

## FACTORS AFFECTING NUTRITIONAL STATUS OF CHILDREN

<sup>1</sup>\*Dr. Maria Rasool, <sup>2</sup>Dr. Saira Riasat Bhatti and <sup>3</sup>Dr. Hira Mohi -Ud- Din<sup>1</sup>PMDC# 87639-P.<sup>2</sup>PMDC # 87638-P.<sup>3</sup>PMDC # 87795-P.

\*Corresponding Author: Dr. Maria Rasool

PMDC# 87639-P.

Article Received on 18/06/2018

Article Revised on 09/07/2018

Article Accepted on 30/07/2018

## ABSTRACT

**Objective:** To determine the impact of maternal education, employment, and family size on nutritional status of children. **Methods:** It was case control study conducted at OPD of DHQ Teaching Hospital Sargodha, from September 2015 to April 2017. Total 340 children (170 cases and 170 controls) with age range of six months to five years along with their mothers were included. Anthropometric measurements were plotted against WHO growth Charts. 170 wasted ( $<-2$  SD) were matched with 170 controls ( $\geq -2$  SD). Maternal education, employment and family size were compared between the cases and control. Confounding variables noted and dichotomized. Univariate analysis was carried out for factors under consideration i.e.; Maternal Education, employment and family size to study the association of each factor. Logistic regression analysis was applied to study the independent association. **Results:** Maternal education had significant association with growth parameters; OR of 1.32 with confidence interval of (CI= 1.1 to 1.623). Employment status of mothers had OR of 1.132 with insignificant confidence interval of (CI=0.725 to 1.768). Family size had OR of one with insignificant confidence interval (CI=0.8 -1.21). Association remained same after applying bivariate logistic regression analysis. **Conclusion:** Maternal education has definite and significant effect on nutritional status of children This is the key factor to be addressed for prevention or improvement of childhood malnutrition. For this it is imperative to launch sustainable programs at national and regional level to uplift women educational status to combat this ever increasing burden of malnutrition.

## INTRODUCTION

Even at this day and age child malnutrition is one of the challenges being faced by developing countries.<sup>[1,2]</sup> Pakistan is one of those countries, which are striving hard to overcome this ever-increasing burden of malnutrition for many decades.<sup>[3]</sup>

Child malnutrition is considered as the key risk factor for illness and death, contributing to more than half deaths of children globally.<sup>[4]</sup> It not only increases the frequency and severity of infections but makes the children vulnerable to death from common infections.<sup>[5]</sup> Under nutrition especially in first 1000 days of life lead to stunted growth and impaired cognitive ability and poor educational attainment.<sup>[6]</sup>

One in every nine people remained undernourished predominantly in developed countries in years 2014-2016.<sup>[8]</sup> Over 50% children in

South Asia are malnourished.<sup>[9]</sup> Half of the world's malnourished children reside in Pakistan, India, and Bangladesh. In South East Asia Pakistan has second highest infant and Childhood mortality.<sup>[10]</sup>

According to most recent data in Pakistan 43.7% of children were stunted, 15.1% were wasted and 31.5% were underweight. Conditions being worse in rural than in urban areas.<sup>[11]</sup> Severe stunting was present in 21.9% of cases while 5.8% had severe wasting and 11.6% were underweight.<sup>[11]</sup>

Effect of maternal education on nutritional status of children has been demonstrated decades ago and is far reaching than any other determinant.<sup>[12,13]</sup> Ability to acquire the health knowledge, following the recommended feeding practices and increased command over resources are the suggested conduits through which maternal education influences the child health.<sup>[14]</sup>

In addition to the illiteracy, educated mothers having high educational achievements also have children who are undernourished. This highlights the importance of time and attention devoted to children, which employed and highly educated woman cannot provide, depriving their children from the benefits of their education.<sup>[13]</sup>

A number of studies have been done to elucidate the demographic, socioeconomic, maternal and political factors, which are considered to be main determinants of

malnutrition in children<sup>15</sup>, but at national level there is paucity of literature regarding the importance of maternal education and employment level. Through this study we want to highlight the importance of these two determinants and also want to see the effect of family size on nutritional status of children. We conducted this study with the objective to determine the impact of maternal education, employment, and family size on the nutritional status of children.

