

ASSESSMENT OF NUTRITIONAL STATUS OF THE FARM FAMILIES WITH SPECIAL FOCUS ON PRIMARY SCHOOL CHILDREN IN PAKISTAN

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Abstract

Purpose of the study: The main purpose of this study was to assess the nutritional status of farm families with a special focus on primary school children in Punjab.

Methodology: This study was conducted in tehsil Jaranwala, Faisalabad. Five villages and two primary schools were selected from each village randomly. From these schools, 323 children whose fathers were farmers were selected as samples. A cross-sectional research design was used for the present study. In this context, an interview schedule was prepared and face-to-face interviews were administered to collect the required data.

Main Findings: The chi-square analysis confirmed that education, and income of parents associated factors had a statistically significant ($P < 0.05$) and positive correlation with BMI. Descriptive statistics indicated poverty was ranked 1st among reasons for malnutrition followed by inappropriate dietary choices and unavailability of healthy foods with mean values of 4.25 and 4.11, respectively. Whereas, children don't want to come to school due to poor health" was ranked 1st in all effects of poor health with a mean value of 4.50.

Applications of the study: This study has highlighted the importance of the nutritional status of primary school-going children and also investigates the different factors that inverse impact on their health. This study will be proved helpful among farm families by creating awareness about the nutrition of children. Based on the findings of this study, the urge to the government to take steps to improve the literacy level and build strategies to improve the awareness level of mothers about the nutrition of children, especially in rural areas.

The novelty of the Study: This is the first study that investigates the assessment of the nutritional status of school-going children of farm families in Punjab, Pakistan especially in tehsil Jaranwala, Faisalabad.

Keywords: Diet, Nutrition, Adults, Farm families, Factors, Malnutrition.

INTRODUCTION

A balanced diet is a prerequisite need of every human being, as described in the "convention on children's rights." It is very important for every individual, especially for children, to be free from poverty and hunger to be physically fit and maintain better mental health ([Neumann et al., 2004](#); [World Bank Report, 2012](#); [Joshi, 2012](#)). But in Asian countries such as Pakistan, India, and Sri Lanka, microscopic nutrition is the leading cause of malnutrition among farm women and in their children ([Raza et al., 2019](#)). Malnutrition affects the physical and cognitive development of children ([Ahami et al., 2020](#)). It has long-term adverse effects on children particularly in middle and low-income countries ([Umeokonkwo et al., 2020](#)). It has long-term consequences on children leading to adolescence ([Adetunji et al., 2019](#); [Bansal, 2017](#)).

It is an estimated about 38.2 million children under the age of 5 years were malnourished. At the same time, malnutrition is a severe problem that is silently increasing worldwide and causing about 3 lac deaths of children every year ([WHO, 2020](#); [Chattha et al., 2019](#)). Pakistan is a country in transition and now facing both problems of overnutrition and undernutrition ([Galal, 2002](#)).

Large family size, early marriages, higher birth rate, low income, and lack of breastfeeding and exclusive breastfeeding were major reasons for malnutrition in children ([Asim, 2018](#)). Research revealed that nutrient deficiencies and poor health in children of primary school age are the main reasons for low enrolment in schools, low-level classroom performances, high absent rates, and early dropouts ([Muller and Krawinkel, 2005](#)). The effects of long-term malnutrition on children's health and physical well-being are as follows: delay in child's motor skills development and low physical growth, decreased I.Q. level, growing behavioral problems, lack of social skills, and more chances of getting sick ([Black et al., 2003](#); [Zengin and Karatas, 2019](#)).

Primary school children need more attention regarding their physical and mental growth in order to meet the requirement of their health. In this context, different campaigns related to nutritional programs were implemented by government or donor agencies in developing countries. Therefore, this study is designed to identify the nutritional gap at the ground level to realize the current situation of tehsil Jarawala.

AIM AND OBJECTIVE OF THE STUDY

The principal aim of this study was to evaluate the nutritional status of school-going children of farm families. The main objectives of the research were; to assess the nutritional status by determining the BMI of primary school children of farmers; to analyze the effect of nutritional status on student's educational performance and to suggest research-based suggestions to improve the nutritional status of primary school children.

