Influencing Factors of Child Health and Morbidity in Bangladeshi Children

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Abstract. The study of child health and child morbidity in developing countries is an important issue in public health programs. Child mortality is caused by direct, indirect and other related factors and morbidity such as acute respiratory infection (ARI), diarrhea, fever, cough etc. This data employs the prospective data on child status in Bangladesh to identify the existing situations about child health and child morbidity. A secondary data has been taken from the Bangladesh Demographic and Health Survey (BDHS), which is one of the biggest public health surveys in Bangladesh. The survey was conducted in the year 2014. In this study, the dependent variable of interest was the ARI and diarrhea. A number of demographic variables and potential factors were considered as independent variables. The Chi-square test, logistic regression and correspondence analysis were considered for analytical purposes.

Keyword: Child morbidity, Child health, ARI (acute respiratory infection), Diarrhea

Introduction

Children are the future of any nation or community. They are essential for the survival of any group of people. For this reason and more the focus of international public health concern has been on reducing child mortality and morbidity in order to propagate, preserve, nurture and ensure continuity of the human race. Beauty is one of the girls enrolled in our study on adolescents' reproductive health, which was conducted in Matlab, a rural area in Bangladesh. Infant and child morbidity and mortality in Bangladesh have long been a topic of interest to population researchers because of its direct relationship with the acceptance of modern contraception.

Childhood diarrhea diseases and acute lower respiratory infections are two of the leading causes of the world's burden of diseases. Acute respiratory infections (ARI) are a leading cause of childhood illness and death. Early diagnosis and treatment with antibiotics can reduce the number of deaths caused by ARIs, particularly deaths resulting from pneumonia. Vaccinations are most effective when given at the proper age. Universal immunization of children against the major vaccine-preventable diseases (tuberculosis, diphtheria, peruses, tetanus, hepatitis, haemophilus influenzae type B, poliomyelitis, pneumonia, and measles) is globally recognized as one of the most cost-effective programs to reduce infant and child morbidity and mortality. According to William (1984), CHS are that aspect of medical services that provide essential health services to protect, promote and maintain health and well-being for child bearing families as a unit and for each individual child within that family up to school age (from birth to five years). Adolescence is a challenging stage in life, the stepping stone for a child to reach adulthood, and generally defined as the period from 10 to 19 years (UNFPA, 1998a, p. 1). The objective of child health care services according to Nelson (2000) is to reduce child morbidity and mortality to enhance mental, physical and psychological well being of the children to permit them to come to adulthood at their optimal stage of development as to complete with life struggle at their affective level.

Social factors like Mother's education, Mother's occupation, Father's education, Wealth index, Source of drinking water, type of toilet facility and Demographic factors like division, Place of residence, Place of delivery, Age of mother at first birth, Size of child at birth, Child's

weight, Vaccination were found to have significant effect on child health and morbidity under five year's children in Bangladesh.

Data Source

In the estimation of factors for Child Health and Morbidity in Bangladesh, we have mainly used the data extracted from the response of Children record questionnaire of 2014 Bangladesh Demographic and Health Survey (BDHS).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 survey was implemented by Mitra and Associates, a Bangladeshi Research firm located in Dhaka. Macro International Inc., a private research firm located in Calverton Maryland, USA, provided technical assistance to the survey as part of its international Demographic and Health Surveys Program. The U.S Agency for International Development (USAID)/Bangladesh provided financial assistance.

Analytical Methods

The bivariate and multivariate analysis both were applied in the study. The chi-square statistic (bivariate analysis) is commonly used for testing relationship between categorical variables which were related to child health and morbidity and the multivariate analysis namely the logistic regression analysis was devoted to inquire net effects of covariates. The statistical analysis has been conducted using SPSS 21.

Results and Discussion

Table 1 shows that the bivariate analysis of effective different independent variables.

Table 1. Bivariate effect on child health and morbidity into different independent variables

