Stunting Syndrome in Pakistani Children: Latest Evidence from PDHS (2017-2018)

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ARTICLE DETAILS

ABSTRACT

Malnutrition particularly stunting considered as nutrient deficiency that has adverse effect on the children at micro level and to the nation at macro level. Malnutrition leads the poor physical and mental development of the children which may lead to greater risk of morbidity or critical infection which ultimately greater economic loss of the society. The objective of the current study is to find the factors that may significantly affect the stunting among children. The current study investigates the said phenomenon using the latest wave of PDHS. The logisitic regression model is applied to find the determinants of stunting among children. The results show that variables of child and mother characteristics have strong influence on stunting. Additionally, the results indicate that children affected with diarrhea have found more likely to be stunted while the wealth effect reduces the likelihood of stunting. The study suggest that proper education facilities should be provided to females to augment awareness and knowledge for proper care of the children and timely vaccination program for the children should be started to protect the children from diseases.

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1. Introduction

The term malnutrition refers to both over nutrition and under nutrition. Children are malnourished if they take insufficient calories, vitamin and protein through their diet for growth and development or they are not able to take proper diet due to ill health or any disease. In this study malnutrition consider as a under nutrition (S. Das & Gulshan, 2019). Malnutrition leads the poor physical and mental development of the children which may leads to greater risk of morbidity or critical infection which ultimately greater economic loss of the society (S. Das & Gulshan, 2019). Malnutrition in all its forms has become main cause of morbidity and mortality which increases the pressure on health care system and increases health cost of individuals and nation (Swaminathan et al., 2019).
Malnutrition in children under five years is a worldwide phenomenon which is serious in developing countries including Pakistan. The most important components of child malnutrition are stunting, wasting and underweighting. Stunting is the most serious problem (S. Khan et al., 2019). Globally, one fourth of children are stunted (Swaminathan et al., 2019). According to Global Nutrition Report (GNR), children less than five years are facing multiple burdens: the stunted children are 150.8 million, wasted children are 50.5 million and overweight are 38.3 million (Micha et al., 2020). In Pakistan, 41.4 million children are malnourished, which is the third largest malnourished population in the world (Unicef & Organization, 2017). There are 20 million infants who are born low birth weight each year globally. Malnutrition significantly contributes to the global burden of several diseases. According to GNR, 22.2 percent children are stunted, 7.5 percent are wasted and 5.6 percent are overweight. In Pakistan, there is alarming situation, which is 37.4 percent children are stunted, 5.5 percent are wasted, 2.2 percent are overweight, 5 percent children are stunted and wasted and 2.6 percent children are stunted and overweight. If we combine the above three forms, almost 52.7 percent children face the problem of malnutrition in Pakistan which is addressable issue (Micha et al., 2020).

Pakistan is 5th largest populous country. It has 207 million population with 275 persons per square kilometer. The working age population is 15-65 is 64%. The per capita income is 1497 US dollars. Pakistan ranked 154th on human development index HDI 2020. So Pakistan may be good case study for estimating determinants of child malnutrition in developing countries. Stunting is more harmful than other all forms of malnutrition. From policy point of view separate analysis for stunting is required so that separate policy may be framed.

Previous studies related to child malnutrition in Pakistan were mostly based on micro level like; schools, hospitals, province, district and community base. Few studies were used the macro level data, were either limited to socio- demographic correlates or children under two year of age. In addition, there is lack of data and literature regarding the determinants of stunting in Pakistani children. Therefore, the current study utilized the nationally representative based on Pakistan Demographic and Health Survey (PDHS) 2017–2018 data, to examine the factors associated with stunting among Pakistani children aged 0–59 months.

2. Review of Literature

Literature review is the part of academic writing and demonstrating knowledge to understand the specific topic. It helps to understand the methodology and theoretical framework about the specific topic. After reviewing the all available material (theoretical and empirical), we can avoid from unnecessary duplication. Current study explores the factor affecting the stunting ion Pakistan. The review of previous studies showed that gender of child, rural areas, age of child, maternal age, mother body mass index and mother education effect the stunting.

