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The Impact of Parents' Education on Child Health from the Perspective of Demographic and Health Survey

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Abstract

The prevalence of underweight at 31 % and stunting at 44 % among under 5 children indicates poor child health situation in Pakistan. Although many significant covariates of malnutrition have been outlined in past studies, most of them do not signify parents' education as a composite factor to affect child malnutrition. Hence, this research will investigate the impact of parents' education on malnutrition, controlling for other socio-demographic and behavioral confounders.

This study will construct logistical regression modeling using an analytical framework for empirical analysis using a data set of 3199 selected mothers produced birth cards at the survey time, retrieved from the latest Pakistan Demographic and Health Survey 2012-13.

Among empirical outcomes, parents' education, household economic rank and environmental settings have significant influence on underweight and stunted infants. The interesting point is that likelihood of stunting growth is relatively less reduced than that of underweight growth when one parent with secondary and second with primary level of education, but, underweight hazard is decreased little less as only one parent is with primary level of education comparing with stunting risk. Highly educated parents have similar likelihood of acute and chronic malnutrition. Rich households appeared little more effective to cause stunted kids than underweight ones. Furthermore, moderate environment setting significantly generates a higher risk of underweight relative to stunting hazard for the kids. These outcomes suggest that parents' education should be targeted in the public health policies to scale up child nutrition in both time span.

Keywords: Parents' education; malnutrition; health knowledge; logistical regression; Pakistan.

Introduction

The economic developments in South Asian region over the previous decades have not been properly mirrored in developments in child nutrition (Grantham-McGregor et al., 2007; Cebu StudyTeam, 1991). Malnutrition not only makes children more susceptible to mortality and morbidity (Fenske et al., 2013), but has resulted in poor scale of education in future (Islam et al., 2006), lesser physical and intellectual capabilities in adult life (Siddiqi et al., 2011) and deferred mental development (Moestue & Huttly, 2008). Olack et al. (2011) reported the highest rate of under nutrition as child's age ranges from 48 to 60 months and 37 to 47 months, respectively. In short, both chronic and acute malnutrition are major obstacles for short and long term child growth. Acute malnutrition contributed a load of diseases in the developing regions and it caused 15 percent of the total disability-adjusted life years (DALY) damages with greater risk of mortality (Wolde et al., 2015). An underweight child results in wasting and stunted growth due to less weight for his age. Further-

more, severe underweight is an outcome of unexpected illness and a constant decline of food intake for short run (Planning Commission, 2011). Furthermore, acute malnutrition can easily be resolved by scaling up nutrition relative to the stunting that can be spreading throughout, by targeting vital organs like brain and kidneys which ultimately impacts IQ and schooling (Schmidt, 2014). The higher rate of underweight at 30 % and stunting at 45 % is a critical situation in Pakistan (National Institute of Population Studies, Islamabad, 2013). 9.6 million under 5 kids in Pakistan are undergoing stunting in initial days of childhood (Unicef, 2016). These terrible records are of particular concern meanwhile Pakistan is regarded as self-reliant in various agriculture foods.

The Zero Hunger Plan authorized by the Ministry of National Food Security and Research in 2013, an allocation of 985 million $ annually for Benazir Income Support Program (unconditional transfers to the poor) in 2013 to react the nutritional requirements of kids and women, a distribution of two billion $ in 2015-16 and 1.9 billion $ in 2016-17 for the earlier nutrition plans with the assistance of global agencies and the SUN (Scaling up Nutrition) program 2013 had concerned to women and child nutrition (UNICEF., 2017; International Food Policy Research, 2016). Government called world partners to advance these projects. UNICEF also focused under-5 infants to lessen stunting rate to 34 percent till 2017 employing nutrition specific and sensitive plans (Unicef, 2016). In spite of all efforts, nutrition outlooks of kids and mothers were not improved in the current decade. Moreover, children with improved health had been in a small proportion in Pakistan among 5 global countries and It failed to decrease stunting among 15 nations (Network., SUN, 2018).

