Physical Education, Health and Social Sciences

https://journal-of-social-education.org

E-ISSN: 2958-5996

P-ISSN: 2958-5988

Primary School Children's' Nutritional Status in Gilgit-Baltistan, Pakistan: Variations, Concerns and Suggestions

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DOI: https://doi.org/10.63163/jpehss.v2i4.477

Abstract

The purpose of this cross sectional study was to assess the status of nutrition of primary school kids from the disadvantaged region of Gilgit-Baltistan, Pakistan. The study involved a sample of primary school students (N = 815). Using the anthropometry protocols by WHO (2019), two key indicators of nutrition, Height, and Weight of the primary school students were measured. Both descriptive and inferential statistical tools were used to analyse the data. To assess the existing status; Height for Age Z scores (HAZ) was calculated through WHO Anthro Plus software 2007 and Body Mass Index (BMI) percentile values were calculated. Rresults revealed that the overall prevalence of stunting among primary school students was as high as 63%, with a significant gender disparity (higher among females). Among the school going children 55.5% children were found to be underweight while only 24.7% 'healthy'. In the 'Severely Stunted' group, Gilgit district had higher number of students, that is, 57% (171/413), and District Skardu had 43% (130/402). Higher rates of undernutrition observed among students enrolled in public schools than the private schools. The findings of this study underscore the urgent need for targeted interventions to improve the nutritional status of primary school students, particularly among girls and those attending public schools to reduce the malnutrition. In addition, the effectiveness of the already being-run-programs' also need to be assessed, reassessed for their effective utilization.

Key Words: nutrition; malnutrition; health; education; height; weight

Introduction

Nutrition is the field of science that deals with the processes related to food and its nutrients with respect to health; including growth and development, maintenance of the body and immunity (World Health Organization, 2003). Concerns over environmental issues globally has put the children at risk. Health concerns are more arising from the underdeveloped countries, especially the ones with ever increasing population. Pakistan is one of the countries which is facing the challenge of overpopulation, thus children are at higher health risks. Assessing nutritional status as an individual's physiological health conditions, which is influenced by the intake and utilization of nutrients (Todhunter, 1970), is thus of high importance in order to address health concerns among the populace, in general and the school going children in particular, who are severely

malnourished. Although the nexuses of health and education is widely recognized, yet this area has remained out of sight of both health and education departments. Healthy nutritional status is an essential element of interest specifically at early ages for proper cognitive, physical and mental development (WHO, 2021). A healthy body and healthy mind is correlated with the proper intake of nutrients. Furthermore, with healthy nutritional status body becomes immune to chronic diseases; diabetes, cardiovascular disease and many viral diseases (WHO, 2020). Poor nutrition directly or indirectly influences performance of the students at any stage of the study. According to Seyoum, et al. (2019), there could be many factors behind the underperformance and low motivation of the students and young children in their academic performance, most obvious reason is the lack of proper nutrition.

The importance of the nexus of health and education can also be found in Maslow (1943) who identified physiological needs as another bridging concept between education and health. Physiological needs fall at the base in the pyramid of the Maslow's hierarchy of needs. Maslow suggested that to progress at advanced or higher level one must fulfill the basic biological needs.

Recently many studies have established the disparity of educational opportunities mostly associated with health concern especially of brain functions for better learning. Studies also indicate early nutrition being key to the health and active participation of an individual in their future lives (Alaimo et al., 2001; Galal & Hulett, 2003; Opoola, Adebisi & Ibegbu, 2016).

There are different techniques to measure the nutritional status: four basic assessment methods are summarized as ABCD methods. A stands for Anthropometry, B is for Biochemical method, C for Clinical method and D for Dietary history method (WHO, 2003). Major indicators of under-nutrition are stunting, wasting and underweight prevalence (Schmidhuber & Shetty, 2005). A study by Mian Ferroni and Underwoo (2002) had indicated a high prevalence of malnourished children i.e. 44% including severe malnutrition (15%) among school going children was observed in Pakistan (Mian, et al., 2002). There are very few studies with recent updates on the status of nutrition, especially among school going children in the context of Gilgit-Baltistan. Studies show nearly 20 million children out of school. Those studies and reports indicate that Pakistan has been lagging far behind (Masood et al., 2024) that the crises of energy which is affecting all other SDGs. According to Saad et al. (2019, p.1), "Sustainable Development Goals (SDGs) have become central focus worldwide due to their favorable outcomes in health, environment, sustainability, quality of life, and economic development." It requires the proper knowledge and data which focus on the well–being of the students, specifically, primary school children are at the most crucial period of their lives that determines the physical, psychological, emotional and cognitive development in their futures. Keeping this background and need in mind the current study aims to explore the status of nutrition among the school-going primary level children in the context of Gilgit Baltistan.

