We observed that more than half of the respondents (77%) were delivered by caesarean. Nearly 50% of respondents were being middle and poor socioeconomic classes. In this study, we observed that 13.4% Bangladeshi ever married women were illiterate, while another 27.7% that they received primary education, it was also seen that 47.5% of women had incomplete secondary education and only 11.4% completed Secondary or higher education. Here we also observed that 14.5% do not suffer any disease, 4.9% had Diarrhoea, 34.4% suffer fever, 30.5% had cough, 0.8% had blood in stool and 14.3% had heart problem. In our present study 60.7% respondents place of delivery was their own home. Finally, we observed that only 31.2% respondents received all vaccine.

Table 1: Frequency and Percentage distribution of the independent Variables

Variable	Frequency	Percentage
Respondent's current		
≤ 20	1277	27.6
21-29	2458	53.1
30-39	834	18.0
40 and above	61	1.3
Respondent's Weight		
Under weight	2833	61.2
Over weight	1797	38.8
Respondent's Height		
Short	1942	41.9

Tall	2688	58.1
Age at Marriage		
≤ 18	3360	72.6
18-21	816	17.6
21+	454	9.8
Marital Duration		
≤ 5	2773	59.9
5-10	1025	22.1
10-15	561	12.1
15+	271	5.9
Delivery by Caesarean		
No	3554	77.0
Yes	1066	23.0
Respondent Education Level		
Illiterate	621	13.4
Primary complete	1281	27.7
Secondary incomplete	2198	47.5
Secondary Complete	530	11.4
Wealth index		
Poorest	983	21.2
Poorer	885	19.1
Middle	882	19.0
Richer	964	20.8
Richest	916	19.8
Type of place of residence		
Urban	1465	31.6
Rural	3165	68.4
Place of delivery		
Own Home	2809	60.7
Public hospital	170	3.7
District Hospital	142	3.1
NGO static clinic	136	2.9
Health complex	166	3.6
Privet hospital	1054	22.8
Child Welfare	122	2.6
Others	31	0.7
Vaccination		
All vaccine receive	1444	31.2
Not all vaccine receive	2809	60.7
No vaccination	377	8.1
Diseases		
Fever	1617	34.4
Diarrhea	229	4.9
Cough	1413	30.5
Heart problem	663	14.3
Blood in stool	37	0.8
No diseases	671	14.5
Total	4630	100.0

Table 2 indicated the distribution of response variable''Body Mass Index of Women". Among the total number of sample was 4630, 59.1% respondents had poor health and 40.9% respondents had good health.

Table 2: Frequency and Percentage distribution of the dependent Variables

Variable	Frequency	Percentage
Body mass index		
Poor health	2737	59.1
Good health	1893	40.9
Total	4630	100.00

Chi-square test of association was performed to identify any association between body mass index of women and potential factors. The majority of factors were associated significantly with the women health and morbidity. As shown in table 3.

Table 3: Variable associate with women health and morbidity

Factors	P-value
Type of place of residence	.000
Respondent's Weight	.000
Respondent's Height	.020
Age at marriage	.000
Marital duration	.001

Delivery by caesarean	.000
Vaccination	.007
Respondent's Education Level	.000
Wealth Index	.000
Disease	.100
Place of delivery	.000

Table 3 clearly showed , independent variables Type of place of residence, Age at marriage, marital duration, Wealth index, Educational level, Respondents Weight, Respondents Height, Vaccination, Diseases, Place of delivery and Delivery by caesarean were associated significantly with health and morbidity of women. Finally a binary logistic regression model was used to regress the dependent variable using independent variables which were found significant in chi-square test of association. The findings were presented in the following table 4.

Table 4: Results of logistic regression analysis for the simultaneous effects of all factors in the model of Body mass index of women in Bangladesh.