## METHODS

It was case control study conducted at OPD of The DHQ Teaching Hospital Sargodha, from September 2015 to April 2017. Approval from Institutional Review Board was taken before commencement of study. Questionnaire Performa was used. After informed consent children of both genders with age range of six months to five years old, visiting outpatient department were included. Children having any chronic disease (e.g.; congenital heart disease, renal failure, chronic lung disease or chronic liver disease) were excluded from the study. Three hundred and forty children (170 cases and 170 controls) with their mothers were included in study. Anthropometric measurement of children was done and plotted against WHO growth Charts. Those children whose weight for height was falling from median to at or above -2 SD score of WHO growth chart were considered control. Those children whose weight for height was falling <-2 SD were considered as cases.

Their mothers were interviewed for determinants of under nutrition under consideration i.e.; education, employment and family size. Education level was classified as educated or uneducated. Uneducated was defined as those who have not attended the school or could not read and write their name. Educated mothers were defined as those who could read and write their name or have attended school. Confounding factors like father's education level, maternal age, child's gender, under five children, family size rural or urban residence, joint or nuclear family, separated or single parent were also noted. Data was analyzed by using statistical software SPSS 20. Determinants of malnutrition under consideration i.e. education and employment status of mothers and family size were compared between the cases and control. The potential confounding variables were dichotomized. Father's education as educated or not, maternal age as < 30 years or >30 years, child's gender, belonging to urban and rural area, family size was grouped as 5 or <5 and other group >5, under five children two or less and >2 children, parent's status as living together or separated, family system as nuclear (husband, wife and children only) or joint (husband, wife, children, and maternal or paternal grandparents).

Univariate analysis was carried out for factors under consideration i.e.; maternal education, employment and family size to study the association of each factor. Odds ratio (OR) and 95% confidence interval was estimated for each of the factor. The simultaneous effects of

maternal education, maternal employment and family size with other confounding factors like father's education, maternal age, child's gender, under 5 children, family size, rural or urban background, family system, parents status were analyzed using logistic regression analysis to study the independent association of these factors with the nutritional status. A p-value of less than 0.05 and an OR with a 95% confidence interval (CI) that did not include one was considered significant.

## RESULTS

In our study, we incorporated 340 children with age range of six months to five years with 170 cases and 170 controls. Mean age of children was  $21.64 \pm 15.4$  months. The gender distribution was uniform with 52% of cases and controls male. Comparative anthropometric, socio-demographic characteristics of study population are shown in Table-I.

Literacy of fathers surpassed the mother's as out of 340 children 199 mothers (58%) were educated as compared to 245(72%) fathers who were educated. Comparison of maternal education, employment, and family size was done between cases and controls and odds ratio with confidence interval was determined. About 51.8% mothers were educated in cases as compared to 65.3% of educated mothers in control with OR of 1.316 and (CI= 1.1 to

1.623). Table-II Employment status of mothers was found to be very low with only 9% of employed mothers in cases as compared to 7% in control with OR of 1.132 and insignificant CI of (CI=0.725 to

1.768). Third variable under consideration showed that 67.1% of cases had family size of more than five compared to 65.3% in control with OR of one with insignificant CI of (CI=0.8 - 1.21). To study the combined effects of different variables on the risk of being undernourished children bivariate logistic regression model was applied which showed no significant change in association which is depicted in Table-III.

## DISCUSSION

Our study result established that low literacy rate of mothers was significantly associated with poor nutritional status of children. These results were consistent with results of studies conducted around the globe, e.g.; a case control study done in Africa shows strong impact of maternal literacy on child's nutritional status.<sup>16</sup> Another case control study proved that parental illiteracy was significantly associated with the risk to develop malnutrition in children under the age of five.<sup>3</sup> A study from Ethiopia has revealed significant association of maternal education with wasting of children. Furthermore in the same study even father's education has been documented strongly associated with wasting of children, however in our study father's education was not

found strongly associated with nutritional status of children.<sup>[16]</sup> A cross sectional study done in Karachi also

has validated significant association of maternal education with nutritional status.