Literature Review

Nutrition in educational context

Nutrition is the term used medical sciences (WHO, 2003). "Nutrition" is defined as the scientific study of all the biochemical processes that contribute to the consumption and utilization of food, to keep body healthy (Oxford Dictionary, 1999). It's a field of science of its own that deals with the components of the food (Carbohydrates, fats, proteins, minerals, vitamins and water) and the energy they provide in calories to the living body (National Library of Medicine, 2015). Likewise, WHO (2003) states that nutrition is the knowledge of growth and development, maintenance of the body and immunity (Siagian & Halisitijayani, 2015).

Theories form medical sciences, cognitive sciences as well as social sciences seem to converge on matters related to human health and nutrition. The relevance of the study of nutrition to the context of education sector that the nutrition related deficiencies can lead to lowering cognitive abilities of the children which affect the learning performance (Endalew, Muche & Tadesse, 2015; Senbanjo, et al., 2011). Many studies have explored the association between healthy nutritional status and the academic performance and intellectual ability of students (e.g., Mukudi, 2003; Ivanovic et al., 2004; Pollitt, 1990; Senbanjo, et al., 2011; Schmidt, Strack & Conde, 2018; Themane et al., 2003), admitting that children with unhealthy diet exhibit poor learning level and poor conceptual knowledge (Kim, S., & Kim W. & Kang, 2013). Studies also depicted the outcomes of nutrition deficiency such as lack of attention on the lecture, concentration problem and hyperactivity disorder (Siagian & Halisitijayani, 2015; Schmidt, et al., 2018). According to El-Adeham et al. (2016), students who lack standard level of nutrition in their body face difficulty in learning and storing knowledge.

A more comprehensive theoretical frame of relevance of nutrition with in education context is the 'Motivation' theory of Maslow (1943), which identified Physiological needs (food and clothing), as primary important factor for motivation. Physiological needs are essential to meet by students for proper physical growth and perform better. Furthermore, primary school is an important stage in the development of consciousness and personality of the child. At this level balanced nutrition is of paramount importance for the social, emotional, physical and cognitive growth of children. Besides, balanced nutrition is crucial for endurance, physical growth, cognitive development and productivity (Opoola, Adebisi & Ibegbu, 2016).

Under-nutrition is a major public health challenge affecting academic school achievement (Duyar & Pelin, 2010). Policies focusing on the development of the students' consciousness and their personality development at the primary school level are prerequisite in the process of increasing human capital and the future knowledge economy. After all, these goals can only be materialized through investing in the development of the children providing them basic health facilities and the required foods in their mental growth at their door steps. Supply of adequate and quality food has been a major issue in developing countries. Along with that, the school going children, especially at primary school level lack basic knowledge about nutrition in their daily foods (Nnebue, 2016). Due to this significant association between the nutritional status and the learning of students, both educationist and health experts have been showing their concerns on the no or low quality food in under-developing countries. Numerous studies (Shariff et al., 2000; Alderman et al., 2001; Glewe et al., 2001; Aturupane et al., 2011) explored that the different indicators of unhealthy nutritional status critically influencing the cognitive ability of the students.

Indicators of Nutritional Status

There are different indicators used to measure techniques to determine a person's nutritional status. These techniques are also called ABCD methods. A stands for Anthropometry, B is for Biochemical method, C for Clinical method and D for Dietary history method. Out of all these techniques, Anthropometry is the most widely used technique around the world to assess the health status of children (Wang, et al., 2000). Anthropometry involves the systematic assessment of human body. It includes the measurement of height, weight, body mass Index, body and head circumferences. In 2018, American Academy of Pediatrics (AAP) published that in children the Anthropometry ("Anthropometry", 2018) technique can assist to examine under-lying nutritional and medical issues in children. With respect to age and gender of the children it is highly recommended to consider the standard deviation z-scores for the assessment of nutritional status of children (Onis, et al., 2009). For this purpose, the World Health Organization's (WHO, 2017) criteria of Child Growth Standard Medians is mostly used all over the world for observation in