MATERIALS AND METHODS

This study was conducted in tehsil Jaranwala, Faisalabad. Five villages and two primary schools were selected from each village to evaluate the nutritional status of primary school children who belonged to farming families. There were ten primary schools located in these selected villages. Total 2033 Children were studying in these schools in session 2019-2020. From these schools, 323 children who belong to farm families were selected randomly. An interview schedule was prepared, and face-to-face interviews were administered to collect the required data. The weights and heights of the respondents were measured and BMI was calculated to assess nutritional status. The age of respondents was noticed from school records. Weight was calculated in kilograms by using the weighing machine. The respondents' height was calculated in centimeters with the use of measuring tape by standing the respondent against the wall. To calculate BMI a formula was used that is

$$\text{BMI} = \text{Weight (kg)} / \text{height (m)}^2$$

These three parameters were calculated and compared against the CDC growth charts developed by the centre for disease control and protection. CDC growth charts were developed in 2000 and it consists of a set of charts for infants and children of age 2-20 years old. In this study, CDC growth charts specially developed for 2-20 years old children and adolescents are used. These charts include percentile curves that indicate overweight, obesity, stunting, and wasting (Kuczmarski, 2002). These charts include the following type of percentile curves.

Percentile curves for BMI

BMI falling in 85th -95th percentile showed the risk of being overweight; less than 5th percentile shows Underweight and more than 95th percentile showed overweight. In table 8 showing the BMI percentile.

Data analysis

After the data collection, data were further investigated and interpreted to draw conclusions and make essential recommendations. The most suitable statistical methods engaged in computing the several values and their analysis were pronounced. Descriptive and inferential statistical tests were used with the help of the Statistical Package for Social Sciences (SPSS) to find out results and draw a conclusion.

RESULTS AND DISCUSSION

Demographic characteristics

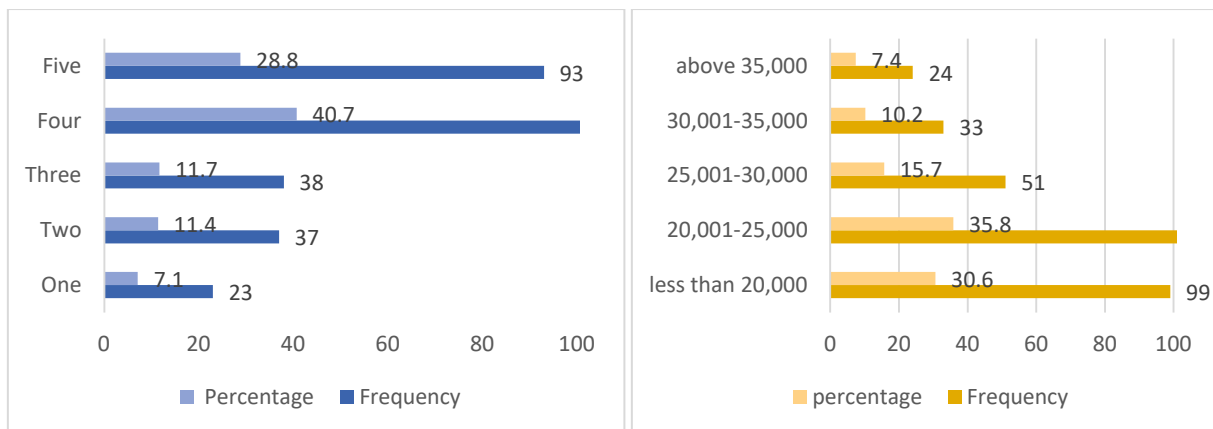


Figure 1: Distribution of the respondents according to their education **Figure 2:** Distribution of the respondents according to their head household income

