Impact of Socioeconomic and Demographic Factors Affecting Child Health in Selected South Asian Countries

[1]Sofia Anwar, [2]Maria Khushbakhet, [3]Aisha Asif, [4]Zahira Batool

[1]Professor and chairperson, Department of Economics, Government College University Faisalabad, Pakistan, sofia_eco@gcuf.edu.pk
[2]MPhil Scholar, Department of Economics, Government College University Faisalabad, Pakistan, mkch_89@yahoo.com
[3]PhD Scholar, Department of Economics, Government College University Faisalabad, Pakistan, aieshasif@gmail.com
[4]Associate Professor, Department of Sociology, Government College University Faisalabad, Pakistan

ARTICLE DETAILS

ABSTRACT

Development of any nation is estimated through child health condition. In particular, the fourth millennium development goal out of eight is to reduce the mortality rate. The target set under this goal was to reduce by two-third, between 1990 and 2015, the proportion of child mortality. Maternal BMI is closely associated with child nutritional status. Weak mother having low BMI has low nutrition status which effect child weight. Healthy and balance food of mothers have positive effect on their child. Underweight mother can have impaired and poor growing kids. This study presents impact of some socio-economic demographic and maternal health related factors on health status of children in selected South Asian countries i.e. Pakistan, Bangladesh and Nepal. The study used micro data from demographic and health survey (DHS) of Pakistan, Bangladesh and Nepal. Multinomial logistic regression results revealed that mother education, mother working status, mother health, availability of safe drinking water, family size and vaccination have significant effect on child health. Mother's education is positively associated with healthy child. Working mothers are more likely to have healthy child. Weak and obese children are positively associated with malnourished and overweight mothers respectively. Small family size has positive impact on weak child health. Vaccination and availability of improved and safe water are positively associated with child health.

1. Introduction and Literature Review

Development of any nation is estimated through child health condition (Anwar et al., 2012). Many developing nations included; Pakistan joined the United Nations Millennium summit and agreed to make efforts to achieve the Millennium Development Goals (MDGs).The attainment of MDGs is the numerical measurement of the progress in which efforts are made by any country. In particular, the fourth millennium development goal out of eight is to reduce the mortality rate. The target set under this goal is to reduce by two-third, between 1990 and 2015, the proportion of child motility (WHO, 2005).

Underweight in children are the main causes of child health problems in developing countries. Newly born babies who have completed 37 weeks of gestation and have low birth weight (less than 2.5 kg) have greater possibility to contain growth restrain whereas this situation refer to low birth weight and weak child. The nutritional condition measures stunting and obesity which are considered as risk factors whose exposure applied to all children of less than five years (Black et al., 2008). The child malnutrition more often leads to illness and death (Cheah et al., 2010).There are number of factors which results in child malnutrition like food security (availability and access), mother's poor nutritional level, low literacy level, less awareness of health care service and child care where malnourishment is the most important determinant of child BMI (Linnemayr et al., 2008).

Childhood obesity is directly correlated with weight problems during adulthood. The obese children have greater probability to be involved in health issues like blood pressure and diabetes in early adolescence (Serdula et al., 1993; Whitaker et al., 1997; and Freedman et al., 2007). Obesity is also cause of overweight and slow metabolic system (Modi et al., 2011). Furthermore, obesity among children is related with a number of long term psychological issues (Dietz, 1998; Strauss, 2000; Daniels, 2006; Mocan & Tekin, 2007).

The mother's education leads to improvement in child health via more efficient child care in the home along with the enhanced use of prevention services and treatment (Caldwell, 1994). There is no specific threshold level of mother's education which should be attained before the benefits of mother's education forward to the child health. Mother's education aware them about their child health which cause lower death rates, longer life expectancies and nutrition status (Abuya et al.,2013; Barrera, 1990; Hadden & London, 1996).

There is direct Relationship between mother's working status and child health as working mothers have enough money to purchase healthy and hygienic food (energy and protein dense food) , services of house cleaner and utensils washer as well as vehicle which offer them more time to spend in child care activities (Gwozdz at al., 2013). Working mother spent some hours at work so they are more conscious about their child care working mothers have healthy child as the working mothers of under five children have less chance to be weak than non-working mothers (Fukuda et al., 2014).