children's weight and height growth as per age and gender. According to WHO (2017), stunted growth is low height that is more than two standard deviations below the WHO Child Growth Standards median. Besides, when children consume poor nutrition, they develop low weight-for-height, it is called wasting, whereas, wasting is termed as weight-for-height z-score (WHZ) below − 2. Prolonged malnourishment can also develop complications as underweight in children. When children gain low weight-for-age, then they are labeled as under-weight.

Nutrition Status among Children in Pakistan

According to the NNS report by UNICEF (2018), in Pakistan the nutritional status of children under five years of age is deeply concerning. A study conducted in Islamabad depicted that the nutritional status of children (5-10 years old) is low (Mian, et al., 2002). According to Mian et al. (2002), 44% including severe malnutrition (15%) among school going children was observed in Pakistan (Mian, et al., 2002). According to National Nutrition Survey (2018) 40.2% under five years of age children are stunted in Pakistan while it is 46.6% in Gilgit Baltistan. The major cause of under-nourishment is linked with poor nutrition; taking low quality and low quantity food. Malnourishment has major health and life related implications including academic performance of children. According to Riaz, et al. (2010) the prevalence of stunting and under weight ratio is high among students in the Rawalpindi city. In the context of Gilgit, a few public sector or NGOs based reports have indicated that stunting and wasting heavily prevails among the children of age 5 to 15 (National Nutrition Survey, 2018). In Gilgit Baltistan Multiple Cluster Indicator Survey (MICS) and National Nutrition Survey (NNS) are conducted by Government of Pakistan frequently to study prevalence of malnutrition however, there is scarce of studies about existing nutritional status among primary school children, especially with a focusing on variations between school system and gender across districts.

Measures

Based on the aims of the study, a quantitative cross sectional research design was employed to collect data from primary graders from the schools of Gilgit Baltistan. Gilgit Baltistan, an administrative province of Pakistan in the extreme North of Pakistan, comprising of ten districts. For this study, two of the districts namely Gilgit and Skardu were selected as these two district are the hubs of the population in Giglit-Baltiatn province of Pakistan, with majority of the 1.5 million population concentrated in the headquarters and main cities Gilgit and Skardu. The survey was conducted on the randomly selected primary schools (from around 1200 primary schools) of Skardu and Gilgit districts. All the primary school students of the districts Skardu and Gilgit were the targeted population of the current study. To explore the variation of nutritional status across districts, students were selected keeping in view of the population proportion of children across school system (public and private) and gender wise. Thus a proportional stratified random sampling technique was employed. First schools were selected from each district based on the ratio of their respective population of primary schools. Then from within each district further stratification was made into public and private school, followed by an even further stratification of boys and girl's schools. Hence, a total of 815 children were surveyed.

To record the data of anthropometric measurement, a questionnaire measuring students' nutritional status [QMNS] was developed. The QMNS was comprised of two major sections: Demographic Information and the Checklist for recording students' nutritional status based on the key indicators of nutritional status (Weight, Height). Height, Weight were measured in centimeters through the standard instruments. To collect accurate data Anthropometry protocols by WHO (2019) was followed. To measure the height of the children, a stadiometer was used. The child has stand straight in front of the scale with shoulder and heels touching the back of the stadiometer

and straight hanging arms. Then, the head piece was dropped down to the level of the head of the child. The measurement was repeated twice and two readings were recorded within 0.2 cm or 0.25 inches. To measure the weight of the child, a portable weight scale was used. Before, taking readings, extra clothes and shoes of the child were removed. For ethical considerations the school principals and class in charges were requested to accompany researcher while taking measures.

Analysis and results

The results of the analysis about the number of students Districts, School System and Gender are presented in Table 1.

Table 1 Demographic Information of Participants

Districts		**School System**		**Gender**	
		Public	**Private**	**Boys**	**Girls**
Gilgit = 413		207	206	207[a]	206[b]
Skardu = 402		200	202	202[c]	200[d]
Total	**815**	**407**	**408**	409	406

Note. [a] 101 boys from private and 106 from public. [b] 105 girls from private and 101 from public. [c] = 105 from private, 95 from public. [d] = 105 from private, 95 from public.