Khuwaja et al. (2005) investigated prevalence and correlates of stunting among the school children in southern Pakistan. They select the 1915 children 6–12 years of age selected from 32 schools in rural Sindh. Z scores were used to measures for stunting. The results of study showed that 16.5% children were stunted and female children were more stunted than male children. More than seven year of age was more stunted. The children having poor family back ground are more stunted than rich children. The results also showed that in rural areas of Sindh, sex of child, father’s occupation and age of child are major risk factors of stunting among school children aged 6-12 years.

Fenske et al. (2013) explored the determinants of stunting in India. They utilized the cross sectional data of children from Indian national family health survey for 2005-2006. They use the
additive quintile regression and Logit regression. The results of study showed that child age, sex, household wealth, maternal education and MBI showed the largest effects. Twins associated with increase in stunting. Maternal age, mother body mass index, birth order and numbers of antenatal visits affect stunting in non linear ways. The study suggested that there need to system base approach to reduce stunting.

Hoddinott et al. (2013) discussed the economic importance for investment to reduce stunting. The study presented the functional consequences of stunting in first 1000 days. The study summaries the empirical literature and also discussed the gaps where they exist. The main objective of study was to generate important estimates of the cost and benefit of intervention in stunting reduction.

Das et al. (2016) discussed the prevalence and determinants of stunting from the results of previous studies in Pakistan. The study discussed that there is alarming situation in Pakistan. According to PDHS 2012-13, 44% children are stunted. The suggested that there is dire need to focus the current situation and formulate the nutrition focused strategies.

Kim et al. (2017) discussed the importance of thirteen determinants of child stunting in south Asia. The study utilized the data set of DHS. The study analyzed the 21745 children by employing the logistic regression model. The results of study showed that mother’s height and lack of necessary food are the major risk factors of stunting. Mother’s height, low dietary intake, household wealth, mother’s body mass index and age at marriage are the important correlates for severe stunting for the age group of 6-23 months. The findings of the study indicate that they should be dire need of investment in child nutrition specific program in South Asian countries.

Anik et al. (2019) investigated the double burden of malnutrition that the coexistence of stunted child and overweight mother at the same household. In this study the latest data sets of Pakistan, Bangladesh, Nepal and Myanmar were used. They employ the logit Model, relative index of inequality and slope index of inequality were used. The results of study showed that the prevalence rate of double burden malnutrition was 10.4%, 1.54%, 3.93% and 5.54% respectively in Bangladesh, Nepal, Pakistan and Myanmar. The DBMHL in all above selected countries were higher in urban areas than rural areas. The study suggested that to control the higher prevalence the Govt. of respective countries should need the urgent implementation multi sectoral actions through effective policies.

Khan et al. (2019) explore the determinants of stunting, wasting and underweighting in children under five year of age in Pakistan. They utilize the data set of Pakistan demographic and health survey of 2012-13. They estimate the sample of 3071 Pakistani children by employing the univariate and multivariate binary logistic regression model. The results of study show that 44.4 percent, 29.4 percent and0.7 percent children less than five year are stunted, wasted and underweight respectively. The children whose mother age is more than 18 year, three visits of mother at clinic during pregnancy and location in rural areas are less stunted. Mother’s low education, short stature, small size of child at birth and mother body mass index is positively associated with underweighting. Wasting is positively associated with mothers no education. The study suggests that marriage of female less than eighteen year, mothers no education and low nutritional status of women is preventable. The Government should intervene in mother’s education and nutritional status.