The age of mother is associated with the child health (Abuya et al., 2012). Teenage mothers are psychologically less mature and remain unaware and hesitant regarding reproductive matters (Garenne et al., 2000; Woldemicael, 2005).The child health increase with the age of mother and the marriage in early age increases the infant mortality (Tagoe-Dark, 1995).

Weak mother has low nutrition status which effect child weight. Healthy and balance food of mothers have positive effect on their child. Underweight mother can impair to growing infants, because underweight mother may have premature and underweight baby at birth. Children of overweight mother associated with higher BMI and fat in their liver children and the consequence of mothers BMI on their child's improvement in the womb may cause of path towards lifetime metabolic health problems (Modi et al, 2011; Negash et al., 2015).

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This study is important as there exists lacuna on the subject of child health regarding comparison of developing countries which are of same continent. This study will provide important facts about demographic, socioeconomic and health factors effecting child health. This study is limited to the socio economic, demographic and health factors which effect child health of age five and under five.

2. Data and Methodology

2.1. Data

The data for this study is derived from Pakistan Demographic and Health Survey (12-2013), Bangladesh Demographic and health survey (2011-12) and Nepal demographic and health survey (2011-12) in order to compare the effects of socioeconomic, demographic and health factors on child health in Pakistan, Bangladesh and Nepal.

To put DHS in useable format some manipulation were adopted. There were many missing values in PDHS data set. It was inevitable to fill those missing values because analysis has been done by SPSS version 20. So missing values are excluded. The data was required on child with age 5 and below for proxy of child health which is child Body Mass Index, DHS provide data for children up to age 13 in Pakistan and in Nepal up to age 12. We filtered the data set to obtain required data for analysis. The values of child body mass index far beyond the lower and upper bound of standard values were considered as outliers and removed. In DHS some variables had large categories (Wealth Index, House hold size, water source, toilet facility and etc.), we merge them categories into 3 and 4 subcategories.

2.2. Methodology

Multinomial logit model is the extensive form of the logit model. Multinomial logistic function is used in this study to examine the effects of child Body Mass Index. Outcome of independent variable is different for each type of dependent variable. In this model one category of dependent variable is used as the reference category. All further categories defined in the perspective of that reference category. It could be the first, last or the category with maximum incidence. For all N categories N-1 equations are estimated. In Equation form multinomial logit model with three dependent variables and different independent variables is.

$$Y_{(a,b,c)i} = \ln \frac{\Pr(Y = a,b)}{\Pr(Y = c)} = \alpha_{a,b,c} + \sum_{j=1}^{J} \beta_{(a,b,c)j}(Z)_{ij} \quad \text{……………………...(1)}$$

Where;
Y= dependent variable
N= a, b, c are the three different categories of child health.
Here it determines the probability of *ith* children facing one of the *jth* outcomes (of being week, healthy and obese).
Y_i is the end results practiced by c

$$Ln \frac{pr(Child\ Health/BMI = Weak\ Child)}{pr(Child\ Health/BMI = Healthy\ Child)} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \text{........} + \beta_k X_k \quad \text{………………………….(2)}$$

$$Ln \frac{pr(Child\ Health/BMI = Obese)}{pr(Child\ Health/BMI = Healthy\ Child)} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \text{........} + \beta_k X_k \quad \text{…………………………...(3)}$$

2.3. Results and Discussion:

Relative probability of weak children rather than healthy children is significantly higher in urban areas than in rural areas keeping other factors constant in Nepal documented by previous studies (Ruel, 2003). Obese Child lives in urban areas than rural areas are relatively 41% more likelihood rather than healthy child in Pakistan.

The relative probability of weak children rather than healthy children is significantly 32% and 31 % increasing for uneducated mothers and lower educated mothers than educated mothers in Nepal and Bangladesh respectively. It is supported by studies (Mondal et al., 2009; Frost et al., 2005). The relative probability of obese child than healthy child is 73% more than uneducated mothers. Pakistan has insignificant effect which shows it has not direct effect on child health.

