SOCIOECONOMIC FACTORS ASSOCIATED WITH STUNTED GROWTH AMONG CHILDREN AGED UNDER FIVE YEARS IN FAISALABAD, PAKISTAN

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ABSTRACT
The study aim is to identify socioeconomic stunted growth factors among under 5 years children in Faisalabad, Pakistan. The prevalence of stunted growth is a serious public health issue worldwide, including South-Asia. Pakistan is reported one of the highest levels of stunting prevalence in children as compared to other developing countries. The prevalence of child stunted growth in Pakistan is still very high, but unfortunately little is known about the associated factors. A community-based study was carried out with 400 respondents (pairs of mother and children) between under 5 years of aged. To select the study participant, sample a multistage sampling technique was used for data collection from community. Children anthropometric measurements was taken to determine prevalence of stunted growth and structured questioner was used to collect the information about socioeconomic associated factors with malnutrition. For the data analysis, version 23 of the SPSS is used. Multiple linear regression analysis was used to found the socioeconomic factors associated with stunting among children. Study results indicated that contributed socioeconomic factors toward stunting are number of children under 5 years, child birth size, household food security, hand washing practice, feeding colostrum to newborn child, Exclusive breastfeeding, dietary diversity, and basic food groups.

Keywords: Factors, undernutrition, stunting, five years, children, Pakistan.

INTRODUCTION
Worldwide, undernutrition is still determining as silence emergency and policy concerns that arise as a result of alarming health problem especially in Southeast Asia (Black et al., 2003; WHO, 2019). When child’s height is less than -2 standard deviations (SD) from the World Health Organization standard is called stunted (WHO, 2006). In socioeconomic development of country child health is considered as significant indicator (UNICEF, 2013). In 2018 globally, stunted growth continues with an estimated 149 million of children under the age of five. More than half (55%) of under five children live in Asia (UNICEF, 2018). The results of Pakistan demographic and health survey 2017-18 describes the 38 percent children of the total are moderately stunted (below -2 SD) and in Punjab children are moderately stunted (below -2 SD) 29.8 (PDHS, 2017-18).

A body of literature emphasized nutrition related factors on childhood undernourished association between several infections including malaria, pneumonia and diarrhea under five years (WHO, 2018). Although in literature multifaceted “undernutrition” is low height-for-age that also called stunting (Ntenda & Chuang, 2018; Das & Gulshan, 2017). This study is consisted on undernutrition to find the associated factors of stunting which are multilevel and multifactorial (Black et al., 2013; UNICEF, 2013) and that directly linked with the (individual, household, and community level) dynamic in relation to height-for-age (stunting). (i) Immediate(individual) level, encompassing inadequate/insufficient nutritional intake, as well as infectious disease like malaria pneumonia, measles and diarrhea found at the child level and considered outcomes factor (ii) underlying (household) level, contain food insufficient access, insufficient health-care services, inadequate care and unhealthy environment, occurring at household level as well as mediated by immediate factors and (iii) basic.
(community) Level, include insufficient potential and current resources at the public/societal level, the communities structures provide for immediate and underlying determinants context (Ntenda & Chuang, 2018). It is very important here to examine a range of factors and measure their level of influence on children’s health under 5 years in Pakistan with a view to informing policy development.

REVIEW OF LITERATURE

A large number of research studies has well-documented the relationship between nutritional health of child, sanitation, clean water supply, and personal hygiene especially in child under the age of five years (Tharakhan & Suchindran 1999; Checkley et al., 2004; Fewtrell et al., 2006). For example, Checkley et al., (2004) found a direct and significant correlation among the above-mentioned variables by studying the case of Children in Peru that were suffering from stunting

Webb et al., (2006) describes availability, utilization and access are the three parameters of food security. He also argues that these three pillars are highly connected and hierarchical. For example, food availability leads to food access to people that further enables the people to utilize food to improve their health and well-being. Zakari et al. (2014) argues that food security determinants are changed in rural and urban ranges. Majority of the people in rural areas rely on small-scale farming and their dependence of cash is significantly little. They grow and produce food through farming for their own use while the sell the food in excess to urban areas. Therefore, people in rural areas might have higher prevalence of food security relative toward people in urban areas.