3. Data and Methodology
The study utilized the latest wave of Pakistan Demographic and Health Survey, 2017. The study adopted the Logistic regression model to find the determinants of stunting among children of age under
The functional relationship to be used in the current study is expressed as:

\[ \text{STUNT} = f(\text{Age of the children, Sex of the children, Birth order of the children, Birth interval of the children, Body Mass Index of Mother, Mother education, Breastfeeding, Age of Mother, Diarrhea, Wealth Index}). \]

The logit model used to estimate the determinants of stunting among children under five is given in equation 2.

\[
\Pr(\text{STUNT} = 1) = \pi_0 + \pi_1 AOC_i + \pi_2 SOC_i + \pi_3 BOC_i + \pi_4 BIC_i + \pi_5 LBMI_i + \pi_6 MED_i \\
+ \pi_7 BF_i + \pi_8 AOM_i + \pi_9 DIA_i + \pi_{10} WI_i + e_i
\]

Where STUNT is the stunting status of the children, AOC is the age of the children, SOC is the sex of the children, BOC is the birth order of the children, BIC is the birth interval of the children, BMI is the body mass index of the mother, MED is the mother education, BF is the breastfeeding, DIA is the diarrhea related disease. The variables used in the analysis are described in Table 1.

### Table 1: Operational Measurement of Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable</td>
<td></td>
</tr>
<tr>
<td>Stunting</td>
<td>Stunting=1, 0 otherwise</td>
</tr>
<tr>
<td></td>
<td>Less than five years of age who are below 2 standard deviation from median age.</td>
</tr>
<tr>
<td>Explanatory variables</td>
<td></td>
</tr>
<tr>
<td>Age of the Children</td>
<td>In Months</td>
</tr>
<tr>
<td>Sex of the Children</td>
<td>1=Male, 0 otherwise</td>
</tr>
<tr>
<td>Birth order of the Children</td>
<td>Order of birth</td>
</tr>
<tr>
<td>Birth Interval of the Children</td>
<td>Greater than 24 months=1, 0 otherwise</td>
</tr>
<tr>
<td>Low Body Mass Index of Mother</td>
<td>Less than 18.5=1, 0 otherwise</td>
</tr>
<tr>
<td>Mother Education</td>
<td>1=Educated, 0 otherwise</td>
</tr>
<tr>
<td>Breast Feeding</td>
<td>In Months</td>
</tr>
<tr>
<td>Age of the Mother</td>
<td>In years (current age of ever married women)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>Diarrhea in last two week =1, 0 otherwise</td>
</tr>
<tr>
<td>Wealth Index</td>
<td>Wealth index combined</td>
</tr>
</tbody>
</table>

### 4. Results and Discussion

Table 2 provides empirical estimates of the results of logistic regression model used to measure the determinants of stunting among Pakistani children using latest wave of DHS.
Table 2 Results of Logit Model

<table>
<thead>
<tr>
<th>Stunt</th>
<th>Coefficient</th>
<th>Robust Std. Err</th>
<th>z</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of the Children</td>
<td>.0267845</td>
<td>.0143335</td>
<td>1.87</td>
<td>0.062**</td>
</tr>
<tr>
<td>Sex of the Children</td>
<td>-.4856587</td>
<td>.4775723</td>
<td>-1.02</td>
<td>0.309</td>
</tr>
<tr>
<td>Birth Order of the Children</td>
<td>.00336</td>
<td>.1295313</td>
<td>0.03</td>
<td>0.979</td>
</tr>
<tr>
<td>Birth Interval of the Children</td>
<td>-.0204085</td>
<td>.0222949</td>
<td>-0.92</td>
<td>0.360</td>
</tr>
<tr>
<td>Body Mass Index of Mother</td>
<td>.0002443</td>
<td>.0004832</td>
<td>0.51</td>
<td>0.613</td>
</tr>
<tr>
<td>Mother Education</td>
<td>-.330025</td>
<td>.1998856</td>
<td>-1.65</td>
<td>0.099**</td>
</tr>
<tr>
<td>Breast Feeding</td>
<td>.1108134</td>
<td>.9942415</td>
<td>0.11</td>
<td>0.911</td>
</tr>
<tr>
<td>Age of the Mother</td>
<td>-.0355387</td>
<td>.0284867</td>
<td>-1.25</td>
<td>0.212</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>.2310808</td>
<td>.1287076</td>
<td>1.80</td>
<td>0.073**</td>
</tr>
<tr>
<td>Wealth Index</td>
<td>-.817498</td>
<td>.2146775</td>
<td>-3.81</td>
<td>0.000*</td>
</tr>
<tr>
<td>Constant</td>
<td>-6.382637</td>
<td>92.61707</td>
<td>-0.07</td>
<td>0.945</td>
</tr>
</tbody>
</table>