Background Variable	β	P- Value	$Exp(\beta)$	Change in -2LR
Type of place of residence				
Urban(ref)	….			
Rural	-.091	.000	.913	.0514*
Respondents Weight				
Under weight(ref)	….			
Over weight	5.53	.000	252.08	2657.8*
Respondents Weight				
Short(ref)	….			
Tall	-2.608	.000	.074	343.2*
Age at marriage				
≤ 18(ref)	….			
18-21	.097	.001	1.102	4.622*
21+	.174	.000	1.602	
Marital Duration				
≤ 5(ref)	….			
5-10	.380	.019	1.462	
10-15	.347	.018	1.415	6.99*
15 and above	.702	.004	2.018	
Delivery by Caesarean				
No(ref)	….			
Yes	.527	.000	1.694	5.317*
Respondent Education Level				
Illiterate(ref)	….			
Primary complete	.178	.000	1.194	
Secondary incomplete	.287	.010	1.333	2.65*
Secondary Complete	.242	.007	1.274	
Wealth index				
Poorest(ref)	…			
Poorer	.265	.002	1.304	
Middle	.214	.010	1.28	14.87*
Richer	.465	.009	1.593	
Richest	.781	.000	2.184	
Vaccination				
No vaccination(ref)	…			
Not All vaccine receive	.027	.005	1.027	7.01*
All vaccine receive	-.268	.000	.765	
Diseases				
No disease(ref)	….			
Fever	.001	.000	1.001	
Diarrhea	.168	.001	1.182	
Cough	.220	.011	1.246	6.366**
Heart problem	.262	.003	2.138	
Blood in stool	.760	.018	1.299	
Place of delivery				
Home(ref)	….			
Public hospital	.358	.000	1.430	
District Hospital	.436	.003	1.547	
NGO static clinic	.367	.001	1.443	
Health complex	-.059	.001	.943	7.267*
Privet hospital	-.082	.004	.922	
Child Welfare	.021	.000	1.021	
Others	.728	.001	2.071	

Note: ref=Reference category
*5% level of significance, ** 1% level of significance.

Interpretation of parameters in binary logistic regression is not straight forward. Generally it can be said that compared to reference category ,categories within factors having positive coefficients are more likely to influence health and morbidity of women. Such as, respondents who lived in rural area were more likely to have a higher health and morbidity problem than urban respondents. The factor age at the first marriage of respondent was significant. It showed that majority of women got married less or equal to 18 years and they also collapsed in health and morbidity. Respondents wealth index and education level are most influential factors that affect health and morbidity. We have ever seen that rural low asset quartile peoples have high risk morbidity and poor health than high asset quartile people. We also observed that illiterate women are not aware of their health problems. It is argued that better educated women are more aware of health problems, know more about the availability of health care services and use this information more effectively to maintain or achieve to good health status.

From the stepwise logistic regression analysis technique the independent variables Type of place of residence, Age at marriage, Marital duration, Wealth index , Educational level, Respondents Weight, Respondents Height, Vaccination, Diseases, Place of delivery and Delivery by caesarean have significant effect on health and morbidity.

VI. Limitation of the Study

This study is based on data of Bangladesh Demographic and Health Survey (BDHS) 2014.Though BDHS data is widely recognized and well accepted data, but may be affected by some non-sampling and sampling error. Non-sampling errors are made due to mistakes made in implementing data collection and data processing, such as failure to locate and interview the correct household, misunderstanding of questions on the part of either the interview or the respondent and data entry errors.Despite this limitations, we believe that our findings may be helpful to illuminate the association of the body mass index of women with other explanatory variables under study.

VII.Conclusion

Health and morbidity related problems are very common to Bangladeshi women. This study is designed to identify potential factors for health and morbidity of women. In our study, Statistical techniques are performed to discover association from acquired secondary data. The stepwise logistic regression analysis shows, Type of place of residence, Age at marriage, Marital duration, Wealth index , Educational level, Respondents Weight, Respondents Height, Vaccination, Diseases, Place of delivery and Delivery by caesarean have significant effect on health and morbidity of women. Here ,we observed the average BMI is founded only 18.01.The legal BMI in Bangladesh for women has three categories such as less than 18.5 indicates underweight , 18.5 to 24.5 indicates normal weight and greater or equal 25 indicates overweight also known as Quetelet index. The mean age at first marriage is found only 17.17.The legal age of marriage in Bangladesh for women is 18 years , but a large portion of marriages still take place before the legal age.   Female education is a vital aspect of changing health services and plays an important impact on the socio-economic well-being of individuals. However, at present, in Bangladesh only 12% of ever married women age 15-49 years has completed their secondary or higher education. It has long been recognized that education is strongly related to a broad range of demographic characteristics .Bangladesh is the highest among women with no education which influence increasing morbidity.

Concerning the current situation, alternative steps might be taken by government and non-government organizations. The government should pay an attention to ensure the existing marriage act (where the age at first marriage for women is 18 years) to prevent the early marriage in Bangladesh. More working opportunities have to create for women in Bangladesh by the Government and others. Finally ,for the development of the country ,it is not only important to control the size of the population ,but also to develop the quality of its education level, health facilities ,training and other skill development mechanisms.

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