Various factors can be responsible to the earlier malnutrition situation as a result of food insecurity and micronutrient-dense diet consumption among less than 5 years old children. Hall et al. (2001) extensively identified the reasons of under-nutrition in children, aligning with the UNICEF under-nutrition model, separating them as immediate (individual), underlying (regional, household and maternal) and intermediate (household and individual) reasons. Nutrient paucities in utero, improper nutrition after breastfeeding and infections in early childhood are appeared as immediate reasons (Fenske et al., 2013). Driving such immediate reasons are the underlying and intermediate predictors which comprise of, but are not restricted to baby care practices, household income, food security, seeking for health services, parental education, sanitation conditions and hygiene practices. The later characteristics are of course again engrafted in the larger socio-economic and behavioral sphere. Various past studies also indicated that malnutrition is mainly triggered by improper food intake (Abdurahman et al., 2016), frequent infections (Akintan et al., 2015), parents education (Chai et al., 2016; Johri et al., 2016), residence (Humphries et al., 2017), poor sanitation condition (Oninla et al., 2010), no antenatal visits (Mekonen, Nigatu, & Lamers, 2015), economic (Mbwana et al., 2017), cultural, and social factors (Braveman & Barclay, 2009). Studies based on developing nations, Pakistan, Bangladesh, India counted lower mothers' educational and economic status, and less access to medical center as the risk factors to malnutrition (Abuya et al., 2012; Boyle et al., 2006; Friesen et al., 2017; Rahman et al., 2016). In fact, the poverty, food insecurity and high illiteracy are the roots of chronic and acute malnutrition in Pakistan (Planning Commission, 2011).

Before analyzing the empirical evidence, this study considers the different opinions on the role of behavioral and socioeconomic characteristics associated with infant health. In the following, all explanatory factors as well as their fundamental analytical interpretations from the existing literature are introduced.

Socio-economic Characteristics

Parents' Education & Health Knowledge

Parental education and infants health association is of interest for two causes. First, if health participates into well-being, it may fundamentally be fascinated as an outcome. Furthermore, it may

be attracted in the sense of distribution indicating that how disparities in health relate to disparities in other contexts. Currie, (2009) stated that poor parents' education might affect the future schooling and labor market consequences of their infants via its effect on child health. Parents with lower educational scale may not be able to make investment in the health of their infants, and this may result in long-reaching consequences for the adult consequences of the child (Cunha & Heckman, 2007; Currie & Almond, 2011). Thus, inequalities in parents' education have further implications that one might think. Linkages through which parents' schooling may affect health are various (Lindeboom et al., 2009); parental schooling may be entered into the production function of infant health directly (e.g. via higher knowledge and associated increasing efficiency in the health investment) and indirectly (e.g. through improved income level which leads to higher expenditure on health inputs).

While the existing literature has offered overwhelming evidences that the maternal education is more essential, few studies have analyzed the father's schooling child health relationship (Chen & Li, 2009) because of the fact that fathers offer less time for childcare, and therefore the association between the father's schooling and infant health may not be instant and mothers being a primary caregivers may directly influence infant health than fathers (Aslam & Kingdon, 2012). In a society where mothers mainly look after their children, her education has revealed a strong and significant impact on child health than father education (Bloom et al., 2001). Hence, it is commonly regarded as a vital predictor of infants' health. However, some evidence based studies also supported the vital role of fathering. The significant role of fathers in the lives of children cannot be underestimated not only because infants 'need and love their fathers', but also for the significant effects that fathers have on the cognitive, emotional, physical and social well-being of infants from early period to adolescence and with long-reaching effects on their adult life. "Involved father brings favorable benefits to their infants that none can bring (Popenoe, 1996). Father education was also incorporated as a leading socioeconomic indicator of child survival because paternal education was also empirically noted helpful to scale up socioeconomic conditions (Deshmukh et al., 2012; Khattak et al., 2017; Chen & Li, 2009).

Economic and Environmental Position

Economic level of a household plays a vital role to determine child health. While several authors have raised questioned about the causal impact of income on infant health (Glewwe, 1999)**,** undoubtedly an influence of income on child survival operates via several other factors. Many inputs, like food intake, quality of medication, household sanitation which are strongly related with infant health, rely on income. Furthermore, income also rests on the level of education. In other words, it also reveals an income effect share of the total education influence (Thang & Popkin, 2003). Preferably, this study uses these heterogenic factors to better recognize the determinants of infants' health. The instrument to measure income is critical in analysis. This study selects wealth index which adds a possession of multiple household assets and is built by Wealth Health Organization (National Institute of Population Studies, Islamabad, 2013)**.**

A sufficient access to sanitation facilities and safe drinking water helps to play a significant role in aiming at better health outcomes for adolescents. Lack of safe drinking water and proper sanitation facilities causes malnutrition through water and air-borne diseases, which in advance reduces the child's capacity to absorb nutrition (Kraemer, 2016; WHO, 2008). Better environment conditions such as households owning piped water, sanitation, and electricity facilities usually have lesser contaminant threats than households deprived from these amenities (Barrett & Browne, 1996; Defo, 1997). This study builds environment index via sum method to analyze the impact of environment setting on infants' nutrition.