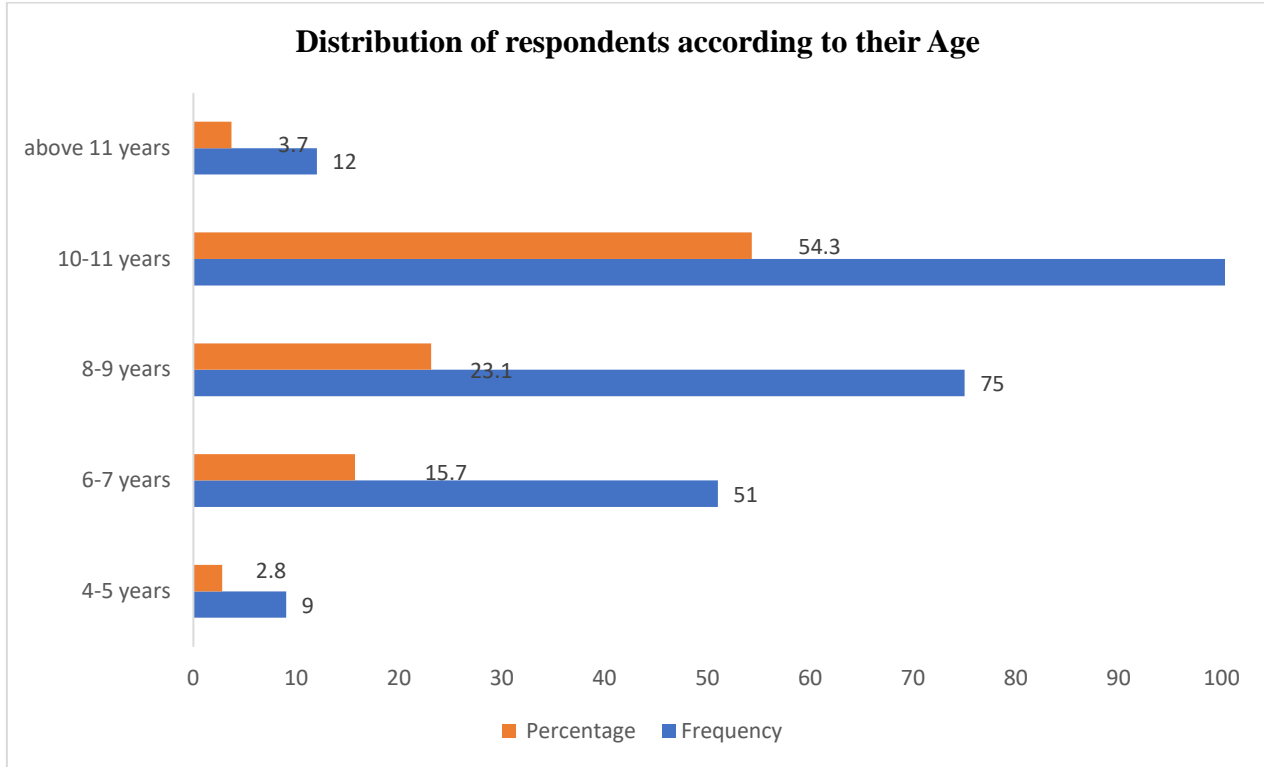


Figure 3: Distribution of the respondents according to their age

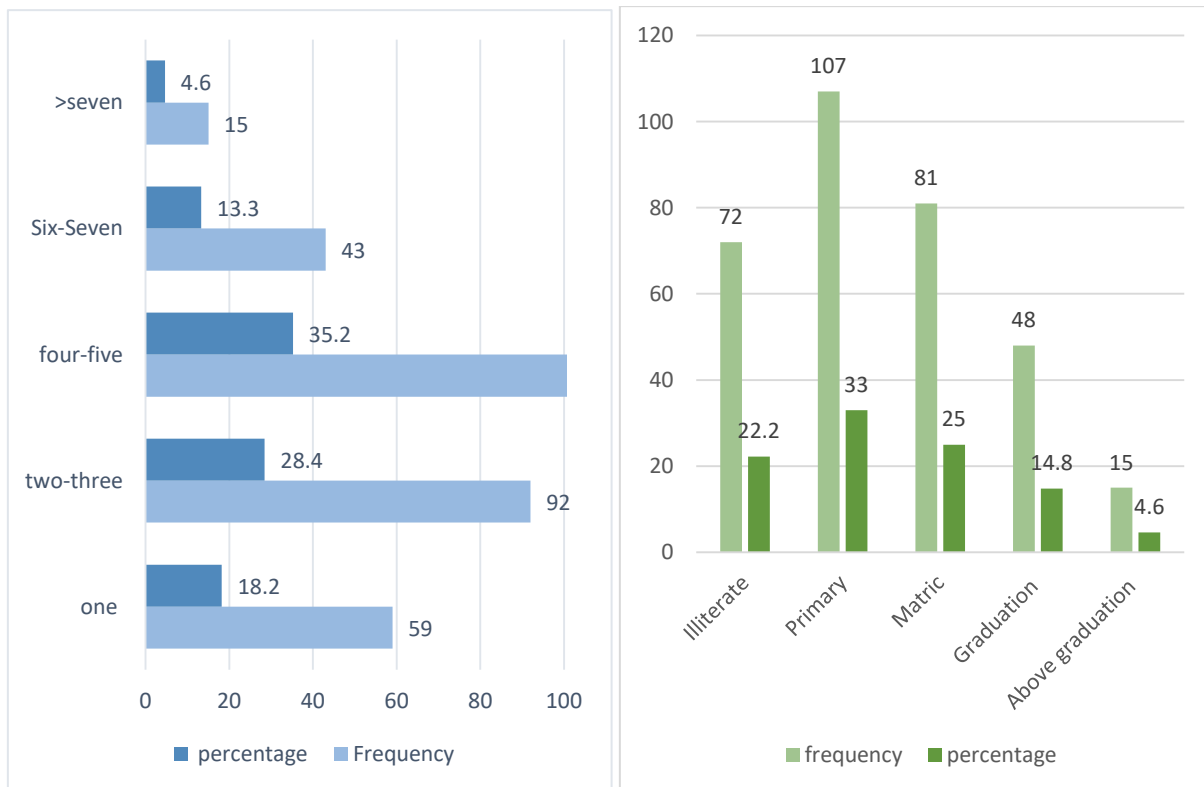


Figure 4: Distribution of the respondents according to **Figure 5:** Distribution of the respondents according to their no. of sibling their mother education