Some research studies reported that families having more than 3 child had higher percentage of underweight child relative to families that had children less than 3 in number (Hien and Kam, 2008). On the other hand, nutritional status of child with family size has a positive association because it ensures food security as more family members are able to work and provide for the family (Zakari et al., 2014). There is a strong relationship between the problem of stunting among child and their age as this problem is worsened in the first 2 years particularly among child between the ages of six to twenty-four months but it increased at a slower rate afterwards (Mariott et al., 2012; Kabubo-Mariara et al., 2009; Teshome et al., 2009).

A study assessed the magnitude practice of exclusive breastfeeding (EBF) practice and its associated factors in early childhood that is essential immediate nutrition for the child long-term health and its benefits have proven in the life’s first year (Bhandari. et al., 2008). Deprivation of colostrum is directly related to increasing stunting in child that was up to 2.1 times more than the studies conducted in the context of Ethiopia and Turkey (Engebretsen et al., 2008; Ergin et al., 2007). Ruel and Menon (2002) found the EBF to 6 to 9, 9 to 12 and 12 to 36-months increased their weight and health significantly relative to child to the use of complementary foods and liquids given as an alternative to child. This growth was maximized due to EBF exclusively after 12 months of age in child.

Breastfeeding practices and child health are also influenced by cultural traditions and norms. For instance, Zakar et al. (2018) found that people of Rajanpur had a perception of giving honey and other liquids to their child instead of breastfeeding them during the first hour of birth that could be detrimental to child’ health. Also, no personal hygiene is maintained in such cases because such doses are given by respectable persons or religious persons in the family.

Objectives of the Study
1. To measure the incidence of stunted growth at the age of 5 years children
2. To evaluate the socioeconomic contributing factor toward stunting among under five-year children

RESEARCH METHODOLOGY

It was cross-sectional community-based research that is carried out through multistage sampling technique. The study was conducted to determine the factors associated among children at the age of five years in the Faisalabad district, which is Pakistan’s third most populous city of Pakistan with a total population of 7,873,910, a total rural population of 4,113,582, a male population of 2,102,745 and a female population of 4,113,582 (Pakistan Bureau of statistics, 2017). Every child was 0–59 months old and his / her mother / caregiver was identified through a standardized random sampling process and involved in the study by door-to-door visits. The district of Faisalabad consists of eight towns, four rural and four urban 289 councils (City District Government Faisalabad, 2016). Therefore, the study was carried out with all four Faisalabad district of rural towns. Eight union councils were randomly
selected (two union councils from each town) and two villages were selected randomly from each union council. If more than one child at the age under five years was found in chosen household, then selected last one child in this research study.

**Determination of Sample Size**

The sample size was calculated of a single population proportion equation ($z^2 \times p \times q/d^2$), with 95% confidence level (CI) and 5% of error margin. Approximate proportion (P) of stunting is (38%) according (PDHS, 2017-18) that is (age height < median-2SD) among children below 5 years. Therefore, the estimated samples size for the stunting prevalence in children were measured relatively high 362 ~ 400, were taken as samples for this research. The structured questionnaire was designed on the basis of the research from the relevant literature. The questionnaire has been translated into local language Punjabi. For data collection, the structured interview guide was used face-to-face from respondents.

**Anthropometric Measurements**

Measurement guide was drawn by the Food and Nutrition Technical Assistance Project (FANTA) to the measurements of weight and height with age in child by using standardized anthropometric measurement procedures (Bruce, 2001). Weighing scale was used for body weight measurements with light cloths no coats or jackets, shoes and nearest 0.1 kg for other clothing in a portable scale. Child height was measured with stadiometer port from toe to top of the head with position Frankfurt’s Plane touched the stand vertical at 0.1cm. Children recumbent length was taken at the age of 6–23 months and standing position height was measured at the age of 24–59 months. Each child's age gathered from their mother. All measurements of anthropometry are occupied by two times, calculating and recording with the two measurements average.

**Statistical Analysis**

SPSS version 23.0 was used to enter and analyze data and WHO Anthro software 2006 was use to examine the child that are stunted or not stunted (WHO, 2006). International criteria were used for anthropometric classifications $< -2$ SD. In this study dependent variables were stunted, and stunting were defined as $0=$ for not stunted and $1=$ for stunted (WHO, 2006).

To identify associated factors of child stunting, the study of multiple linear regression was used. In order, to identify degree of correlation among independent variables and results, both (raw and modified) odds ratios and confidence intervals (CI) was measured. With outcome variable all independent t variables were associate with stunting. A p-value of $< 0.05$ was deemed statistically significant toward announce test.