Health Knowledge and Behavioral Factors

Several past studies asked questions about the causal pathways between maternal schooling and infants' health. They confirmed a strong connection between mother schooling and indicators of care, like improved sanitation conditions, behavior for health seeking and adequate health knowledge etc. (Bloom et al., 2001; Dewey & Begum, 2011). Educated mothers had better choices to improve infants' health as primary caregivers and recognized the threats to their health. Maternal education also caused behavioral changes which results in lower chances of childhood diarrhea (Thomas et al., 1991). Where education brings a change in a caring attitude of a family, it also generates knowledge about health quality. In case of Bangladesh, Biplob et al. (2011) identified specific kinds of health knowledge related to the higher education, including (i) using oral rehydration therapy for the treatment of diarrhea, (ii) washing hands after toilet use, (iii) awareness about boiling water's benefits, and (iv) infections as major causes of diseases. Such health awareness can bring behavioral changes that lead to good attitude for health-seeking and consequently, better infants' health. Knowledge about hepatitis disease is incorporated for empirical work to account for maternal awareness about health quality.

Mother autonomy, another behavioral variable, is regarded as a leading factor to impact infants' health. Das Gupta (1990) resulted that women with higher empowerment and decision-making will had healthier children. Education also impacts child survival by improved decision-making power of mothers within a household. An increasing tendency of education changed the outdated balance within a family, giving little more autonomy to the educated mothers. Women are more caregivers and spearing more time for the security of their babies than men (Caldwell & Caldwell, 1991).

The number of babies parents are willing to have (reproductive attitude) is an internal decision process. The decision for second baby is influence by the health of the first baby. Mostly, educated parents prefer fewer children to have (Pryer et al., 2002)**.** However Desai & Alva (1998) highlighted that if family planning is followed adequately, this endogeneity is more likely to be minor. In this study, total pregnancy outcomes are taken to present mother reproductive behavior.

This research work is a unique struggle to analyze parents' education child malnutrition association employing a sample of 3199 women and corresponding children under 5 form latest Pakistan Demographic and Health Survey 2012-13. This study has a contribution to the existing child health literature in two ways: (i) Many empirical evidences regarding a great contribution of mother and paternal education into infants' nutrition level were presented in the past studies (Cutler & Lleras-Muney, 2006; Deshmukh et al., 2012; Khattak et al., 2017; Pal et al., 2017) in which mother and father education were separately discussed. This study has firstly introduced parents' education as a composite factor against the prior studies because where education for mothers is significantly causing child nutrition along its intervening linkages (Anwar et al., 2013; Frost et al., 2005; Kandala et al., 2011), education for fathers definitely assists child health through scaling up socioeconomic and behavioral outlooks of a household. Only educated mother can't do a lot for better child without her partner specially enriched with higher schooling because both husband and wife are two wheels of a vehicle. In Pakistan setting, the father's formal education can significantly do more because fathers (34%) are more with secondary schooling than mothers (10%) and illiteracy rate among mothers (57%) is higher than among fathers (29%) (National Institute of Population Studies, Islamabad, 2013). If the higher educational scale does matter in a family, then the father's schooling have more importance than the mother's schooling in Pakistan. Furthermore, mothers with higher education have a preference to marry a person owning higher schooling level because they are highly paid and are helpful to sustain environmental, economic and nutritional status of a household in future (Khat-

tak et al., 2017). Furthermore, educated persons also have a desire to marry an educated female because she is more likely to have family care oriented behavior (Cutler & Lleras-Muney, 2006). In the context of importance for parents' education, this study combines parents educational scales via parents' education index. Hence, this study will investigate parents' education child health association in the context of short and long term infant's nutrition. (ii) This study constructs environment and parents' education indexes via sum method that is the most adequate technique for indexing rather than others like principal component analysis (PCA) etc. because the former technique is the foremost suitable to index different categorical items (Barasa et al., 2017) against the later method followed by different past studies (Anwar et al., 2013; Frost et al., 2005). Furthermore, it is also possible to re-classify the variables after indexing via sum method. On the other hand, it is almost difficult to re-classify and interpret categorical variables after indexing via PCA. Furthermore, indexing via PCA will give biased results. Higher value of Cronbach's alpha also confirms the reliability of the composition of these indices.

Following the earlier discussion, this research work will analyze parents' schooling infants' malnutrition gradient, controlling for the significant confounders using a sample retrieved from latest Pakistan Demographic and Health Survey, 2012-13 (PDHS 2012-13). Outcomes of this study will underline evidence-based suggestions to scale up nutritional outlook of infants under 5.

Methodology

Data

That data on all explained and explanatory variables is retrieved from Pakistan Demographic and Health Survey 2012-13 (PDHS). Only less than 5 years old infants are considered for analysis. Two anthropometric measures, underweight (low weight for age) and stunting (low height for age) are presented as explained variables. These indices are expressed as the number of standard deviation (SD) units i.e. (Z-score) from the reference group's median for which WHO (World Health Organization) Child Growth Standards are calculated (World Health Organization, 2006). An infant whose Z-score for height-for-age / weight for age is less than minus two standard deviations (-2SD) from the median of WHO reference group is stunted/underweighted respectively. Otherwise, he is normal (Onis & Branca, 2016).

$$\text{Z} - \text{Score} = \frac{\text{Measured Value} - \text{Average Value for the Reference population}}{\text{Standard Deviation of the Reference population}}$$

WHO Anthro software helps to calculate z-scores of explained variables (World Health Organization, 2006).