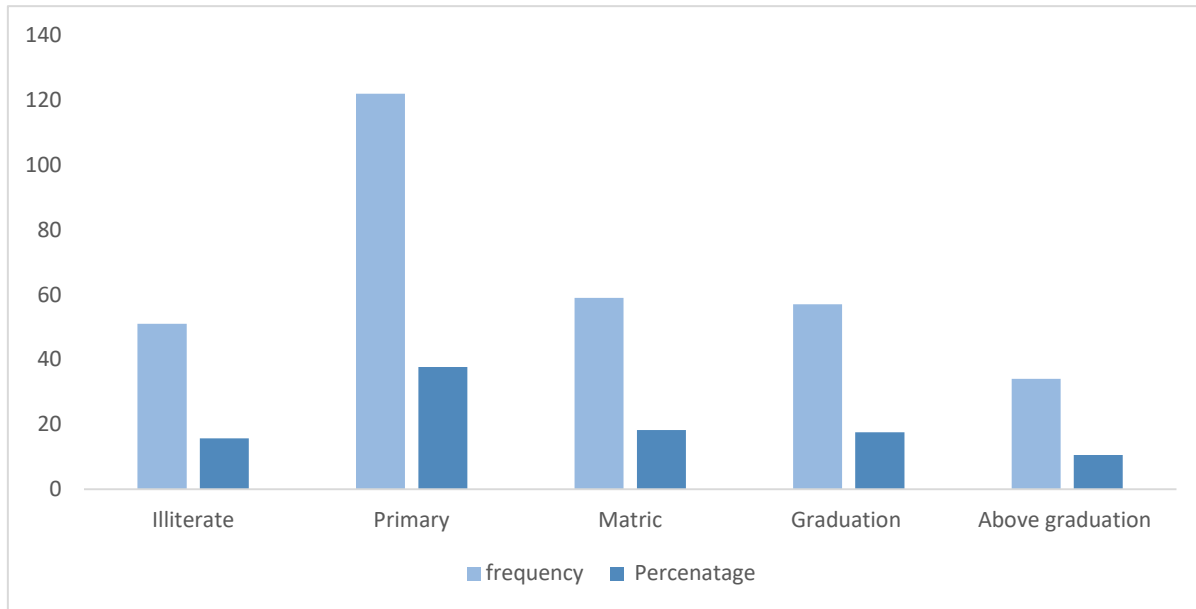


Figure 6: Distribution of the respondents according to their father education

Figure 1 indicates more than one-third of the respondents belonged to the 4th class, i.e., 140 (40.7%) out of 323 respondents. Figure 2 displays 30.6% of the respondent's household income was less than 10,000. One-third of the respondent's household income (35.8%) was between 10,001 to 15000. Figure 3 indicates that a small proportion of students (2.8%) and (5.3%) of age 4-5 five years and 8-9 years respectively. The majority of the respondents had the age of 10-11 years old while less than one-fifth (15.7%) was aged 6-7 years and almost 23.1% of the respondents were above 11 years. Less than one-third (28.4%) had 2-3 siblings and one-third (35.2%) had 4-5 siblings. A small proportion of respondents (4.6%) had more than 7 siblings. Some respondents with 6-7 siblings were found 13.3% as presented in figure 4. Whereas, Figure 5 illustrates that 33% (107) of the mothers having passed primary and 25% (81) had studied up to matric. An only a small proportion of mothers (4.6%) had qualified above graduation. More than one-fifth of respondent's mothers (22.2%) were illiterate. Out of 323 respondents, only 14.8% of respondent's mothers were graduates. [Mahmood et al. \(2016\)](#) associated malnutrition of children with mothers' education as the prevalence of malnutrition was higher in children of mothers with no or deficient level of education. Figure 6 shows the father's education of respondents. Less than one-fifth (15.7%) of the fathers were illiterate. More than a third of the respondents were primary pass, which was 37.7% (122). Only a small proportion of fathers (10.5%) were qualified above graduation level, and less than one-fifth (17.6%) were qualified. Figure 6 also confirmations that less than one-fifth of the respondents (18.2%) were matric pass. Babar et al. (2010) stated that father education is an important determinant and positively impacts a child's nutritional status.

Table 1: Relationship between education and body mass index of students

	BMI Percentile				Total
	Less than 5	5-85	85-95	More than 95	
Illiterate	24	36	6	6	72
	33.3%	50.0%	8.3%	8.3%	100.0%
Primary	25	73	6	3	107
	23.4%	68.2%	5.6%	2.8%	100.0%
Matric	15	60	6	0	81
	18.5%	74.1%	7.4%	0.0%	100.0%
