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ORIGINAL ARTICLE

Determinants of Stunting Among Under Five Children in Pakistan: A Cross Sectional Study

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ABSTRACT

Objective: To assess the nutritional status of children height-for-age (HAZ) and to determine multilevel risk factors contributing to stunting burden among children under five years.

Study Design: Community-based cross-sectional study

Place and Duration of Study: The study was carried out in four rural towns of Faisalabad district from July 2018 to February 2019.

Materials and Methods: A total of 400 children under five years of age were selected purposively. Anthropometric measurements were taken to assess the malnutrition (stunting) in children. A structured questionnaire was used to collect data. Data were analyzed by SPSS version 23.0. Univariate and bivariate analysis was used to check the correlation between dependent and independent variables.

Results: Overall, 42.4% of children were stunted (< -2 SD). Females were more stunted 48.7% than males 36.5%. Mothers' current age (26-30), higher number of children under five years, low birth interval (months), small birth size, household food insecurity, hand wash practice without soap, use of bottle to feed a child and not feeding colostrum to the child were factors significantly associated at ($p < 0.000$) with stunting.

Conclusion: Prevalence of stunting is very high in Faisalabad. It might be reduced if stunting integrated interventions will be improved and implemented at household and personal (child) level.

Key Words: *Factors, stunting, height-for-age, under five, children, Pakistan*

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INTRODUCTION

Height-for-age Z score (HAZ), below minus two standard deviations from the median of a reference population standard is referred as "stunting". It is a failure to achieve the potential linear growth, as a result of repeated and prolonged undernutrition occurrence starting from birth¹. Stunting is considered a better predictor of overall undernutrition among children. Globally, stunting affects members of children and having

severe long and short term health consequences including educational performance, increased risk of chronic diseases, lost productivity and poor cognitive development in childhood². Sustainable Development Goals (SDGs) pay high attention to draw the health issues and consequently, they have aimed to proceed a global target intended for 2025 to reduce undernutrition among under-five children and then maintaining it³. More than half (55%) Of all under-five stunted children live in Asia⁴. In 2018 Globally, stunting continues to be

present in an estimated 149 million (21.9%) children under-five years. Pakistan Demographic and Health Survey (PDHS) 2017-18 results show that almost 38% of children in Pakistan are moderately stunted (below -2 SD), while 29.8% are stunted below -2 SD in Punjab⁵. In this paper, we studied the complex phenomenon of undernutrition with contributing factors which are multilevel and multifactorial and directly linked to individual, household and community-level. However, in Pakistan stunting has received little attention. This is might be due to lack of awareness, resources, cultural barriers or other restrictions:

- i) Immediate (individual) level, encompassing inadequate/insufficient dietary intake and infectious diseases (such as malaria, pneumonia, measles and diarrhea) found at the child level and are considered outcome factors.
- ii) Underlying (household) level, contains food insufficient access, insufficient health-care services, inadequate care and unhealthy environment at household level as well as mediated by immediate factors.
- iii) The basic (community) level, include insufficient potential and current resources at the public/societal level. The community's structures provide for immediate and underlying determinants context.⁶ Here, it is very important to examine a range of individual, household and community factors and measure their level of influence on children's health under-5 year in Pakistan to informing policy development.

MATERIALS AND METHODS

It was a cross-sectional community-based study that was conducted by multistage random sampling. The study was conducted to determine factors causing stunting in under-5 children in district Faisalabad. The sample size was calculated based on a single proportion of the population equation $z^2 \times p \times q/d^2$, using the assumptions as 95% confidence level (CI) and 5% error margin. Approximate proportion (P) of stunting is (38%) according to (PDHS, 2017-18) that is present among children below 5 years. Therefore, the estimated sample size for the prevalence of stunting in children was 400.

Anthropometric measurements including the height and weight of the children were taken.