In this study, among key factors of malnutrition, parents education, a composite index, is classified as both parents are illiterate=0, both with primary schooling=1, only one with primary schooling=2, one with primary and second with secondary schooling=3, both with secondary schooling=4 & only one with secondary schooling=5. Among other covariates, health knowledge (if she does not know about Hepatitis disease =0 and otherwise=1, sex of household head as a proxy for maternal empowerment (male=0, and female=1), attitude for health seeking (if she did not visit medical expert for prenatal care=0, otherwise=1), reproductive attitude (pregnancy outcomes). wealth status (poor class=0, medium class=1 & rich class=2), HH environmental index (poor=0, moderate=1 and good=2) and residence (urban=0 & rural=1) are socio-demographic and behavioral variables. Proxies are used due to missing of direct measures. Wealth index is constructed by DHS (Demographic and Health Survey) using PCA (principle component analysis). Environment and parents educational indexes are constructed via sum method rather than PCA because the former method is the most reasonable to index categorical variables (Barasa et al., 2017). Having view of

reliability analysis allows environment and parental educational indexes to be selected as key factor for child health (Borooah, 2005).

Econometric Model

Logit Model

As response factor is binary and qualitative, Logit model (Binary Logistical Regression Model) is scrutinized to analyze parents' schooling infant malnutrition relationship based on the sample size of 3,199. STATA 21 is used to perform empirical investigation.

Results

The descriptive statistics and empirical outcomes showing the parents' education infants' under-weight and stunting relationship are given in tables.

Tables 1 and 2 depict an illustration of descriptive and bivariate analysis based on a sample of 3199 less than 5 years old infants. Such analysis elaborates the distribution of specific contextual characteristics of the selected age grouped children. This elucidation is compulsory to explain the study outcomes and to investigate cause effect association between the chosen explanatory variables and malnutrition. 47% and 31.4% infants are a victims of chronic and acute malnutrition, respectively. 19.3 % children are born in families where parents are with zero education. About 28.5% and 19.2% children are attached to the households where both parents are primary passed and only one parent (father/mother) is primary passed, respectively. Among 14.4 % parents, one is with primary and second is with secondary education. 12.5 % parents are enriched with secondary schooling and only 5.6 % one parent is with secondary education. 21.6 % and 38.6 % households are with poor and middle economic position respectively, while 39.8 % household are with the title of rich status. 42.1 % infants live in the urban regions while 57.9 % children are a part of rural areas. Mothers are not empowered within 93% household. 85% mothers have considerable health care information. 55% mothers did not have proper prenatal care visits while 45 % mothers get assistance for prenatal care visits. with mothers deprived from empowerment in the household (93%), having considerable health care information (85%), who reside in the better environment settings (85.5%) and who did not get proper prenatal care visits (55%). 53 % household are having better environment condition while 20 % and 13% are attached to the poor and moderate environmental settings. 43 % mothers have 2 pregnancy outcomes however about 26 % mothers have 1 and 3 pregnancy outcomes.

Tables 1 and 2 also pronounce the differentials of malnutrition by mother and household characteristics. Parents education child stunting nexus is highly consistent (P=0.00) while 24.2% (24%), 29.5% (31.7%), 18.5% (19.3%), 11.8% (10.1%), 9.3% (9.6%) and 6.6% (5.3%) under 5 infants are with stunted (underweight) growth as parents have prior scales of education, respectively. Mother information about health displays a linear connection with stunting and underweight (P=0.0) and stunted (underweight) infants are 82.2% (84.8%) as mothers are well informed about health outcomes. The stunting and underweight rate significantly (P=0.00) decreases as pregnancy outcomes increase. Residence location does significantly (P=00) matter to cause short and long periods malnutrition and infants resided in urban and rural households are 38.8 % (34.5%) and 61.2 % (65.5%) with stunted (underweight) growth respectively. Maternal response for health seeking amenities (P=0.0), empowerment (P=0.05), income rank of household (P=00) and environment outlook (P=0.00) have also significantly affected long and short terms health outcome of children. Furthermore, about 61.8 % (59.4%), 94% (93%), 41.4 % (40 %) and 62.6 % (58.8%) stunted (underweight) children are associated with mothers who are not fond of searching for the latest medical facilities, have less empowerment, are living in poor household and are residing in the better environmental setting, respectively. Breastfeeding appeared as inconsistent indicator of infants' health outcome.