Graduation	15	23	10	0	48
	31.3%	47.9%	20.8%	0.0%	100.0%
Above graduation	3	12	0	0	15
	20.0%	80.0%	0.0%	0.0%	100.0%
Total	82	204	28	9	323
	25.4%	63.2%	8.7%	2.8%	100.0%

Chi-square = 33.438^a d.f. =12 P-value = .001* Gamma = .03 *Significant

The gamma Value (.03) shows a positive correlation between mother qualification and BMI. The chi-square value (35.438) shows a significant relationship between mother qualification and BMI. The table shows that 33.3% of the illiterate mothers were underweight, 50% had normal nutritional status, while 8.3% and 8.3% of children of illiterate mothers were at the risk of being overweight and overweight, respectively. 68.2%, 74.1%, and 80% of children of the primary pass, matric pass, and above graduate mothers showed normal nutritional status.

Table 2: Relationship between household income and body mass index of students.

	BMI Percentile				Total	
	Less than 5	5-85	85-95	More than 95		
Household Income	less than 10,000	33	49	15	2	99
		33.3%	49.5%	15.2%	2.0%	100.0%
	10,001-15,000	34	76	6	0	116
		29.3%	65.5%	5.2%	0.0%	100.0%
	15,001-20,000	9	42	0	0	51
		17.6%	82.4%	0.0%	0.0%	100.0%
	20,001-25,000	6	24	3	0	33
	18.2%	72.7%	9.1%	0.0%	100.0%	
	above 25,000	0	13	4	7	24
		0.0%	54.2%	16.7%	29.2%	100.0%
Total		82	204	28	9	323
		25.4%	63.2%	8.7%	2.8%	100.0%

Chi-square = 96.284 d.f. =12 P-value = .000* Gamma = .023*Significant

The gamma Value (.023) shows a positive correlation between household income and BMI. The chi-square value (96.284) shows a significant relationship between household income and BMI. Table indicated that 49.5% of children with a monthly household income of less than 10,000 had normal nutritional status, 33.3% were underweight and only 2% were found to be overweight. Prevalence of being overweight was found more in children. Prevalence of being overweight was found more in children who had a monthly household income of above 25,000 rupees as no child was found overweight whose monthly household income was 10,001 to 25000 rupees while 29.2% children were found overweight having a household income above 25,000 rupees. No child was found underweight whose monthly household income was above 25,000 rupees, while only 18.2% of children were underweight whose monthly household income was between 20,000 to 25,000 rupees.