Variable	Category	Acute Respiratory Infection		P-value
		No	Yes	
Place of residence	Rural	12.8%(56)	87.20%(4530)	.000
	Urban	31.62%(732)	68.38%(1594)	
Mother's education	No education	19.19%(169)	80.81%(274)	.003
	Primary	25.25%(136)	74.75%(667)	
	Secondary and higher	35.05%(183)	64.95%(1535)	
Mother's occupation	Housewife	35.4%(298)	64.6%(457)	.030
	Secondary level worker	40.0%(13)	60%(49)	
	High level worker	46.2%(323)	53.8%(537)	
Father's education	No education	15%(108)	85%(613)	.007
	Primary	16.8%(145)	83.2%(716)	
	Secondary	12.0%(97)	88%(712)	
	Higher	11.5%(45)	88.5%(348)	
Wealth index	Poorest	29.38%(164)	70.32(391)	.045
	Poorer	30.53%(2080)	69.47%(587)	
	Middle	34.44%(195)	65.56%(472)	
	Richer	35.77%(70)	64.23%(404)	
	Richest	38.83%(51)	61.17%(235)	
Place of delivery	Home	40.1%(388)	59.9%(480)	.040
	Public hospital	41%(25)	59%(75)	
	District hospital	35.8%(21)	64.2%(41)	
	Child welfare center	16%(7)	84%(36)	
	Upazila health	18%(6)	82%(33)	
	Private hospital	22%(10)	78%(39)	

	NGO static clinic	9%(20)	91%(317)	
Source of drinking water	Piped water	6.46%(2)	93.54%(29)	.000
	Tube well water	13.87%(344)	86.13%(2173)	
	Surface	16.48%(15)	83.52%(91)	
	Others	42.45%(58)	57.55%(80)	
Vaccination	Yes	34.9%(365)	65.1%(2302)	.030
	No	13.12%(28)	86.88%(57)	
Age of mother at 1st birth	12	8.6%(12)	91.4(127)	.009
	13-17	11.02%(20)	88.8%(3931)	
	18-22	32%(106)	68%(1041)	
	23-28	56%(1540)	46%(12)	
Size of child at birth	Very large	47.33%(344)	52.67%(2173)	.007
	Large	41.40%(521)	58.60%(1200)	
	Average	36%(422)	64%(625)	
	Small	31.11%(65)	68.89%(632)	
	Very small	20%(325)	80%(524)	
Type of toilet facility	Modern toilet	40.67%(288)	59.33%(423)	.003
	Open toilet	14.73%(300)	85.27%(1765)	

Proportion of Some Selected Diseases

Proportion of some selected diseases with respective variable are shown below.

Table 2. Proportion of diseases with respect to wealth index

Disease	Wealth Index					No. of disease
	Poorest	Poorer	Middle	Richer	Richest	
Fever	35.12%	35.63%	35.92%	34.16%	37.43%	1617
Cough	37.50%	31.34%	30.04%	30.53%	27.69%	1413
Diarrhoea	5.03%	5.26%	4.67%	4.27%	3.40%	229
Total	25.88%	24.08%	23.54%	22.98%	21.84%	3259

Table 3. Proportion of diseases with respect to division

Disease (%)	Division						
	Barisal	Chittagong	Dhaka	Khulna	Rajshahi	Rangpur	Sylhet
Fever	37.35	36.65	31.87	31.50	36.66	37.15	38.58
Cough	32.99	32.82	26.93	31.35	33.96	29.43	31.36
Diarrhoea	5.38	6.29	5.22	30.51	3.64	1.10	5.34
Total	25.24	25.25	21.34	22.12	24.75	22.56	25.09

Table 4. Proportion of diseases with respect to mother's education

Disease (%)	Mother's education			
	No education	Primary	Secondary	Higher
Fever	37.90	35.87	34.48	29.40
Cough	31.93	30.67	30.82	32.39
Diarrhoea	5.87	4.56	4.50	3.91
Total	25.23	23.7	23.26	21.9

Table 5. Proportion of diseases with respect to residence

Disease (%)	Residence	
	Urban	Rural
Fever	30.47	39.00
Cough	26.13	36.00
Diarrhea	3.60	6.94
Total	20.06	27.31

The Logistic Regression Model

The logit of the multiple logistic regression models is given by the equation

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots\dots\dots\dots\dots\dots + \beta_i X_i$$

The dependent variable in logistic regressions is usually dichotomous, that is, the dependent variable can take the value 1 with a probability of success, or the value 0 with probability of failure 1- θ . The relationship between the predictor and response variable is not a linear function in logistic regression; here logit transformation of θ is given by:

$$\hat{\theta} = \frac{e^{(\alpha+\beta_1 X_1+\beta_2 X_2+\dots\dots\dots\dots\dots+\beta_i X_i)}}{1+e^{(\alpha+\beta_1 X_1+\beta_2 X_2+\dots\dots\dots\dots\dots+\beta_i X_i)}}$$

Where, α =the constant of the equation and β = the coefficient of the predictor variables

An alternative form of the logistic regression equation is:

$$Y = \text{logit}[\theta(X)] = \log\left[\frac{\theta(X)}{1-\theta(X)}\right]$$

$$= \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots\dots\dots\dots\dots\dots + \beta_i X_i$$

So, arguing analogously as in the case of linear regression model, we can say that $\beta_j (j = 1,2,3, \dots\dots\dots\dots\dots, k)$ represents the rate of change in$\log\left[\frac{\theta(X)}{1-\theta(X)}\right]$ for one unites change in $X_j (other\ variable\ remaining\ constant)$. It has several properties; θ is bounded only 0 and 1. If $\theta(X)$ <0.5, logit θ is negative; while if $\theta > 0.5$ logit θ is positive.