Phi and Cramer's V values confirms that parents education index, family economic status, health seeking outlook, and environmental setting have significantly greater contribution into stunting and underweight infants without controlling for confounding factors. Only significant approved predictors of chronic malnutrition in bivariate analysis are included in the logistical regression framework while controlling for confounding covariates.

Table 1: Descriptive and Bivariate Analysis in the Context of Stunted Infants

Variables	Children (%)	Stunted Children	
		Number (%)	P-value
Not Stunted	1695 (53 %)		
Stunted	1504 (47 %)		
Parents' Educational Status			0.00***
Illiterate parents	629 (19.3%)	364 (24.2%)	
Both with Primary Schooling	913 (28.5%)	444 (29.5%)	
Father/Mother Primary Schooling	619 (19.2%)	278 (18.5%)	
One with Primary & Second with Secondary	460 (14.4%)	178 (11.8%)	
Both With Secondary Schooling	399 (12.5%)	140 (9.3%)	
Only One With Secondary Schooling	179 (5.6%)	100 (6.6%)	
Health Care Information			0***
Did not heard about Hepatitis	485(15.2%)	268 (17.8%)	
Heard Hepatitis	2714 (84.8%)	1236 (82.2%)	
Mother Empowerment			0.02**[2]
Low Empowerment	2967 (92.7%)	1412 (94%)	
High Empowerment	232 (7.3%)	92 (6%)	
Attitude for Health Seeking			0***
Gets no assistance for Prenatal Care	1759 (55%)	929 (61.8%)	
Gets Assistance	1440 (45%)	575 (38.2%)	
Residence Location			0***
Urban	1347 (42.1%)	583 (38.8 %)	
Rural	1852 (57.9%)	921 (61.2%)	
Environment Condition			0***
Poor Environment Condition	642 (20 %)	345 (22.9%)	
Moderate Environment Condition	416 (13%)	217 (14.4%)	
Better Environment Condition	2141 (67%)	942 (62.6%)	
Family Economic Status			0***
Poor Class	690 (21.6%)	410 (27.3%)	
Middle Class	1235 (38.6%)	622 (41.4%)	
Rich Class	1274 (39.8%)	472 (31.4%)	
Pregnancy outcomes			
one	854 (26.7%)	364 (24.2%)	0***[1]
Two	1385 (43.3%)	636 (42.3%)	
Three	841 (26.3%)	441 (29.3%)	
Four	119 (3.7%)	63 (4.2%)	
Breastfeeding			0.82
Not Breastfed since the last 6 Months	1408 (44%)	665 (44.2%)	
Breastfed	1791 (56%)	839 (55.8%)	

1 significant at a level of 1%, 2 significant at a level of 5%

Table 2: Descriptive and Bivariate Analysis in the Context of Underweight Infants

Variables	Children (%)	Underweighted Children	
		Number (%)	P-value
Not Underweighted	2193 (68.6 %)		
Underweighted	1006 (31.4 %)		
Parents' Educational Status			0.00***
Illiterate parents	629 (19.3%)	241 (24%)	
Both with Primary Schooling	913 (28.5%)	319 (31.7%)	
Father/Mother Primary Schooling	619 (19.2%)	194 (19.3%)	
One with Primary & Second with Secondary	460 (14.4%)	102 (10.1%)	
Both With Secondary Schooling	399 (12.5%)	97 (9.6%)	
Only One With Secondary Schooling	179 (5.6%)	53 (5.3%)	
Health Care Information			0.05**
Did not heard about Hepatitis	485(15.2%)	153 (15.2%)	
Heard Hepatitis	2714 (84.8%)	853 (84.8%)	
Mother Empowerment			0.02**[2]
Low Empowerment	2967 (92.7%)	935 (93%)	
High Empowerment	232 (7.3%)	71 (7%)	
Attitude for Health Seeking			0***
Gets no assistance for Prenatal Care	1759 (55%)	598 (59.4%)	
Gets Assistance	1440 (45%)	408 (40.6%)	
Residence Location			0***
Urban	1347 (42.1%)	347 (34.5 %)	
Rural	1852 (57.9%)	659 (65.5%)	
Environment Condition			0***
Poor Environment Condition	642 (20 %)	258 (25.6%)	
Moderate Environment Condition	416 (13%)	164 (16.3%)	
Better Environment Condition	2141 (67%)	584 (58.1%)	
Family Economic Status			0***[1]
Poor Class	690 (21.6%)	296 (29.4%)	
Middle Class	1235 (38.6%)	401 (39.9%)	
Rich Class	1274 (39.8%)	309 (30.7%)	
Pregnancy outcomes			
one	854 (26.7%)	259(25.7%)	0**[2]
Two	1385 (43.3%)	435 (43.2%)	
Three	841 (26.3%)	271 (27%)	
Four	119 (3.7%)	41 (4%)	
Breastfeeding			0.12
Not Breastfed since the last 6 Months	1408 (44%)	422 (42%)	
Breastfed infants	1791 (56%)	584 (58%)	