**Table I: Comparative anthropometric, socio-demographic characteristics of study population.**

<b>Anthropometry &amp; Demographics</b>	<b>Case</b>	<b>Control</b>
Weight (mean & sd)	6.38 ± 2.23	10.43 ± 3.9
Height (mean & sd)	71.56 ± 10.67	79.21 ± 14.21
<b>Mother's Education</b>		
Educated	88(51.8%)	111(65%)
Un-Educated	82(48.2%)	59(34.7%)
<b>Father's education</b>		
Educated	121(71.2%)	124(72.9%)
Un-educated	49(28.8%)	46(27.1%)
<b>Employment status</b>		
Employed	9(5.3%)	7(4.1%)
Un-employed	161(94.7%)	163(95.9%)
<b>Family size</b>		
≤ 5	56 (32.9%)	59(34.7%)
> 5	114 (67.1%)	111(65.3%)
<b>Maternal age</b>		
< 30 yrs	108 (63.5%)	94(55.3%)
> 30 yrs	62(36.5%)	76(44.7%)
<b>Under 5 children</b>		
≤ 2	143(84.1%)	145 (85.3%)
> 2	27 (15.9%)	25 (14.7%)
<b>Residential Area</b>		
Rural	60(35.3%)	38(22.4%)
Urban	110(64.7%)	132(77.6%)
<b>Family system</b>		
Joint	106(62.4%)	96 (56.5%)
Nuclear	64(37.6%)	74 (43.5%)
<b>Parent-status</b>		
Separated	1(0.6%)	2(1.2%)
Living together	169(99.4%)	168(98.8%)
<b>Income</b>		
≤10,000 Pak-Rupees	113(66.5%)	85(50.0%)
>10,000 Pak-Rupees	57(33.5%)	85(50.0%)

of children.<sup>[4]</sup> Although a substantial number of studies do verify our results regarding importance of maternal education, we came across a study which demonstrated that impact of maternal education is also dependent on other socio-environmental factors.<sup>[17]</sup> Contrary to our hypothesis that employment status of mothers can hamper the growth rate of their children, we did not find significant association with poor nutritional status showing maternal employment does not have marked negative impact on growth. It is proved in a study that maternal employment impacts on cognition level also but this affect is trivial and was not universally observed.<sup>[18]</sup> Positive effect of maternal employment on growth and development.

**Table II: Crude odds ratio and confidence interval between under nutrition and risk factors.**

Category			Case	Control	OR (CI)	p-value
Maternal education	Educated	199 (58%)	88(51.8%)	111(65%)	1.32 (1.1 – 1.62)	0.008
	Un-educated	141(42%)	82(48.2%)	59(34.7%)		
Father- education	Educated	245(72%)	121(71.2%)	124(72.9%)	1.045 (0.82–1.32)	0.405
	Un-educated	95(28%)	49(28.8%)	46(27.1%)		
Employment	Employed	16(4.7%)	9(5.3%)	7(4.1%)	1.132 (0.725-1.768)	0.39
	Unemployed	324 (95.3%)	161(94.7%)	163(95.9%)		
Family size	≤ 5	115(34%)	56 (32.9%)	59(34.7%)	0.961 (0.765-1.207)	0.409
	>5	225(66.2%)	114 (67.1%)	111(65.3%)		
Maternal age	< 30 yrs	202(59.4%)	108 (63.5%)	94(55.3%)	1.2 (1-1.4)	0.075
	> 30 yrs	138 (40.6%)	62(36.5%)	76(44.7%)		
Under 5 children	≤ 2	288(84.7%)	143(84.1%)	145 (85.3%)	0.956 (0.718-1.273)	0.4
	>2	52 (15.3%)	27 (15.9%)	25 (14.7%)		
Residential Area	Rural	98 (28.8%)	60(35.3%)	38(22.4%)	1.34 (1.1 – 1.661)	0.006
	Urban	242(71.2%)	110(64.7%)	132(77.6%)		
Family- system	Joint	202 (59.4%)	106 (62.4%)	96 (56.5%)	1.13 (0.91 – 1.41)	0.16
	Nuclear	138 (40.6%)	64(37.6%)	74 (43.5%)		
Parent status	Separated	3(0.9%)	1(0.6%)	2(1.2%)	0.6(0.14 – 3.11)	0.50
	Living together	337 (99.1%)	169 (99.4%)	168(98.8%)		
Income	≤10,000 Pak -Rupees	198 (58.2%)	113(66.5%)	85(50.0%)	1.4 (1.1-1.79)	0.001
	>10000 Pak- Rupees	142 (41.8%)	57(33.5%)	85(50.0%)		