Results

Result of logistic regression analysis shown in Table 6. The variables Mother's education, Mother's occupation, Wealth index, Place of residence, Division, Place of delivery, Child's weight, Vaccination, mother age at 1st birth, Size of child at birth, are 5% level of significance, the variables Source of drinking water, Type of toilet facility, Father's education are 10% level of significance. The 7th column of the table shown that the odds ratio which explain that the odds ratio of mother's education is .679, 1.200, and .850 indicates that Child health and morbidity will be.679, 1.200, and .850 times higher for those mothers of children who have illiterate, primary and secondary than those mothers who have higher educated. The odds ratio of Fathers education are 1.888, 1.285 and 1.561 indicates that Child health and morbidity will be 1.888, 1.285 and 1.561 times higher for those fathers of children who have primary, secondary and higher educated than those fathers are illiterate. Similarly the odds ratios of wealth index of respondents are 5.022, .941, .810 and 1.419 indicates that child health and morbidity are 5.022, .941, .810 and 1.419 times higher for those respondents who have wealth index are poorer, middle, richer and richest than those respondents who have poorest. The odds ratios of place of residence are 6.63 indicates that child health and morbidity are 6.63 times higher than rural area's people. Division has been appeared as a highly significant factor affecting child health and morbidity positively. The odds ratios of Division are .622, .984 and .255 with 95% CI (.450, .858), (.784, 1.235), and (.187, .349) respectively. Which indicate that child health and morbidity are .622, .984 and .255 times higher for children whose those Division which have Chittagong, Dhaka and Sylhet than those Division are Barisal (reference category). Also the odds ratio of mother's occupation is .763 and .236 indicates that Child health and morbidity will be .763 and 236 times higher for those mothers whose occupation secondary level worker and high level worker than those mothers occupation are primary level worker. Place of delivery has been appeared as a highly significant factor affecting child health and morbidity positively. The odds ratios of place of delivery are .729, 1.575, .857, .615, 1.530, 1.311 and 1.044 with 95% confidence interval (.375, 1.417), (1.056, 2.349), (.367, 2.002), (.301, 1.253), (.154, 15.168), (.995, 1.729) and (.531, 2.053) respectively, which indicates that child health and morbidity are .729, 1.575, .857, .615, 1.530, 1.311 and 1.044 times higher for those respondents whose place of delivery are Public hospital, District hospital, Upazila health

complex, Privet hospital, Child welfare center and NGO static clinic than those at home (reference category). The odds ratio toilet facility are .924 indicates that child health and morbidity are .924 times higher for those children whose toilet facility have open toilet than modern. Also the odds ratio of source of drinking water is .177, .202 and .236 indicates that are .177, .202 and .236 times higher for those children whose source of drinking water have Tube well, Surface water and others than those Piped water. The odds ratio of Size of child at birth is 817.988, .696, .571 and. 1.074 indicates that child health and morbidity is 817.988, .696, .571 and. 1.074 times higher for those children whose size at birth have large, average small and very small than those children whose size very large. Similarly the odds ratio of mother age at 1st birth is 1.176, 1.261, 2540.8 indicates that child health and morbidity is 1.176, 1.261, 2540.8 times higher for those children whose mother age at first birth have 13-17, 18-22, 23-28 than whose age of mother have 12.