1 significant at a level of 1% 2 significant at a level of 5%

Table 3 The Effect of Parents' Education on Stunting Growth of Children under 5

Variables	Odds Ratio	z	P>z	At 95% C.I LB[3]	UB[3]
Illiterate parents	1				
Both with Primary Schooling	0.77	-2.61	0.01***	0.63	0.94
Father/Mother Primary Schooling	0.82	-1.72	0.09*	0.65	1.03
One with Primary & Second with Secondary	0.72	-2.37	0.02**	0.56	0.95
Both With Secondary Schooling	0.70	-2.44	0.02**	0.52	0.93
Only One With Secondary Schooling	1.19	1.00	0.32	0.85	1.67
Better Environment	1				
Poor Environment Condition	1.04	0.42	0.67	0.86	1.27
Moderate Environment Condition	1.22	1.78	0.08*[2]	0.98	1.51
High Empowerment	1				
Low Empowerment	1.41	3.05	0***	1.13	1.75
Pregnancy outcomes	1.06	1.52	0.13	0.98	1.15
Poor Class	1				
Middle Class	0.77	-2.65	0***	0.63	0.93
Rich Class	0.50	-5.24	0***	0.39	0.65
Residence	1.14	1.49	0.14	0.96	1.35
Mother Attitude for Health Seeking (1)	0.79	-2.88	0***	0.68	0.93
Health Care Information (0)	1.19	1.67	0.09*	0.97	1.45

[1] significant at a level of 1% [2] significant at a level of 5% and 10% [3] confidence interval within upper bound and lower bound

Table 3 interprets the impacts of parents' education on stunting growth of less than 5 years old children controlling for confounding covariates. Comparing with illiterate parents, both parents with primary schooling, only one with primary education, one parent with primary and second with secondary education, and both parents with secondary schooling have reduced likelihood of stunting growth of infants by 23% (OR=0.77; $p<0.01$), 18% (OR=0.82; $p<0.1$), 28% (OR=0.72; $p<0.05$) and 30% (OR=0.70; $p<0.05$), respectively. The odds of only one parent with secondary schooling have also reduced stunted children, but this connection is not significant. Lower empowerment of mothers displays 1.41 (OR=1.41; $p<0.01$) times greater likelihood of stunted children relative to high empowerment of mothers. Mothers attached to the rich and middle class families have 50% and 23% (OR=0.50 and 0.77; $p<0.01$) less probability of stunted infants, respectively relative to the poor mothers. The chances of stunted infants significantly rise with moderate household environment by 1.22 times (OR=1.22; $p<0.1$) relative to the better environment. Mothers with poor knowledge have 1.20 (OR=1.20; $p<0.01$) times more likelihood of chronic malnutrition for their infants relative to their counterpart. Moreover, the likelihood of stunting hazard is approximately 21% lower when mothers are highly interested to search for latest medication. However, 1.14 times more probability of stunted infants is attached to rural mothers, but this association is inconsistent. Likewise, pregnancy outcomes infant stunting an insignificant association is estimated. Finally, among behavioral

and socioeconomic predictors, parents education, household economic position, empowerment and knowledge have reasonable on infant stunting.

Table 4. The Influence of Parents' Education on Underweight Growth of Children under 5

Variables	Odds Ratio	z	P>z	LB[3]	UB at 95 C.I[3]
Illiterate parents	1				
Both with Primary Schooling	0.88	-1.21	0.23	0.72	1.08
Father/Mother Primary Schooling	0.84	-1.43	0.1* [2]	0.65	1.07
One with Primary & Second with Secondary	0.57	-3.76	0***[1]	0.42	0.76
Both With Secondary Schooling	0.71	-2.14	0.03**[2]	0.52	0.97
Only One With Secondary Schooling	0.80	-1.21	0.23	0.55	1.15
Better Environment	1				
Poor Environment Condition	1.20	1.75	0.08*	0.98	1.48
Moderate Environment Condition	1.51	3.58	0***	1.20	1.89
High Empowerment	1				
Low Empowerment	0.92	-0.69	0.49	0.73	1.16
Pregnancy outcomes	0.91	-2.09	0.04**	0.84	0.99
Poor Class	1				
Middle Class	0.66	-4.17	0***	0.54	0.80
Rich Class	0.53	-4.97	0***	0.41	0.68
Residence	1.10	1.08	0.28	0.93	1.31
Mother Attitude for Health Seeking (1)	0.95	-0.58	0.56	0.81	1.12
Health Care Information (0)	0.83	-1.73	0.08*	0.67	1.03