Table 3: Ranking of food items taken for breakfast by primary school children

Food items	Mean	SD	W.S.	R.O.
Tea	3.70	1.134	1195	1
Paratha	3.54	1.025	1145	2
Biscuit/ cake/ rusk	3.47	1.084	1122	3
Egg	3.06	0.610	988	4
Pickle	2.78	0.974	898	5
Roti	2.58	0.979	832	6
Butter milk	2.37	0.984	767	7
Bread	2.27	0.678	734	8
Fruits	1.59	0.764	514	9
Any other	1.41	0.540	455	10
Milk	1.39	0.647	449	11

Consumption of teas was found at number one among all the food items that children take for breakfast, with a mean value of 3.70. The paratha was found in 2nd place among all the food items taken by primary school children for breakfast with a mean value of 3.54. Biscuits/ cakes and rusk were ranked 3rd among food items with a mean value of 3.47. Egg, pickle, and roti were ranked 4th, 5th, and 6th among food items with mean values of 3.06, 2.78 and 2.58, respectively. Buttermilk, bread, and fruits were ranked 7th, 8th, and 9th among food items with mean values of 2.37, 2.27, and 1.59 respectively.

Table 4: Ranking of junk food items consumed by primary school children

Junk food items	Mean	SD	W.S.	R.O.
Samosa	3.20	0.932	1033	1
Chips	2.75	1.047	888	2

Fitter	2.50	0.737	807	3
Any other	1.77	0.975	571	4
Chocolates	1.66	0.802	536	5
Sweets	1.59	0.686	513	6
Shawarma	1.26	0.886	407	7
Burger	1.08	0.792	348	8
Sandwiches	0.95	0.680	307	9
Pizza	0.75	0.535	242	10

1=Never, 2=Rarely, 3=Sometimes, 4=Very Often, 5=Always

Different types of junk foods were ranked 1-10. The samosa was ranked 1st among all junk foods eaten by children with a mean value of 3.20. Chips were at 2nd position with a mean value of 2.75, followed by fitters with a mean value of 2.50. Chocolates and sweets were in 5th and 6th place among junk foods eaten by primary school children with a mean value of 1.66 and 1.59. Pizza was the last number among junk foods eaten by primary school children understudy with a mean value of 0.75. Junk foods have low or no nutritional value, and eating junk foods is increasing very rapidly in Pakistan. Children like to eat junk food due to its taste and the easy availability of these types of foods around the schools. Junk foods are the main cause of obesity and chronic diseases in children.

Table 5: Ranking of dairy food items consumed by primary school children

Dairy food items	Mean	SD	W.S.	R.O.
Tea	4.08	0.901	1317	1
Yogurt	3.40	1.015	1098	2
Milk	3.21	0.993	1037	3
Butter Milk	3.09	0.801	998	4
Any other	1.89	0.735	610	5
Cream	1.65	0.703	534	6

1=Never, 2=Rarely, 3=Sometimes, 4=Very Often, 5=Always

Dairy products are an important source of protein which is a necessary element of the diet. Different types of dairy products were ranked 1-6. Tea was ranked 1st among dairy products consumed by primary school children with a mean value of 4.08, followed by yogurt and milk with mean values of 3.40 and 3.21, respectively. Buttermilk was ranked 4th in dairy products eaten by children with a mean value of 3.09. The cream was ranked at the last number among dairy products eaten by children with a mean value of 1.65. Apart from these dairy products, some other dairy products were ranked 5th in the list with a mean value of 1.89.

Table 6: Ranking of fruits according to their consumption by primary school children

Fruits	Mean	SD	W.S.	R.O.
Mango	2.61	0.457	843	1
Any other	2.59	0.757	836	2
Guava	2.48	0.641	801	3
Orange	2.19	0.747	707	4
Date	2.06	0.937	665	5
Grapes	2.00	0.774	646	6
Watermelon	1.77	0.866	571	7
Apple	1.70	0.860	549	8
Mellon	1.51	0.762	487	9
Apricot	1.48	0.850	478	10
Peach	1.40	0.715	452	11
Pomegranate	1.35	0.815	436	12

1=Never, 2=Rarely, 3=Sometimes, 4=Very Often, 5=Always

Fruits are essential to maintain nutritional status because fruits are a major source of many essential nutrients under-consumed, including potassium, dietary fiber, vitamin C, and folic acid. In the above table, different fruits were ranked 1-12. Mango was ranked first in all the fruits eaten by primary school children with a mean value of 2.61. Guava and orange were ranked 3rd and 4th among fruits eaten by children with mean values of 2.48 and 2.19, respectively. After these, dates were at

4th number among fruits eaten by children with a mean value of 2.06 and grapes were at 6th number with a mean value of 2.00.