of their children has been documented in various other studies validating our results.<sup>[19,20]</sup> Promising effect of maternal employment on child's well-being and nutritional status has also been documented by Hoffman.<sup>[21]</sup> Similarly Sattar has documented providential effect of maternal employment on child's nutritional status.<sup>[22]</sup> Endorsement of this fact that women's autonomy is deeply embedded with their educational attainment and employment status which indirectly impacts on growth parameters of her children has been shown by Senerath as well.<sup>[23]</sup>

**Table III: Estimates of simultaneous effect of various factors through logistic regression analysis.**

Factors	ODDS Ratio	95% CI	P- Value
Maternal education	1.76	1.107-2.807	0.017
Employment	1.316	0.456 – 3.795	0.612
Family size	0.851	0.528 -1.371	0.508
Maternal age	1.603	0.981-2.621	0.06
Income	2.064	1.312 – 3.245	0.002
Father education	0.893	0.538 – 1.483	0.662
Parents status	0.279	0.023-3.412	0.318
Under 5 year	0.654	0.333-1.283	0.217

Although in our study we could not prove strong association of family size with nutritional status but many studies have documented strong impact of family size and education on growth parameters of their children.<sup>[24]</sup> Susan has demonstrated that birth order and family size carries a substantial effect on children's growth.<sup>[25]</sup> A contemporary study done in Bangladesh

has supported the strong association of maternal education, working mothers and family size on child's well-being and growth.<sup>[26]</sup> A study done by Desai S has documented that impact of family size is largely dependent on the socio-economic condition of family.<sup>[27]</sup>

## CONCLUSION

Maternal education has definite and significant effect on nutritional status of children. This is the key factor to be addressed for prevention or improvement of childhood malnutrition. For this it is imperative to launch sustainable programs at national and regional level to uplift women educational status to combat this ever increasing burden of malnutrition.

## REFERENCES

1. Ali Naser I, Jalil R, Wan Muda WM, Wan Nik WS, Mohd Shariff Z, Abdullah MR. Association between household food insecurity and nutritional outcomes among children in Northeastern of Peninsular Malaysia. *Nutr Res Pract*, 2014; 8(3): 304-311. doi: 10.4162/nrp.2014.8.3.304.
2. Aamer I, Yakoob MY. Impact of maternal education about complementary feeding and provision of complementary foods on child growth in developing countries. *BMC Public Health*, 2011; 11(Suppl 3): S25. doi: 10.1186/1471-2458-11-S3-S25.
3. Dube J, Bantamen G, Belaynew W, Dube J. Nutrition & Food Sciences Assessment of Factors Associated with Malnutrition among Under Five Years Age Children at Machakel Woreda, Northwest Ethiopia: A Case Control Study. *J Nutr Food Sci.*, 2014; 4. doi: 10.4172/2155-9600.1000256.
4. Ali SS, Karim N, Billoo AG, Haider SS. Association