[1] significant at a level of 1% [2] significant at a level of 5% and 10% [3] confidence interval within upper bound and lower bound

Table 4 presents the influence of parents schooling on underweight growth of less than 5 years old kids after controlling for key confounders. Comparing with parents without schooling, both parents having secondary education, one parent with secondary and second with primary schooling, and only one with primary schooling have decreased chances of underweight growth of infants by 29% (OR=0.71; $p<0.05$), 43% (OR=0.57; $p<0.01$) and 16% (OR=0.84; $p<0.1$), respectively. The odds of both parents with primary and just one with secondary education have also reduced underweight children, but these relationships are insignificant. Mothers living in the middle and rich class households have 34% and 47% (OR=0.66 and 0.53; $p<0.01$) less chances of acute malnutrition among under 5 infants, respectively comparing with poor mothers. The chances of underweight kids significantly increase with poor and moderate environmental setting by 1.20 and 1.51 times (OR=1.20 and 1.51; $p<0.1$ and 0.01) respectively relative to the better environment. Surprisingly, mothers with inappropriate health information have (OR=0.83; $p<0.01$) 17% less likelihood of acute malnutrition for their kids relative to the counterparts. The likelihood of underweight hazard is approximately 9% lower as pregnancy outcomes within the range from 0-4 rises. However, household location and mother empowerment have inconsistent association with underweighted kids. Likewise, maternal attitude for health seeking has inconsistent impact on underweight infants. Finally, among behavioral and socioeconomic predictors, parents' education, household economic position, and environmental setting have significant influence on underweight kids.

Discussion

A consistent nationally representative large database, Pakistan Demographic and Health Survey (PDHS-2012-13), is scrutinized to analyze parents education long and short term infants' health outcome relationship controlling for particular confounders in Pakistan by utilizing BLRM (Binary Logistical Regression Model).

In the prior research findings, higher level of parents' education is significantly marked more protective against chronic and acute malnutrition for less than 5 years old infants relative to poor schooling of parents. Khattak et al. (2017) and Woldemariam & Timotiows (2002) also empirically estimated that higher schooling of both parents significantly contributed to the normal nutrition of the specific age group kids. Monteiro et al. (2010) also regarded higher level of female schooling a key factor contributing to lower stunting rates in Brazil. Similarly, Deshmukh et al. (2012) accounted for the contribution of higher father schooling to reduce stunting. Furthermore, underweight hazard was significantly reduced for the infants whose fathers had university education (Rachmi et al. 2016). Horta et al. (2013) also disclosed a consistent association between mother education and chronic and acute malnutrition among indigenous kids whose mothers failed to attend the school regularly in a whole year. Nkurunziza et al. (2017) also reported that mother and father without proper schooling had greater chances of chronic malnutrition, controlling all other confounders. However, Fakir & Khan (2015) differently reported that maternal schooling acute malnutrition connection was no longer consistent while controlling for behavior to seek for the latest medication and health awareness. Planning Commission (2011) also confirmed our results by commenting that the mothers without schooling had a greater percentage of malnutrition as compare to the mothers who completed 10 years schooling. The interesting outcome is that secondary level passed parents approximately have same likelihood to reduce chronic and acute malnutrition of kids while likelihood of stunting growth is relatively less reduced than that of underweight growth when one with secondary and second with primary level of education. Similarly, comparing with stunting risk, underweight hazard is decreased little less as only one parent is with primary level of education. A reasonable explanation for this relationship is that parents with education may directly influence child growth through increased health knowledge in the family. This leads to an appropriate and appreciated caring practices like noticeable health-seeking behavior and improved hygiene and feeding practices (Black et al., 2013; Cutler & Lleras-Muney, 2006). Following empirical outcomes, it is predicted that education where helpful to improve household economic condition, it also persuades the family to alter its fatalistic and outdated mind-set of medical care to embracing and using the modern health care services. Some cross-country comparison based studies posited a negative association between maternal literacy and child mortality (Bicego and Ties Boerma 1993). However, some studies failed to express strong causal association between mothers' education and child growth (Desai and Alva 1998).

Households with rich and middle economic positions significantly resulted in lower chances of chronic and acute malnutrition in our findings because on average, they own sufficient economic resources to scale up the nutrition level of their kids and mothers in such circumstances can escape from all complications in pregnancy. Furthermore, rich economic rank owned households appeared little more effective to cause stunting growth than underweight growth. This important conclusion was also supported by (Bomela, 2009; Rahman et al. 2016). Ukwuani and Suchindran (2003) also supported our finding that children resided in wealthy families were with less likelihood of stunting relative to children living in poor families in Nigeria. These conclusions were totally opposed to (Das Gupta, 1990) who estimated that infant health outcome was independent of wealth status of a household and maternal education. Mostly, past studies revealed that children resided in poor

households were more stunted than those belonged to rich backgrounds (Horta et al., 2013; Kandala et al., 2011; Nkurunziza et al., 2017).