As shown in Table 1 that among the 815 participants (413 from Gilgit, 402 from Skardu) were selected, out of which 409 (50%) were boys and 406 (50%) were girls, which has been shown in further bifurcation from each district as can be seen in rows. Among boys, 198 (48%) were from private while 211 (52%) were from government schools. Among girls, 210 (52%) were from private while 196 (48%) were from government schools.

Descriptions of 'age' across participants

To explore the average age of the participants across different variables, descriptive statistics of frequencies were run. Results are given in Table 2.

Table 2 Participant' Information on Age

Demographic Variable	**Level**	**Mean**	**SD**	**Min**	**Max**
District	Gilgit	10.27	2.01	6	15
	Skardu	10.46	1.89	6	16
School System	Public	10.535	1.94	4	16
	Private	10.195	1.898	5	15
Gender	Male	10.62	1.911	5	16
	Female	10.11	1.911	4	14
Mean of mean=10.37 years					

As Table 2 shows that the average age of the participants was 10.37 years. Boys (10.62 years) were slightly older than girls (10.11 years). Within school system, students (11.21 years) from public schools were older than students (10.03 years) from private schools. To describe age related details in means, we would not recommend readers to make a quick conclusion about nutrition status as mean values without specific age group considerations can results in misleading judgment of the nutrition.

Description of 'Weight'

To explore the average weight of the participants across different variables, descriptive statistics were run. Results are given in Table 3.

Table 3 Weight Analysis of Participants

Variable	Level	Mean	SD	Min	Max
District	Gilgit	25.045	7.621	13	60
	Skardu	24.003	5.781	12	51
School System	Public	23.86	6.919	13	56
	Private	25.19	6.609	12	60
Gender	Male	25.75	6.500	13	56
	Female	23.299	6.865	12	60
Mean of mean=24.52 kg					

As shown in Table 3, the average weight of the participants was 24.52 kilograms. Boys (25.75 kilograms) were slightly heavier than that of girls (23.29 kilograms). Within school system, students (25.19 kilograms) from private schools were heavier than students (23.86 kilograms) from public schools.

Descriptions of Height

To explore the average height of the participants across different variables, descriptive statistics were run. Results are given in Table 4.

Table 4 Height across Demographics

Demographic Variable	Level	Mean	SD	Min	Max
District	Gilgit	130.661cm	22.102	89	199
	Skardu	131.278cm	23.648	99	210
School System	Public	122. 683cm	14.126	89	162
	Private	139.430cm	26.57	99	210
Gender	Male	134. 082 cm	23.483	89	210
	Female	128.030 cm	21.835	91.44	199
Mean of mean=131.027 cm					

According to Table 4, the average height of the participants was 131.027 centimeters. Boys (134.08 cm) were slightly taller than that of girls (128.03 cm). Within school system, students from private schools (139.05 cm) were taller than students from government schools (122.78 cm).

4.8 Descriptive Analysis Based Nutrition Status Categories

In previous section a description of overall distribution of sample based on original data of age, height, weight, which gave an overall view of the distributions of these indicators across the sub-sample categories. In this section, we analyzed the same dividing each indicator nutrition status based on certain cut-off values for height, and weight for a certain level of age (e.g., marginally or severally stunted based on the value of Height for Age-Z Scores, and Weight in percentile ranges).

Height for Age Z Scores (HAZ)

Stunting was categorized or classified in four categories against Z scores as Normal, Marginally Stunted, Moderately Stunted and Severely Stunted. For this study Z scores were

computed based on Height and Age of students of primary schools, through WHO AnthroPlus software 2007. It displays z-scores and provides results for the nutritional status indicator. The results are presented in Table 6 (for n=815).