The relative probability of weak children rather than healthy children is 28 % higher for not working women than working mothers in Pakistan reported by previous studies (Ogada, 2014) that working mothers of age under five children has less chance to be weak those who not working mothers. Relative probability of obese child rather than healthy child strongly significantly 52% and 80% higher of not working mothers than working mothers keeping all others factors constant in Pakistan and Nepal. Gwozdz et al., (2013) recommended that working mothers have a tendency to utilize their money to take time off and take care of their children.

The relative probability of weak children than healthy children is significantly 33 % increasing for middle than rich in Pakistan. In Bangladesh and Nepal it has positive but insignificant relationship. Household wealth is not significant and direct relation with child health. Parental income has negligible effect on child health. Relative probability of obese child rather than healthy child is 78% and 24% higher for poor and middle socioeconomic status than higher socioeconomic status than keeping other factors constant (Gouda, 2014).

Table 1: Household's Socioeconomic and Demographic Variables Distribution With Reference To Child Health in Selected South Asian Countries

Independent Variables		Child Health/BMI								
		Pakistan			**Bangladesh**			**Nepal**		
		Weak Child	Healthy Child	Obese Child	Weak Child	Healthy Child	Obese Child	Weak Child	Healthy Child	Obese Child
Place of Residence	Urban = 1	404 (42.9)	212 (22.5)	326 (34.6)	483 (66.5)	113 (15.6)	130 (17.9)	274 (62.8)	103 (23.6)	59 (13.5)
	Rural = 0	647 (43.6)	351 (23.7)	486 (32.7)	1155 (69.0)	257 (15.4)	262 (15.7)	996 (57.3)	505 (29.1)	237 (13.6)
		Chi Sq. Value = 5.510^ Gamma = .087^			Chi Sq. Value = 2.043 Gamma = -.057			Chi Sq. Value = .988 Gamma = -.024		
Gender of Child	Male = 1	538 (43.9)	272 (22.2)	416 (33.9)	872 (71.2)	155 (12.7)	198 (16.2)	694 (61.1)	302 (26.6)	139 (12.2)
	Female = 0	513 (42.8)	291 (24.3)	396 (33.0)	766 (65.2)	215 (18.3)	194 (16.5)	576 (55.4)	306 (29.5)	157 (15.1)
		Chi Sq. Value = 1.450 Gamma = .003			Chi Sq. Value = 15.592* Gamma = .105*			Chi Sq. Value = 7.861^ Gamma = .109^		
Household size	1-5 Members = 1	218 (51.7)	101 (23.9)	103 (24.4)	847 (77.1)	139 (12.6)	113 (10.3)	642 (62.0)	267 (25.8)	127 (12.3)
	6-7 Members = 2	269 (48.7)	130 (23.6)	153 (27.7)	453 (63.3)	128 (17.9)	135 (18.9)	387 (59.6)	179 (27.6)	83 (12.8)
	8-10 Members = 3	297 (40.6)	165 (22.6)	269 (36.8)	236 (56.6)	70 (16.8)	111 (26.6)	186 (50.1)	120 (32.3)	65 (17.5)
	Above 11 Members= 3	267 (37.0)	167 (23.2)	287 (39.8)	102 (60.7)	33 (19.6)	33 (19.6)	55 (46.6)	42 (35.6)	21 (17.8)