Observation 124
Wald Chi Sq(12) 26.45
Probability 0.0093

Source: Author’s Calculation. * shows the significant at 5% and ** shows the significant at 10%

4.1 Age of the children and sex of children

It is hypothesized that age of the children may affect positively the stunting status of the children. The results also indicate that the age of the children has positive effect on stunting which shows that as age increases the likelihood of stunting will also increase. Because nutritional requirement of children varies by age, as age increases the food and health care requirement increases. Infant of less than six month need only breastfeeding. After the age of six month, requirement of solid food with breastfeeding increases. The literature showed the both positive and negative relationship with stunting. The probability of stunting increases as age increases (Wamani et al., 2007 for Uganda; Das and Rahman, 2011 for Bangladesh; Khan & Raza, 2014 for Bangladesh; Semali et al., 2015 and Das & Gulshan, 2019 for Bangladesh). The majority of the studies justify our results. On the other hand, child’s age showed negative relationship with stunting (Choudhury et al., 2000 for Bangladesh).

The sex of the children is included in analysis as the independent variable and it is assumed to have negative influence on stunting of under five children. Our results of logistic regression model show that sex of the children has negative coefficient which indicates that males children are less stunted as compared to female children. The reason for this negative relationship is the dominance of male as compared to female in Pakistani culture, because parent supposition is that the boys are supporters in old age. Girls are more stunted than boys (Abate et al., 2020; Adekanmbi et al., 2013; Khan & Azid, 2011; Makoka, 2013; Van Tuijl et al., 2021). On the other hand, boys are more stunted than girls in many countries (Bork & Diallo, 2017 for Senegal; Hien & Hoa, 2009 for Vietnam; Mbuya et al., 2010 for Zimbabwe; Thurstans et al., 2020).

4.2 Birth Order and Birth Interval

The literature indicates that the birth order of the children may have significant influence on the stunting of under five children. Our results of the logistic regression model indicate that birth order of the children has positive effects on the stunting which shows that as birth order increases the probability of stunting will also increase. The first child has more intelligent than their siblings because he get more investment being a fist baby (Khan & Azid, 2011 for Pakistan). There is positive relationship...
between birth order and resource allocation (Behrman, 1988). The birth order has positive impact for height for age (Fenske et al., 2013 for India). The first child has height advantage (Dhingra & Pingali, 2021 for India). The literature indicates that the birth interval of the children may also have significant influence on the stunting of under five children. Our results of the logistic regression model indicate that birth interval of the children has negative effects on the stunting which shows that as birth interval increases the probability of stunting will decreases. The reason for this negative relationship is that due to higher birth interval mother has sufficient time for the look after of the children and better use of resources for child reduces the likelihood of stunting. Twins associated with increasing stunting (Fenske et al., 2013 for India). Birth spacing increase the height of the child (Dhingra & Pingali, 2021 for India).

4.3 Body Mass Index of the Mother

The literature indicates that the body mass index of the mother may have significant influence on the stunting of under five children. The empirical results of the logistic regression model indicate that low body mass index of the mother has positive effects on the stunting which shows that lower the body mass index of the mother higher the probability of stunting. Greater mother BMI increases the height for age (reduce stunting) (Fenske et al., 2013 and Khan & Mohanty, 2018 for India). Mother’s BMI negatively affect the stunting (Khan & Raza, 2014). Mother’s height is the major risk factor for child stunting (Kim et al., 2017).