Table 6. Results of the multivariate logistic regression analysis showing the odds ratio, regression coefficients, and their significant level by socioeconomic and demographic characteristics which were effect on child health and morbidity

Variable	β	S.E	Wald	df	Sig.	Odds Ratio (OR)	95% C.I for EXP(B)	
							Lower	Upper
Mother's education Higher(ref)				3				
Illiterate	-.693	1.225	.320	1	.004	.679**	.165	3.492
Primary	.182	1.169	.024	1	.008	1.200**	.121	11.865
Secondary	-.163	.940	.030	1	.004	.850**	.135	5.366
Father's education Illiterate(ref)				3				
Primary	.276	.114	5.900	1	.075	1.888*	.704	1.889
Secondary	.084	.110	.583	1	.554	1.035*	.833	1.285
Higher	-.806	.119	45.58	1	.000	1.003	1.005	1.561
Wealth index Poorest(ref)				4				
Poorer	.529	.553	.915	1	.000	1.698**	.574	5.022
Middle	-.464	.206	5.075	1	.000	.629**	.420	.941
Richer	-.765	.282	7.334	1	.041	.465**	.268	.810
Richest	.016	.170	.009	1	.000	1.016**	.728	1.419
Type of place of residence Urban(ref) Rural	-16.53	.298	3084.50	1	.000	6.63**	3.7302	11.88
Division Barisal(ref)				6				
Chittagong	1.053	.164	41.19	1	.000	.622**	.450	.858
Dhaka	.505	.131	14.83	1	.000	.984**	.784	1.235
Khulna	.388	.200	3.738	1	.053	.502*	.334	.756
Rajshahi	-.065	.148	.194	1	.659	.991	.767	1.281
Rangpur	-.002	.194	.000	1	.990	.776	.533	1.130
Sylhet	1.577	.154	104.5	1	.000	.255	.187	.349
Mother's occupation Housewife(ref)				2				
Secondary level worker	-.271	.482	.361	1	.004	.763**	.297	1.961
High level worker	-1.446	.334	18.735	1	.000	.236**	.122	.453

Place of delivery Home(ref)				7				
Public hospital	-.253	.309	67.14	1	.000	.729**	.375	1.417
District hospital	-.358	.253	200.3	1	.000	1.575**	1.056	2.349
Child welfare center	-3.13	.401	60.92	1	.000	.857**	.367	2.002
Upazila health	-2.27	.325	65.21	1	.000	.615**	.301	1.253
Community clinic	-7.32	1.54	22.60	1	.000	1.530**	.154	15.168
Private hospital	-1.33	.141	88.42	1	.000	1.311**	.995	1.729
NGO static clinic	-2.94	.332	78.47	1	.000	1.044**	.531	2.053
Type of toilet facility Modern toilet(ref) Open toilet	-.080	.094	.720	1	.090	.924*	.768	1.110
Source of drinking water Piped water(ref)				3				
Tube well	-1.734	.507	11.686	1	.070	.177*	.065	.477
Surface water	-1.598	.373	18.366	1	.060	.202*	.097	.420
Other's	-1.446	.334	18.735	1	.065	.236*	.122	.453
Size of child at birth Very large(ref)				4				
Large	15.92	1.269	157.26	1	.000	817.988**	679.71	984.80
Average	-17.3	.558	962.93	1	.000	.869**	.555	3.088
Small	-.560	1.206	.215	1	.006	.571*	.054	6.079
Very small	1.091	.382	.035	1	.000	1.074**	.508	2.271
Child's weight	-2.17	.039	3059	1	.000	1.000**	1.000	1.000
Vaccination Yes(ref) No	-16.15	.854	358.08	1	.000	9.616**	1.804	12.88
Age of mother at 1st birth 12(ref)				3				
13-17	.693	.866	.641	1	.004	1.176**	.539	2.565
18-22	1.872	.782	5.733	1	.000	1.261**	.486	3.569
23-28	19.08	2735.2	2245.8	1	.003	2540.8**	1247.1	2870.0

Note: ref=Reference category; **5% level of significance, *10% level of significance

Conclusions

Taking experiences of safe motherhood initiatives in low resource setting into account, upgrading the quality and coverage of safe motherhood services (including neonatal care) will have the largest payoff in averting deaths and reducing disability among women and children in rural Bangladesh (Tinker et al., 1993). Recently, efforts to reduce maternal mortality in Bangladesh have been made using low cost easily deliverable technology such as tetanus taxied coverage of pregnant women, training of birth attendants and development of community mid-wives, coupled with awareness raising BCC campaigns for identifying and managing risky pregnancy.

The results from both bivariate and multi- variate analysis confirmed the importance of mother's education on the utilization of health care services. Female education retains a neteffect on maternal health service use, independent of other background characteristics, household's socioeconomic status and access to health care services. The strong influence of mother's education on the use of health care services is consistent with the findings from other studies (Abbas & Walkerns, 1986; Elo, 1992; Becker et al., 1993; Fosu, 1994). Also, women's

whose husbands are involved in business/services are more likely to use both modern and traditional health care services.

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