- of Literacy of Mothers with Malnutrition among Children Under Three Years of Age in Rural Area of District Malir, Karachi. *J Pak Med Assoc*, 2005; 55(12): 550-553.
5. Tette EMA, Sifah EK, Nartey ET, Nuro-Ameyaw P, Tete-Donkor P, Biritwum RB. Maternal profiles and social determinants of malnutrition and the MDGs: What have we learnt? *BMC Public Health*, 2016; 16: 214. doi: 10.1186/s12889-016-2853-z.
6. Anderson AK, Bignell W, Winful S, Soyiri I, Steiner-Asiedu M. Risk Factors for Malnutrition among Children 5-years and Younger in the Akuapim-North District in the Eastern Region of Ghana. *Curr Res J Biol Sci.*, 2010; 2(3): 183-188.
7. Egata G, Berhane Y, Worku A. Predictors of acute undernutrition among children aged 6 to 36 months in east rural Ethiopia: a community based nested case - control study. *BMC Pediatr*, 2014; 14: 91. doi: 10.1186/1471-2431-14-91
8. Chakrabatti Dhar. *People, Planet, and Progress Beyond 2015* - Google Books. PG(ed). PG Dhar Chakrabarti, editor. New Delhi: Teri, 2017; 162-165.
9. Arif GM, Farooq S, Nazir S, Sathi M. Child Malnutrition and Poverty: The Case of Pakistan. *©The Pakistan Dev Rev.*, 2014; 53(1): 29-48.
10. Nisar MU, Anwar Ul Haq MM, Tariq S, Anwar M, Khawar A, Waqas A, et al. Feeding Patterns and Predictors of Malnutrition in Infants from Poor Socioeconomic Areas in Pakistan: A Cross-sectional Survey. *Cureus*, 2016; 8(1): e452. doi: 10.7759/cureus.452.
11. Government of Pakistan. *National Nutrition Survey* Government of Pakistan, 2011.
12. Smith-Greenaway E. Maternal Reading Skills and Child Mortality in Nigeria: A Reassessment of Why Education Matters. *Demography*, 2013; 50(5): 1551-1561. doi: 10.1007/s13524-013-0209-1.
13. Huq MN, Tasnim T. Maternal Education and Child Healthcare in Bangladesh. *Matern Child Health J.*, 2008; 12(1): 43-51. doi: 10.1007/s10995-007-0303-3.
14. Makoka D. *DHS WORKING PAPERS The Impact of Maternal Education on Child Nutrition: Evidence from*, 2013.
15. Thuita FM, Mwadime RKN, Wang'ombe JK. Child nutritional status and maternal factors in an urban slum in Nairobi, Kenya. *East Afr Med J.*, 2005; 82(4): 209-215.
16. Dereje N. Determinants of Severe Acute Malnutrition among under Five Children in Shashogo Woreda, Southern Ethiopia: A Community Based Matched Case Control Study. *Int J Res.*, 2014; 1: 339-363. doi: 10.4172/2155-9600.1000300.
16. Reed BA, Habicht JP, Niameogo C. The effects of maternal education on child nutritional status depend on socio-environmental conditions. *Int J Epidemiol.*, 1996; 25(3): 585-592.
17. Huerta C, Adema W, Baxter J, Corak M, Deding M, Gray MC, et al. Early maternal employment and child development in five OECD countries. *Soc Policy.*, 2011; (118).
18. Hoffman, Waldi LN. *The Effects of the Mother's Employment on the Family and the Child*. University of Wisconsin--Madison. Libraries, 1998.
19. Brooks-Gunn J, Han WJ, Waldfogel J. First-Year Maternal Employment and Child Development in the First Seven Years. *Monogr Soc Res Child Dev*. NIH Public Access, 2010; 75(2): 7-9. doi: 10.1111/j.1540-5834.2010.00562.
20. Hoffman LW, Youngblade LM (Lise M. Mothers at work : effects on children's well-being. Cambridge University Press, 1999; 338.
21. Sattar Almani A. Study of the Effects of Working Mothers on the Development of Children in Pakistan. *Int J Humanit Soc Sci*, 2012; 2(11): 164-171.
22. Senarath U, Nalika Sepali Gunawardena NS. Women's Autonomy in Decision Making for Health Care in South Asia. *Asia-Pacific J Public Health*, 2009; 21(2): 137-143. doi: 10.1177/1010539509331590.
23. Ajao KO, Ojofeitimi EO, Adebayo AA, Fatusi AO, Afolabi OT. Influence of family size, household food security status, and child care practices on the nutritional status of under-five children in Ile-Ife, Nigeria. *Afr J Reprod Health*, 2010; 14(4 Spec no.): 117-126.
24. Horton S. Child nutrition and family size in the Philippines. *J Dev Econ*, 1986; 23(1): 161-176. doi: 10.1016/0304-3878(86)90086-6.
25. Zunaid Ahsan K, Arifeen S El, Al-Mamun A, Khan SH, Chakraborty N. Effects of individual, household and community characteristics on child nutritional status in the slums of urban Bangladesh. *Arch Public Heal*, 2017; 75(9). doi: 10.1186/s13690-017-0176-x
26. Sonalde D. *The impact of family size on childrens nutritional status: insights from a comparative perspective*. New York Population Council, 1992; 1992.