		Chi Sq. Value = 45.439* Gamma = .164*			Chi Sq. Value = 91.119* Gamma = .227*			Chi Sq. Value = 23.785* Gamma = .134*		
Wealth Index	Poor = 1	512 (42.0)	266 (21.8)	442 (36.2)	714 (70.8)	142 (14.1)	152 (15.1)	672 (60.2)	307 (27.5)	138 (12.4)
	Middle = 2	173 (40.3)	108 (25.2)	148 (34.5)	294 (66.7)	72 (16.3)	75 (17.0)	239 (57.9)	121 (29.3)	53 (12.8)
	Rich = 3	366 (47.1)	189 (24.3)	222 (28.6)	630 (66.2)	156 (16.4)	165 (17.4)	359 (55.7)	180 (28.0)	105 (16.3)
		Chi Sq. Value = 14.623^ Gamma = -.085^			Chi Sq. Value = 5.395 Gamma = .072^			Chi Sq. Value = 6.654 Gamma = .071^		
Mother's Education	No Education = 1	626 (41.8)	339 (22.6)	532 (35.5)	376 (75.7)	72 (14.5)	49 (9.9)	647 (63.7)	267 (26.3)	101 (10.0)
	Primary = 2	167 (47.9)	81 (23.2)	101 (28.9)	519 (72.0)	98 (13.6)	104 (14.4)	231 (54.6)	132 (31.2)	60 (14.2)
	Secondary & Higher = 3	258 (44.5)	143 (24.7)	179 (30.9)	743 (62.9)	200 (16.9)	239 (20.2)	392 (53.3)	209 (28.4)	135 (18.3)
		Chi Sq. Value = 8.574^ Gamma = -.70			Chi Sq. Value = 39.360* Gamma = .209*			Chi Sq. Value = 34.15* Gamma = .171*		
Mother's Work Status	Not Working = 1	799 (43.0)	408 (22.0)	649 (35.0)	1414 (67.2)	330 (15.7)	361 (17.1)	463 (57.2)	206 (25.4)	141 (17.4)
	Working= 0	252 (44.2)	155 (27.2)	163 (28.6)	224 (75.9)	40 (13.6)	31 (10.5)	807 (59.2)	402 (29.5)	155 (11.4)
		Chi Sq. Value = 10.52^ Gamma = -.067^t			Chi Sq. Value = 10.64^ Gamma = .057			Chi Sq. Value = 16.94* Gamma = -.075^		
Mother BMI	Underweight = 1	192 (54.7)	83 (23.6)	76 (21.7)	467 (70.9)	95 (14.4)	97 (14.7)	265 (68.1)	95 (24.4)	29 (7.5)
	Normal weight= 2	553 (43.5)	289 (22.7)	429 (33.8)	1006 (68.2)	220 (14.9)	248 (16.8)	890 (57.1)	441 (28.3)	228 (14.6)
	Overweight = 3	306 (38.1)	191 (23.8)	307 (38.2)	165 (61.8)	55 (20.6)	47 (17.6)	115 (50.9)	72 (31.9)	39 (17.3)
		Chi Sq. Value = 35.90* Gamma = .162*			Chi Sq. Value = 9.132^ Gamma = .086^			Chi Sq. Value = 26.17* Gamma = .198*		
Mother age at 1st Birth	Under 18 Age = 1	328 (41.6)	189 (24.0)	272 (34.5)	1070 (69.8)	240 (15.7)	222 (14.5)	530 (58.2)	261 (28.7)	119 (13.1)
	19-23 Age = 2	493 (42.3)	270 (23.2)	403 (34.6)	479 (65.2)	115 (15.6)	141 (19.2)	617 (60.1)	268 (26.1)	142 (13.8)
	Above 24 Age = 3	230 (48.8)	104 (22.1)	137 (29.1)	89 (66.9)	15 (11.3)	29 (21.8)	123 (51.9)	79 (33.3)	35 (14.8)
		Chi Sq. Value = 7.95^t Gamma = -.062^			Chi Sq. Value = 12.46^ Gamma = .100^			Chi Sq. Value = 6.565 Gamma = .025		

Source: Demographic and Health Surveys (DHS), author's own calculation
Note:　　Figures in parenthesis are the percentages
^, *, *t* indicate coefficients are significant at 1, 5 and 10 percent level respectively.

Table 2: Socioeconomic and Demographic Variables Affecting the Probability of Weak Child Health in Selected South Asian Countries