The face-to-face structured-interviewer-administered questionnaire was administered to mothers of children below five years. Verbal consent was obtained from mothers of children for data collection. The questionnaire was translated into the local Punjabi language. SPSS version 23.0 was to enter and analyze the data. The WHO 2006 Anthro 3.2.1 software was used to convert children's height, weight and age (months) into height-for-age (HAZ) Z-scores⁷. To determine stunting among children, international criteria <-2 SD were used for anthropometric classifications. Frequencies and chi-square test were used to analyze various variables to identify factors associated with stunting.

RESULTS

Prevalence of stunting among under five children: In this study, anthropometric measurements (height and weight according to age) were taken in 400 children. Stunting or "height-for-age" is a measure of linear growth in children and results indicate that overall, 42.4% of children were moderately stunted (below -2 SD). Total percentage of males was 51.3% and stunted male child were 36.5%. While percentage of total female children was 48.7% and stunted females children were 48.7% (table 1).

TABLE 1: Prevalence of stunting among children under five years in Faisalabad, Pakistan

Children	Total (%)	Stunted (%)	Not stunted (%)
Males	205 (51.3)	75 (36.5)	130 (63.41)
Females	195 (48.7)	95 (48.7)	100 (51.28)
Total	400 (100.0)	170 (42.4)	230 (57.50)

TABLE 2: Frequency distribution of subject characteristics with individual, household and community-level factors of children under five children

Respondent Current Age (Years)	Frequency	Percentage
Below 20	9	2.3
20-25	108	27.0
26-30	117	29.3
31-35	83	20.8
36 and above	83	20.8
Total	400	100.0
Mean = 3.31, SD = 1.143		

Number of children 5 and under		
1	60	15.0
2	145	36.3
3	155	38.8
4 and above	40	10.0
Total	400	100.0
Mean = 2.44, Std. Deviation = 0.865		
Birth interval (in months)		
No previous birth	28	7.0
Less than or equal to 24	281	70.3
Above 24	91	22.8
Total	400	100.0
Mean = 1.16, SD = 0.523		
Child birth size		
Small	72	18.0
Average	288	72.0
Large	40	10.0
Total	400	100.0
Mean = 1.92, SD = 0.524		
Household food security		
Secured	292	73.0
Not Secured	108	27.0
Total	400	100.0
Mean = 1.27, SD = 0.445		
Hand wash practice		
Soap	339	84.8
Plain water	60	15.0
Ash	1	.3
Total	400	100.0
Mean = 1.17 SD = 0.369		
Materials used to feed the child		
Spoon	66	16.5
Cup	72	18.0
Hand	64	16.0
Bottle	198	49.5
Total	400	100.0
Mean = 2.97 SD = 1.157		
Fed colostrum to the child		
No	150	37.5
Yes	250	62.5
Total	400	100.0
Mean = 0.63 SD = 0.585		

The study sample was 400 mothers/caregivers of children. All the individual, household and community-level factors are shown in table 1. The mothers were selected under the age category of 15-49 (reproductive age) years. Most of the respondents (29.3%) were in the age category of 26-30 years, 27.0% respondents were 20-25

years old, 20.8% mothers were 31-35 year old and 2.3% respondents' ages were in the category of below 20 years. Whereas, 20.8 % of respondents' ages were 36 and above years. The mean and standard deviation of the current age of the mothers was 3.31 years \pm 1.143, respectively. Almost, 15.0 present of the respondents had 1 child, whereas, 36.3 present of the respondents had 2 children, 38.8 present of the respondents had 3 children and 10.0 present of the respondents had 4 and above children under five years. The means of value is 2.44 and the standard deviation is 0.865. 28 percent children were "first born". Birth interval was equal to or less than 24 months in 70% children and in 20.8% children it was more than 24 months. The mean and SD for the data was 1.16 and 0.523, respectively.