**RESULTS**

**Table 1: The prevalence of stunting among children**

<table>
<thead>
<tr>
<th>Children</th>
<th>Total</th>
<th>Stunted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Total</td>
<td>400(100%)</td>
<td>170(42.4%) 230(57.5%)</td>
</tr>
<tr>
<td>Males</td>
<td>205(51.3)</td>
<td>75 (36.5%) 130(63.41%)</td>
</tr>
<tr>
<td>Females</td>
<td>195(48.7)</td>
<td>95 (48.7%) 100(51.28%)</td>
</tr>
</tbody>
</table>

In the above table, 400 children were taken purposively with anthropometric measurements. According to the table 1, overall, for both children (males and females) and by gender prevalence of undernutrition is given. Height for age “stunting” was the measure of linear growth of children and a reflection of “chronic undernutrition” as for the long period of failure toward receive the acceptable nourishment as an outcome of chronic illness or recurrent. In the present study results indication that, total 42.4% of both children in are moderately stunted (below -2 SD). Total males are 51.3% and stunted male children are 36.5%. While total female’s children are 48.7% and stunted female’s children are 48.7% according to this study.
In evidence a study in Pakistan shows that more than 2 children in a household at the age of five is highly associated factor of stunting (Mekonen et al., 2019, Berhe et al., 2019, Teshome et al., 2009). Child birth size had a negative sign with value of -.278 having strongly significant relationship. It illustrates that child birth size had strongly contributory stunting factor under 5 years children. Nevertheless, it had inverse relationship which explains that small child size at birth according their mother perception contributing factor for children stunting. Another study in Pakistan shows that children smaller birth size was strong factor of being stunting at the age of 5 in children (Abbasi et al., 2018). It is revealed that if a child born with small birth size having more chances of stunting, then other children (Tekile et al., 2019). Therefore, the size at birth strongly associated with among children. Household food security had positive sign with value of 0.219 having highly significant relationship. It depicts that as there is higher food security in household, children stunting is more likely to having the risks of stunting also high at significance of 0.00 level. However, according to the above results, more food insecurity is strongly associated factor of stunting among children 5 years. According most recent Pakistan National Nutrition Survey 2018, food security is 63.1% in Pakistan (NNS 2018). This study indicated household food security were contributed toward stunting among children (Sarma et al., 2017).

It had positive sign with value of 0.331 which shows strong relationship significant at 0.000 level. Poor hand wasting practice without soap strongly contributory factor of with a slightly increased risk of stunting in children. Handwashing with the cleansing agent as soap was intensely protective against prevalence of stunting. The World Bank’s conducted in Pakistan depicts that water poverty diagnostic in rural Punjab, only 25% of households having soap availability for handwashing and no respondents hand wash with soap before feeding children and only 7% respondents hand wash with soap after cleaning baby’s bottom or their latrine. This increases water infection (World Bank, 2018). In the model, the impact of poor colostrum feeding to child is identified the negative regression coefficient sign at -.259, it shows the strongly significant association at 0.00 percent level with stunting. In rural areas of Faisalabad mother are not aware about the benefits of colostrum feeding to child as pre-lacteal feed. Majority of mother in Pakistan are illiterate especially in rural areas they are not awareness regarding children’s health issues they just believed on traditional and cultural believes consequently discarded colostrum and think that it is dirty harmful milk. In evidence a study in Pakistan shows that 71% of mothers were discarded colostrum (Memon et al., 2006). Exclusive breastfeeding (EBF) had positive regression coefficient sign with value 0.278 show strong association at 1 percent level. According this study, prevalence of EBF is significantly lower than recommended WHO/United Nations Children’s Fund universal level of EBF less than six months’ children (Hossain et al., 2018). In addition, infants exclusively breasted prevent them from infection diseases than who had not