Independent variables	Pakistan	Bangladesh	Nepal

		B	Odd Ratios	B	Odd Ratios	B	Odd Ratios
	Intercept	.487		.420		-.868**	
Place of Residence	Urban = 1	.068	1.070	-.082	.921	.374**	1.454
	Rural = 2			Reference Category			
Mother education	no education = 1	.133	1.143	.189	1.208	.274***	1.315
	primary education	.264	1.302	.272 ***	1.313	.071	1.076
	Secondary& higher education			Reference Category			
Mother's Work Status,	Not Working = 1	.246**	1.279	-.155	.857	.111	1.118
	Working = 0			Reference Category			
Socio economic status ,	Poor =1	.105	1.11	.044	.957	.183	1.201
	Middle= 2	.28***	1.325	.099	.906	.081	1.084
	Rich=3			Reference Category			
Water Source,	Improved water=1	-.26***	.769	-.894*	.409	-.21***	.805
	Non Improved water =2			Reference Category			
Child Gender	Male = 1	.127	1.135	.481*	1.618	.21***	1.227
	Female = 0			Reference Category			
Mother age at 1st birth,	Age up to 18=1	.260	1.296	.498	.608	.439**	1.551
	Age 19-23 =2	-.214	.808	-.413	.662	-.566*	.567
	Age above 23= 3			Reference Category			
Birth Order,	1 birth=1	.090	1.094	-.030	.970	-.430	.650
	2-3 birth=2	-.281	.755	.069	1.071	-.528**	.590
	4-6 birth=3	-.238	.788	.103	1.108	-.417	.659
	Above 6 birth=4			Reference Category			
Family Size,	1-5 members=1	-.369**	.691	-.421 ***	.656	-.683*	.505
	6-7 members =2	-.322**	.724	-.022	.978	-.513**	.598
	8-10 members =3	-.146	.864	-.006	.994	-.105	.900
	Above 10 members = 4			Reference Category			
Mother BMI,	Underweight =1	.442**	1.556	.572**	1.771	.463**	1.590
	Healthy = 2	-.22***	.803	-.499**	.607	-.119	.887
	Overweight = 3			Reference Category			
Vaccination Status,	Not Vaccinated =1	.341**	1.406	.163	1.177	2.292*	9.897
	Vaccinated = 2			Reference Category			

Source: Author's own calculations based on PDHS (2013), BDHS (2011) & NDHS (2011)

Note: a) *, ** and *** indicates coefficient are significant at 1%, 5% &10%

b) The reference category is 2= healthy child

Table 3: Socioeconomic and Demographic Variables Affecting the Probability of Obese Child Health in Selected South Asian Countries

Independent variables		Pakistan		Bangladesh		Nepal	
		B	Odd Ratios	B	Odd Ratios	B	Odd Ratios
	Intercept	.453		.878		.001	
Place of Residence	Urban = 1	.343**	1.410	.238	1.269	.012	1.012
	Rural = 2			Reference Category			
Mother education	no education = 1	.021	1.021	.127	1.135	.573*	1.773
	primary education	.098	1.102	.041	1.042	.377**	1.457
	Secondary& higher education			Reference Category			
Mother's Work Status,	Not Working = 1	.420**	1.522	.238	1.268	.593*	1.809
	Working = 0			Reference Category			
Socio economic status ,	Poor =1	.576*	1.780	.292	1.339	.073	1.076
	Middle= 2	.298***	1.348	-.008	.992	-.061	.941
	Rich=3			Reference Category			
Water Source,	Improved water=1	-.690*	.502	-1.849*	.157	-.758*	.468
	Non Improved water =2			Reference Category			
Child Gender ,	Male = 1	.160	1.174	.295 ***	1.344	-.121	.886
	Female = 0			Reference Category			
Mother age at 1st birth,	Age up to 18=1	-.022	.978	-.496	.609	.079	1.082

	Age 19-23 =2	.056	1.058	-.292	.747	.145	1.157
	Age above 23= 3	Reference Category					
Birth Order,	1 birth=1	.031	1.032	.322	.725	.183	1.20
	2-3 birth=2	-.233	.792	-.115	.891	-.276	.759
	4-6 birth=3	-.278	.757	-.430	.651	-.321	.726
	Above 6 birth=4	Reference Category					
Family Size,	1-5 members=1	.398**	1.488	.401	1.494	.005	1.005
	6-7 members =2	-.29 ***	.748	.145	1.156	-.041	.960
	8-10 members =3	-.037	.963	.429	1.536	.112	1.118
	Above 10 members = 4	Reference Category					
Mother BMI,	Underweight =1	-.602**	.548	-.011	.989	-.402	.669
	Healthy = 2	-.192	.825	-.144	.865	-.124	.883
	Overweight = 3	Reference Category					
Vaccination Status,	Not Vaccinated =1	.33***	1.398	-.618**	.539	-.679	.507
	Vaccinated = 2	Reference Category					