4.4 Mother Education

The literature indicates that the education of the mother may also have significant influence on the stunting of under five children. Our results of the logistic regression model indicate that mother education has negative effects on the stunting which shows that as increase in level of education of mother reduce the probability of stunting. The reason for this negative relationship is that higher educated mother has sufficient knowledge about the nutrition of the children which reduces the likelihood of stunting. Mother’s education plays an important role in the nutrition of child (Khan & Raza, 2013). The children of uneducated mothers are more stunted (Khan & Raza, 2014 for Bangladesh). Increase in mother’s education will reduce the probability of stunting (Pillai & Maleku, 2019). Mother’s no education positively associated with stunting (Khan et al., 2019). Maternal education has positive impact on nutritional status of the child (reduce stunting) (Ahmad et al., 2020).

4.5 Breastfeeding

The literature shows the both negative and positive impact of duration of breastfeeding on stunting. The empirical results of the logistic regression model indicate that breast feeding of the mother has positive effects on the stunting which shows that higher the breast feeding of the mother higher the probability of stunting. The reason for this positive relationship is that children that only takes mother’s milk for longer period of time are more stunted because mother’s milk not enough for the dietary intakes of the growth of the children. longer duration of breastfeeding is positively associated with stunting (Asbar & Tamrin, 2020 and Khan and Raza 2014).On the other hand, breastfed children are less stunted than the children who were never breasted (Mbuya et al., 2010 for Zimbabwe). This is theoretically clear that breastfeeding improve the nutritional status of the child.

4.6 Age of Mother

The literature indicates that the age of the mother may also have significant influence on the stunting of under five children. The empirical results of the logistic regression model indicate that mother age has negative effects on the stunting which shows that as mother age increases the probability of stunting will also decreases. The reason for this negative relationship is that older mother
has more experience which reduces the likelihood of stunting. Mother’s age is negatively associated with stunting (Titaley et al., 2019). Mother’s age is the major risk factor of stunting (Khan & Mohanty, 2018).

### 4.7 Diarrhea

The literature shows the conflicting results. Our empirical results of the logistic regression model indicate that diarrhea has positive effects on the stunting which shows that higher the prevalence of diarrhea the higher the probability of stunting. Diarrhea is positively associated with stunting (Lutter et al., 1989). For Bangladesh, incidence of Diarrhea in last two week has positive impact on stunting by Khan & Raza (2014). The same results were found by Kumar et al. (2019). On the other hand, Diarrhea has weak negative effect on child malnutrition (Garcia et al., 1989).

### 4.8 Wealth Index

The literature indicates that the wealth index have highly significant influence on the stunting of under five children (Tucker et al., 2014). Our estimates of the logistic regression model indicate that wealth index has negative effects on the stunting which shows that household with more income increases reduces the probability of stunting. According to Khuwaja et al. (2005) Poor are more stunted. Higher Wealth status reduce the stunting (Pillai & Maleku, 2019).poorest class is more malnourished (Das & Gulshan, 2019). Low income increases the malnutrition (Asim & Nawaz, 2018). The same results are founded by ( Fenske et al., 2013 and Ahmad et al., 2020).

### 5. Conclusion and Policy Proposal

The empirical literature considers the issue of stunting a valid empirical research question. Hence the objective of the current study is to found the factors that significantly affect the stunting among children. The current study investigated the said phenomenon using the latest wave of PDHS 2017-18. The logistic regression model is applied to found the determinants of stunting among children. The results show that variables of child and mother characteristics have strong influence on stunting. Additionally, the result indicates that children affected with diarrhea have found more likely to be stunted while the wealth effect reduces the likelihood of stunting. Based on the results of the current empirical analysis the study suggest that proper education facilities should be provided to females to augment awareness and knowledge for proper care of the children. This step not only reduces the problem of stunting at micro level but also boost the human capital at macro level. Further, the proper and timely vaccination program for the health care of children should be started to protect them from diarrhea and there is dire need for free health services.

### References