Table 6 Classification Nutrition Statuses of Sample Based on Height-for-age-Z

Status Classification	Z scores	Frequency	Percent	Stunted (%)
Normal (Well nourished)	-1 < HAZ < 0	301	36.9	
Marginally Stunted (Mildly Malnourished)	-2 < HAZ < -1	129	15.8	
Moderately Stunted (Moderately Malnourished)	-3 < HAZ < -2	211	25.9	47. 2%
Severely Stunted (Severely Malnourished)	HAZ < -3	174	21.3	

As shown in Table 6 the differences in the frequencies in each category was obvious, which was also tested using Chi-square goodness of fit test. At confidence level of .05 there was found a statistically significant difference as X^2= 160.488, df= 3, p=.000. A high number of students n=385 (47.2%) fell under the category of moderately to severely stunted categories, while only 36.9% were in the category of normal healthy condition.

Body Mass Index (BMI) (N= 759)

The second indicator of the nutritional status was BMI of students. For the interpretation of the BMI in children it has to be expressed as a percentile. To calculate the number of students against different categories of BMI frequencies were run on SPSS. Results are presented in Table 7.

Table 7 Classification of Nutrition Statuses of Sample for BMI Categories

Categories	Frequency	Percent
Underweight	452	55.5
Healthy Weight	201	24.7
Overweight	48	5.9
Obesity	58	7.1
Total	759	93.1

Comparison across Demographics

Difference between districts, school system and gender based on HAZ

To carry out comparisons the Height-for-Age-Z of the students across demographics, analysis was carried out across districts first. Since the Statuses included three categories (Normal, Marginally Stunted, Severely Stunted), and the Demographic or the Independent Variable was District (Gilgit and Skardu). Chi-square test was run to assess the significance of the difference between the two districts. The difference between frequencies of the nutrition status under height was statistically significant between the two Districts (χ^2 = 9.943, df= 2, p = .007, 2-sided. Cramer's V = .110 (p=.007, small effect). Results for the first indicator height for Age-Z score showed that the 'Normal' category for Gilgit had 196 (45%) cases while for Skardu, there were 235 (55%). In the categories of 'Marginally Stunted' there were 46 (55%) students from Gilgit,

while 37 (45%) from Skardu. Similarly, in the 'Severely Stunted' group, Gilgit had higher number (171/413) 57% while under the same category 130 out of 402 (43%) were from District Skardu. This indicated an overall better nutritional status is found for Skardu as compared to District Gilgit. The difference was significant across frequencies of categories of nutrition status based on HAZ for the school system with large effect size (χ^2 = 80.91, df= 2, p = .000, 2-sided. Cramer's V = .314 (p=.000). Overall, the private school students were better.

Next we analyzed the difference between gender. There was variation in the four categories, however, we noted the number under the 'server stunting' category. Out of a total of 288 students in 'server stunting' category, males were 167 (57%), and the number of females was 121 (43%). However, females were high in the category of marginal stunting (64%) as compared to the male counter parts (30/83 =36%). For an overall difference in the frequency the Chi-square based results also showed significant difference [χ^2 = 27.809, df= 2, p = .000], however, with a small effect size (Cramer's V = 185).

Difference between districts, schools' system and gender based on BMI

Gender based on the BMI categories again showed a significant difference. With females (259/452=57%) being higher in the 'Underweight' category than their male counterparts (193/452= 43%). Similar pattern was found for the other categories. The difference significant (X^2 = 21.784, df= 3, p = .000, 2-sided) with a medium effect size as Cramer's V = .169.

Districts wise, the BMI showed that for the class of underweight, healthy weight, overweight and obesity, there were 225, 101, 22, 29 children respectively for district Skardu. For District Gilgit the frequencies showed 227, 100, 26, and 29 respectively against each of these categories. Unlike height-for-age-z, here on BMI, there was found no statistically significant difference (X^2 = .314, df= 3, p = .978, 2-sided).

On BMI, the two school systems were significantly different (X^2 = 21.784, df= 3, p = .00, 2-sided) with a medium effect size (X^2 = 12.205, df = 3, p = .007, 2-sided). In the 'Stunting' category', the private school students were 93, and 119 public schools. The frequencies in each category showed better nutrition for private schools. However, out of 288 in sever category 225 students were from private schools, which was a bit odd, and thus we recommend further probe for future researcher. On BMI, there was also found a statistically significant difference based for gender (X^2 = 21.784, df= 3, p = .00, 2-sided). Although there seems to be a significant difference but when considered the 'severity' of stunting both