Source: Author's own calculations based on PDHS (2013), BDHS (2011) & NDHS (2011)

Note: a) *, ** and *** indicates coefficient are significant at 1%, 5% &10%

b) The reference category is 2= healthy child

The relative probability of weak children rather than healthy children is significantly lower by 77%, 41% and 81% to the child intake improved and piped water source than non-improved water source in Pakistan. Relative probability of obese child rather than healthy child is 50%, 15% and 47% lower and strongly significant for all three countries using improved water than non-improved water. Previous research found a positive relationship between access to piped water and child health (Merrick, 1985; Thomas and Strauss, 1992; Lee et al., 1997, and Japan and Ravallion, 2003). Relative probability of obese child is 34 % higher than healthy child for male children than female children in Bangladesh.

Male children are significantly more relative chance by 62% and 23% to be weak as compared to female children than healthy children in Bangladesh and Nepal. There is no sex discrimination as cleared by previous studies (Mge & Donnar, 2004; Khoury, 1987).

Younger mothers are significantly more likelihood to have weak children by 55 % as compared to elder mothers relative to healthy children in Nepal. The risk of dying of child at 1st birth is higher for younger mothers. (Gubhaju, 1991 and Furstenberg, 1990) suggested that teenage mothers were less able to overcome the economic and child bearing problems.

In Pakistan first birth order have more relative probability to be weak children as compared to higher birth order as compared to healthy children keeping all other factors constant. Infant weakness was found to decline with higher birth order in one study (Gubhaju et al., 1987). In Pakistan and Nepal lower birth order have less chance to be weak than higher birth. It is supported by (Horton, 1998) explained that there is competition with younger siblings for resources.

The relative probability of weak child is significantly 69%, 65% and 50% lower than healthy child in small families than largeer family's children in Pakistan, Bangladesh and Nepal (Heaton, 2004; black 1989 & Downey 1995).

There are relatively more chances to be weak child than healthy child by 56%, 77% and 59% for underweight mothers than overweight mothers keeping all other factors constant reported by (Nahar, 2010) where mother with lower BMI has lower birth weight which effect breast feeding aptitude and capacity and results in lower BMI in infants and children. Normal weight mother has less chance by 80%, 60% and 89% to have weak child in Pakistan, Bangladesh and Nepal.

Children those are not vaccinated are strongly significantly more relative probability by 40% and 89% to be weak as compared to the vaccinated children than healthy children keeping all others factors constant in Pakistan, Bangladesh. It is justified by (Wang, 2002 and Bonday et al., 2008) where it significantly affect children.

3. Conclusion and Recommendations

This study conclude that mother schooling play important role and helpful to make nutrition decision for their children to improve child height and weight so make sure to improve and facilitate women to educate and provide health knowledge to mothers. Source of water has positive and significant effect on child health so piped and clean water must be assessable to children to save them from deficiencies.

Mother working status has its positive impact on child health in Pakistan and Nepal. Working mothers are more conscious to take care of their children and due to move in social society they are able to obtain knowledge about their child health and can afford nutritional and hygienic food as well as cleaner objects. So steps must be taken for provision of job opportunities. Socioeconomic status also has its impact on child weight. Poor families have weak and obese children due to lack of money they have access to cheap and unhygienic food items. Income sources must be provided to poor families. Teenage mothers are less able to overcome the economic as well as child bearing problems and there may be intervention of education attainment.

Small families have less chance of weak children in each country Pakistan, Bangladesh and Nepal. As parents can put more attention to their children in in small family. Small families have positive impact on child health as deep attention can be given by parents to take care of their children.

Mother's BMI is associated with child BMI. Weak mother has low nutrition status which effect less child birth weight and also compromise in capacity of breast feeding and results in low child BMI. Special campaigns are suggested to improve the BMI of mothers to have health new generation. .

Maternal education is most important factor which effect child health so Government should take steps to improve female education and also provide health knowledge to females as mother education effect child health. It provides more awareness to mothers about how to nurture children.

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