Table 7: Ranking of animal meat according to consumption by primary school children

Animal meat	Mean	SD	W.S.	R.O.
Chicken (Broiler)	2.39	0.562	771	1
Fish	1.09	0.770	352	2
Beef	1.00	0.626	323	3
Mutton	0.80	0.479	258	4
Chicken (desi/indigenous)	0.55	0.385	177	5
Any other	0.30	0.547	97	6

1=Never, 2=Rarely, 3=Sometime, 4=Very Often, 5=Always

Different types of meats eaten by primary school children were ranked 1-6. The chicken was ranked 1st among animal meat consumed by primary school children with a mean value of 2.39, followed by fish with a mean value of 1.09. Beef, mutton, desi chicken, and other types of meats were ranked at 3rd, 4th, 5th, and 6th in the list with mean values of 1.00, 0.80, 0.55, and 0.30, respectively. Meats such as chicken, beef, and mutton are all rich in protein. A balanced diet includes protein from meat. Red meat is the source of iron and different essential vitamins.

Table 8: Distribution of the respondents according to their nutrition status

BMI percentile	f	%
Less than 5	82	25.3
5-85	204	63.1
85-95	28	8.6
More than 95	9	2.8
Total	323	100

The table indicates the nutrition status of children under study. Out of 323 children whose BMI was determined, 63% fall in the 5th to 85th percentile range of CDC growth charts which means they had normal nutrition status. 25.3% were below the 5th percentile and 8.6% were between 85th to 95th percentile range which means 25.3% were underweight and 8.6% were at the risk of being overweight. Just less than 3% were found overweight as they fall in more than the 95th percentile.

Table 9: Ranking of reasons affecting the nutritional status of primary school children

Reasons	Mean	SD	W.S.	R.O.
Poverty	4.61	0.607	1490	1
Inappropriate dietary choices	4.25	0.662	1374	2
Unavailability of healthy food	4.11	0.974	1327	3
Lack of awareness about healthy food	2.80	1.226	904	4
Lack of access to healthy food	2.68	1.180	866	5
Parental other preferences	1.72	0.974	555	6

1=Strongly Disagree, 2=Disagree, 3= Neither disagree nor agree, 4=Agree, 5=Strongly Agree

Different reasons for malnutrition were ranked 1-6. The above table indicated that poverty was ranked 1st in reasons of malnutrition with the mean value of 4.61 followed by Inappropriate dietary choices with a mean value of 4.25. Unavailability of healthy food was ranked at 3rd position with a mean value of 4.11. Lack of awareness about healthy food, lack of access to healthy food, and parental other preferences were ranked at 4th, 5th, and 6th positions with mean values of 2.80, 2.68, and 1.72, respectively.

Table 10: Ranking of different effects of nutritional status on educational performances of primary school children

Effect	Mean	SD	W.S.	R.O.
Don't want to come to the school due to poor health	4.50	0.753	1453	1
Feel tired at school	4.19	0.947	1352	2
Get poor grades due to poor health	3.98	0.925	1284	3
Miss the school due to poor health	3.69	1.133	1191	4
Lost interest due to poor health	3.59	1.145	1161	5



Face difficulties in completing homework due to poor health	3.55	0.922	1147	6
Leave the school at the break due to poor health	3.32	1.040	1072	7
Miss the class due to poor health	2.56	1.228	828	8

1=strongly Disagree, 2=Disagree, 3= neither disagree nor agree, 4=Agree, 5=Strongly Agree