### Table 2: Socioeconomic associated stunting factors of children: A multiple linear regression analysis

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bi</td>
<td>Std. Error</td>
<td>βi</td>
<td>**</td>
</tr>
<tr>
<td>Number of children under 5 years</td>
<td>.146</td>
<td>.027</td>
<td>.254</td>
<td>5.381</td>
</tr>
<tr>
<td></td>
<td>-.263</td>
<td>.036</td>
<td>-.278</td>
<td>-7.377</td>
</tr>
<tr>
<td>Child birth size</td>
<td>.244</td>
<td>.069</td>
<td>.219</td>
<td>3.550</td>
</tr>
<tr>
<td>Household food security</td>
<td>.444</td>
<td>.054</td>
<td>.331</td>
<td>8.265</td>
</tr>
<tr>
<td>Hand wasting practice</td>
<td>-.265</td>
<td>.043</td>
<td>-.259</td>
<td>-6.169</td>
</tr>
<tr>
<td>Feed Colostrum to Child</td>
<td>.281</td>
<td>.044</td>
<td>.278</td>
<td>6.352</td>
</tr>
<tr>
<td>Exclusive breastfeeding (less than 6 months)</td>
<td>-.322</td>
<td>.058</td>
<td>-.305</td>
<td>-5.555</td>
</tr>
<tr>
<td>Dietary diversity food group</td>
<td></td>
<td></td>
<td>-.305</td>
<td>-5.555</td>
</tr>
<tr>
<td>R-Square 0.480</td>
<td>F = 51.695</td>
<td>P-Value (Significance) = 0.000**</td>
<td>** = Highly Significant</td>
<td></td>
</tr>
</tbody>
</table>

**RESULTS AND DISCUSSION**

It is evident from the above table that higher child number at the age of five years is highly associated cause of stunting. The value of regression coefficients is 0. 254 with positive sign which indicates that as the number of children under 5 years increased the risk of having stunting at 0.138, with significance level of 0.000.

Some researches results shows that more than 2 children in a household at the age of five is highly associated factor of stunting (Mekonen et al., 2019, Berhe et al., 2019, Teshome et al., 2009). Child birth size had a negative sign with value of -.278 having strongly significant relationship. It illustrates that child birth size had strongly contributory stunting factor under 5 years children. Nevertheless, it had inverse relationship which explains that small child size at birth according their mother perception contributing factor for children stunting. Another study in Pakistan shows that children smaller birth size was strong factor of being stunting at the age of 5 in children (Abbasi et al., 2018). It is revealed that if a child born with small birth size having more chances of stunting, then other children (Tekile et al., 2019). Therefore, the size at birth strongly associated with among children. Household food security had positive sign with value of 0.219 having highly significant relationship. It depicts that as there is higher food security in household, children stunting is more likely to having the risks of stunting also high at significance of 0.00 level. However, according to the above results, more food insecurity is strongly associated factor of stunting among children 5 years. According most recent Pakistan National Nutrition Survey 2018, food security is 63.1% in Pakistan (NNS 2018). This study indicated household food security were contributed toward stunting among children (Sarma et al., 2017).

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exclusive breastfeeding. Exclusive breastfeeding to providing the ideal food has been recognized as an unsurpassed means for good development and linear growth of child that has significant impact on the child and mother health (Duan et al., 2018). Likewise, results of this study present EBF as a contributor toward childhood stunting. According most recent Pakistan National Nutrition Survey 2018, exclusive breastfeeding rate is 48.4% in Pakistan while 44.3% in Punjab (NNS 2018).

Dietary diversity and basic food groups had negative regression coefficient value -.305 which shows strong relationship among variables. It depicts inverse relationship, as the minimum dietary diversity as less than four food group among children increased the prevalence of children stunting decreased. Above result evidence that minimum dietary diversity food group and stunting strongly associated among children age 0-23 months. According most recent Pakistan National Nutrition Survey 2018 results shows that only one in seven children (that is 14.2%) received minimum dietary diversity among 6–23 months children in Pakistan while 12.6% in rural areas (NNS 2018).

CONCLUSION
Prevalence of stunting is very high in “Faisalabad”. The results show that stunting associated factors was number of children under 5 years, child birth size, household food security, hand wasting practice, feed colostrum to child, Exclusive breastfeeding, dietary diversity and basic food groups.

RECOMMENDATIONS
Our study conclusions suggest that the stunting might be reduced if stunting contribute integrated interventions implemented to improved household, community and personal (child) level. Effort for birth spacing is very important because it directly affects number of under-five children, struggle to reduce poverty to increased food security. Strengthen community level activities to enhance for hygienic as hand washing practices to prevent children from infection diseases. Awareness at community-based nutrition campaigns should be conducted to promote feed colostrum to newborns and exclusive breastfeeding. The awareness programs regarding nutritious foods should be introduced that must be affordable at household and community level by the government by the participation and contribution of non-profit organizations (NGOs) to fighting the challenge of children undernutrition at the age of five years.

REFERENCES