Moderate environment setting significantly generates a higher risk for child health in the short time-span (underweight) relative to the long term (stunting) because diseases/illnesses arisen from poor hygiene conditions mostly results in short-term under nutrition problem. Therefore, poor environment also significantly determines higher risk of underweight for the kid under 5. However, consistent illness mays result in stunting hazard for children. This outcome is aligned with (Chirande et al., 2015; Smith et al., 2005).

Empirical results reveal that poor mother autonomy significantly causes increasing chances of stunting hazard of infants because she is unable to utilize limited income resources in an optimal way without empowerment. Das Gupta (1990) supported this outcome by reporting that mothers without powerful decision making will in household matters had weaker kids. Contradicting to our result, Smith, Ruel, & Ndiaye (2005) concluded that higher maternal decision-making power relative to father in a household significantly reduced child malnutrition. Furthermore, Simon, Adams, and Madhavan (2002) also supported the later outcome by stating that maternal empowerment in household matters helps to utilize the scarce household resources in an optimal way to satisfy the nutritional needs of kids. Our result is also opposed by Hong and White-Means (1993).

Another expected conclusion of this study underlined that mothers without health knowledge had significantly more stunted kids because they are unable to get benefits from latest medication without comprehensive knowledge of health care. Deshmukh et al., (2012), Fakir & Khan (2015) and Johri et al., (2016) favored this current result, demonstrating a positive relationship between health knowledge and nutrition level of kids under 5. However, an unexpected outcome showing less likelihood of underweight growth of children without mother's awareness about health, was noted.

Health seeking mind-set of mothers significantly decreases stunting hazard among less than 5 years old kids because such maternal behavior makes in time medication possible for children and causes to scale up child growth in the long run. To support our finding, Berger et al. (2007) concluded that Indonesian mothers actively collecting Vitamin A in the first six months had healthy infants. This outcome is also aligned with (Mbwana et al., 2017). Increasing number of pregnancy outcomes within the range 0-4 significantly predicts less likelihood of underweight growth of children by 9% because of the possibility that parents may give more care, attention and income sources to newborns. It is also possible that the experience of successive pregnancies may help mothers to reduce pregnancy complications and results in less hazard of underweight. Kavosi et al. (2014) contradicted to this outcome, reporting a greater risk of child under nutrition in large families. However, this outcome was favored by (Woldemariam G, Timotiows, 2002).

Our result related to demographic variable, urban-rural setting, revealed insignificant pattern of relationship with acute and chronic malnutrition. However, opposing this result, Friesen et al. (2017) stated that poor coverage to medical center (rural region) was significantly responsible to malnutrition.

The reason for insignificance impact of maternal attitude for health seeking and empowerment in Table 4 is due to missing direct measures for these factors in PHDS 2012-13 dataset. Moreover these variables require other environment and household conditions like better socioeconomic level of households and weather etc. to improve it. Being a developing territory, it is difficult to collect data within the culture of south Asian region (Anwar et al., 2013).

Conclusion and Suggestions

Among empirical outcomes, parents' education, household economic rank and environmental settings have significant influences on underweight and stunted infants. The interesting point is that likelihood of stunting growth is relatively less reduced than that of underweight growth when one parent with secondary and second with primary level of education, but, underweight hazard is decreased little less as only one parent is with primary level of education comparing with stunting risk. Highly educated parents have similar likelihood of acute and chronic malnutrition. Rich households appeared little more effective to cause stunted kids than underweight ones. Furthermore, moderate environment setting significantly generates a higher risk of underweight relative to stunting hazard for the kids. The findings disclose that the parents' education has a significant nurturing impact on child health. It is also concluded that this nurturing impact of parents' schooling may also be attributed to higher income level, and better environmental setting. These outcomes suggest that among public health policies, raising parents' education should be recommended to scale up infant health in both time span. Furthermore, immediate interventions targeting an inappropriate moderate environmental setting may be suitable to tackle malnutrition.

Limitations

The validity of this study is that it is supported by PDHS 2012-13 dataset on weight and height of less than 5 years infants and other variables which are collected by a trustworthy source of National Institute of Population Studies Islamabad, Pakistan. However, there are some limitations in our study. Firstly, only a selected sample of children whose mothers could record their weight and height on health card during the survey, were considered. Secondly, many important variables like maternal nutrition level, life style and their diet could not be controlled in the study due to lack of these variables in the survey data. Thirdly, several proxy variables, for instance mother empowerment, health seeking, reproductive and environmental behavior, economic status and knowledge are incorporated in our study because of not finding their direct measures in the data set.

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