Poor health condition affects the educational performance of children. A different factor of poor health was rank 1-8. It is depicted from the table that "children don't want to come to school due to poor health" was ranked 1st in all effects of poor health with a mean value of 4.50. "Children feel tired at school" and get poor grades due to poor health" were ranked 2nd and 3rd in effects of poor health with mean values of 4.19 and 3.98. Poor health also causes by the absence of children from school and "miss the school due to poor health" was ranked 4th in effects of poor health with a mean value of 3.69. Children also lost interest in studies due to poor health and results showed "lost interest due to poor health" was ranked 5th with a mean value of 3.59. Children also felt it difficult to do homework due to poor health and its mean value was 3.55 on the table, which meant children often found it difficult to do homework due to poor health. Mean values of "leaving the school due to poor health" and "miss the class due to poor health" was 3.32 and 2.56, respectively, and were ranked at 7th and 8th number.

DISCUSSION

Many studies ([Ashakiran & Deepthi 2013](#); [Yahya, 2013](#)) revealed that eating junk foods in Pakistan has grown up rapidly in the last decades especially at a young age, which causes health-related problems ([Kuzwayo, 2008](#); [Hogan & Burstein, 2007](#); [Kim & Lee, 2008](#); [Jafar et al., 2008](#); [Khan & Azad, 2011](#); [Ergin et al., 2007](#); [Faber & Wenhold, 2007](#)). Almost 38% of children in Pakistan were stunted in growth due to this their academic performance was adversely affected ([Asmare et al., 2018](#); [Acharya et al., 2019](#); [Lokeesan et al., 2015](#); [Marwat et al., 2018](#); [Lodhi et al., 2010](#); [Hirani, 2012](#)). The educational status of mother and father children were found to be significantly associated with children's health ([Aziz et al., 2018](#); [Adamu et al., 2012](#); [Qureshi et al., 2017](#)). The impact of parent's education was associated with a child's awareness regarding nutrition ([Burchi, 2012](#); [Babar et al., 2010](#)). The educational level of the household had a positive effect on children's nutritional status. Limited resources were also major factors in the nutritional status of children ([Crowther et al., 2006](#); [Eman et al., 2005](#); [Al Farooq et al., 2020](#)). Monthly income and parents' health are associated with children's health and education ([Anwer & Awan, 2003](#); [Archer, 2007](#); [Bose, 2020](#); [Blossener & De Onis, 2005](#)). Similarly, [Batool et al. \(2012\)](#) reported that the majority (82.9%) of underweight children in primary schools belonged to families with low income. Among primary school children, 20-80% are suffering from nutritional problems ([Fazili et al., 2012](#); [Best et al., 2010](#)). Evaluation of nutritional status at this early age is necessary to improve overall health ([Fazili et al., 2012](#); [Handa et al., 2008](#); [Bhutta et al., 2017](#); [Golam et al., 2014](#); [Hamid et al., 2008](#)). To improve mental and physical health and enhance the quality of life, any individual needs to have proper nutrition status ([Neumann et al., 2004](#); [Frongillo, 1999](#)). The nutritional status of school-going children was improved through the implementation of the nutrition screening program and intervention strategy by the government ([Asmare et al., 2018](#)).

CONCLUSION AND RECOMENDATIONS

Children under 15 years of age are mostly affected by malnourishment. Unhealthy dietary habits and ignorance about the proper eating schedule of farming families are important considerations that cause malnutrition. In a developing country like Pakistan, poverty, lack of government support and illiteracy are the leading causes of malnutrition in farming families. Natural disasters and warfare are also included in this list to increase malnutrition. Malnutrition leads to severe diseases and morality, especially in infants and adolescents, and puts extra pressure on a farming family's already minimal resources. Despite the increase in awareness about nutrition in Pakistan, for last few decades, there is still no major improvement regarding nutrition in villages, especially children of farming families with little or very little awareness about nutrition. Farm families were lower socioeconomic status, large family size, food insecurity and low literacy rates that are the leading causes of malnutrition This study recommended that social, economic, political changes and personal education are required to improve the nutritional status of school-going children.

LIMITATIONS AND FUTURE THRUST

This study was conducted in one district due to financial and time constraints. The current research would provide an in-depth analysis of nutritional status of local students and the findings can be used for the policy level recommendations and for real benefits to the local district as well as other districts of Punjab.

AUTHOR'S CONTRIBUTION

Mr. Hussain Sardar conducted this research, Dr. Rana Muhammad Amir supervised this research, and others all authors are equally contributed to this research.

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