Size of the child at birth, according to their mothers' perception was inquired 18.0 percent of children had small birth size. The majority of respondent's children (72%) belonged to average birth sizes and 10.0 present had large birth size. The mean and SD value for the data was 1.92 and 0.524, respectively. About, 73.0 present of respondents were living in the house that had food security. The mean and standard deviation of the values of the data were 1.27, and 0.445, respectively.

The majority of respondents (84.8 present) washed their hands with soap, 15.0 present respondents washed their hands with plain water. However, .3 present respondents washed their hands with ash. Majority of the mothers (49.5 percent) used a bottle, 16.5 percent of mothers used a spoon, 18.0 percent of mothers used a cup, and 16.0 percent of mothers used a hand to feed a child. The majority of the respondent's (62.5 percent) fed colostrum to children.

The respondents current age (26-30), higher number children under five years, low birth interval (months), small birth size, household without food security, hand wash practice without soap, use bottle feed to child and not feeding colostrum to the child were factors associated with stunting under five children (table 3).

TABLE 3: Determinant factors associated with stunting under five children in Faisalabad, Pakistan

Contributing Factors	Stunting		Total (%)	Chi-square	Gamma	Sig. Level
	No (%)	Yes (%)				
Respondent current age (26-30)	22 (18.8)	95 (81.2)	117(100.0)	115.226	0.626	0.000
Higher number children under five years	6 (16.7)	30 (83.3)	36 (100.0)	51.212	0.535	0.000
Low birth interval (months)	124 (44.1)	157 (55.8)	281 (100.0)	105.610	0.270	0.000
Child having small birth size	14 (19.4)	58 (80.6)	72 (100.0)	52.049	-0.562	0.000
Household without food security	136 (46.6)	156 (53.4)	292 (100.0)	52.818	0.770	0.000
Hand wash practice without soap	11 (18.3)	49 (81.7)	60 (100.0)	46.013	0.785	0.000
Use of bottle to feed the child	76 (38.4)	122 (61.6)	198 (100.0)	65.897	0.613	0.000
Not feeding colostrum to the child	110 (44.0)	140 (56.0)	250 (100.0)	30.077	-0.522	0.000

DISCUSSION

It is evident from the results that females are more stunted (48.7%) than males, while mothers age between 26-30 are associated with stunting among children under five years. Nurme Alam et al reported that the age of mothers was significantly associated with childhood malnutrition⁸. Higher number of under 5 children is strongly associated with stunting. Some studies that were conducted on same lines revealed that the household with two or more children under 5 years is a strong risk factor for stunting^{9,10}. Another study in Pakistan shows that small birth size was a strong factor of being stunted among under five years of age children¹¹. Tekile et al also report that children born with small birth sizes are more likely to be stunted than children born with larger birth sizes¹². According to the most recent Pakistan National Nutrition Survey 2018, food security is 63.1% in Pakistan. This study indicated household food security contributed toward stunting among children.

In rural Punjab, only 25% of households have soap availability for hand washing and no respondents washed hands with soap before feeding children and only 7% respondents washed hands with soap after cleaning baby's bottom or their latrine. This increases water borne infections¹³. The majority of mothers in Pakistan are illiterate especially in rural areas. They are not aware of children's health issues and just follow in traditional and cultural stereotypes consequently they discard colostrum and think that it is dirty harmful milk for child feed. In evidence, a study in Pakistan shows that 71% of mothers discarding colostrum¹⁴. According to different studies, children who did not get colostrum were more

likely to be malnourished rather than those whose children who were colostrum.^{15,16}

CONCLUSION

The prevalence of stunting is very high in Faisalabad. In this study contributing factors toward stunting are the number of children under 5 years, birth size, household food security, hand washing practices and not feeding colostrum to the child. Stunting might be reduced by implementations of integrated intervention aimed at improving practices at household level as well as at the level of the child community-level activities to enhance hygienic practices should be enforced to prevent children from infectious diseases.

Conflict of interest: There are no conflicts of interest.

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