Discussion

Results revealed that the prevalence of stunting among students was identified as a major concern, with a significant number of students experiencing moderate to severe stunting conditions. According to the study, 47.2% were found to have stunting. This result is almost consistent with the WHO (2021) report that in Asia 46% of the children are stunted. The findings are also in agreement with the studies by Acharya et al. (2019) and Marwat et al. (2018), authors who revealed that in Pakistan almost half (38%) of children are stunted in their early ages. Moreover, a report 'The State of the World's Children 2021' by UNICEF indicated that Pakistan has the highest percentage (37%) for the indicator Stunting compared to the world (22%). The analysis of Body Mass Index (BMI) indicated that the prevalence of underweight is very high (55.5%). Most of the students have BMI less than 5th percentile, suggesting a relatively negative overall weight status among the students. The prevalence of under nutrition among students in Gilgit and Skardu is quite high. A similar study carried out in Pakistan revealed that 45% of the children are underweight (Hamad, et al., 2016). It has also been revealed through different studies that primary school children up-to 20 to 80% have nutritional complications (Best et al., 2010;

Fazili et al., 2012). However, the trends of overweight (5.9%) and obesity (7.1%) in the students is minimal. The findings are relatable to the National Nutrition Survey (2018) where only 9.5% children were found to be overweight in Pakistan. Another important aspect explored in this research is the variation in nutritional status based on MUAC. Mean value for students (M=16.90; SD=2.37) depicted that overall the students are malnourished with low nutritional status. Majority of the students (52.5%) were undernourished falling below cut off points across both age groups. While, 47.4% students were well nourished with TFNC (2016) recommendations. Findings revealed that some of the students (N=227) were severely malnourished.

In congruence to the findings of the present study, the results of Baig, et al. (2006) and Khuwaja, et al. (2005) are parallel to the results of current study that female children are three times more prone to stunted growth than male children. This trend of low weight and height among females is due to gender discrimination and cultural malpractices regarding health and hygiene in Pakistan (Riaz et al, 2010). However, disparities in health status of male and female can be determined by several factors as physiology (Herrador et al., 2014), socio-economic factors (Risman, Froyum & Scarborough, 2018), caloric intake (Herrador et al., 2014) and infectious disease (Black, et al., 2008).

Similarly, there was significant difference between school systems across all the demographic variables. Results showed that the mean values for private schools is much greater, indicating a private school students have better nutritional status as compared to their counterparts in public sectors school. Although our data showed a significant higher number of students from private sector schools under the 'severe stunted' category indicating the risk for the private schools. We searched for other studies regarding this 'odd' difference. One such study we found was the study of Mehboob, Arif and Arif (2021), which showed that public school students were more under nourished or malnourished than private school students. Low or poor health status of public school students was understandable as many studies have pointed out that most of public school student came from low socio-economic backgrounds. Ali, Ayub and Hussain (2015) have also concluded that poverty and underprivileged economic status has close association with undernutrition and can effect children's nutritional status. In many cases, especially illiterate parents hardly keep record of their kids properly so the findings should be viewed and assessed keeping this limitation in mind.

We would like to discuss our findings with regard to age of our sampled school children as the WHO based categories of nutrition statuses do involve consideration for age in days. By the time the data was completed in 2023, the age of our sample of students ranged from 5-17 years, with a mean of 10 on the overall sample. This made the analysis of to be cautionary interpreted, mainly because of two reasons. One is the presence of extreme cases in significant number could not be removed from the analysis in order to save the originality. Second, we observed it to collect accurate data on age related variables was problematic, mainly because we relied on the existing school records or asked from students themselves while measuring their heights and weights. Thus accuracy of age could not be properly verified. This may have caused more children in the 'marginally stunted, or 'severally stunted' categories. However, with this limitation of some bias in data, the WHO based categories are more considered to be reliable as the WHO AnthroPlus software 2007 calculates height for a certain age, which then puts the sample into the indicated categories, corresponding to their nutrition status.

Conclusion and recommendations

The study aimed to explore the nutrition status of children in Gilgit-Baltistan through the anthropometry methods, focusing on primary school student's nutrition statuses in terms of their

height and weight corresponding to their age. A high number of students (47%) fell under the category of moderately to severely stunted, while only 36.9% were in the category of normal healthy condition. For the interpretation of the BMI in children it has to be expressed as a percentile. Thus, World Health Organization International Obesity Task Force (WHO, 1998) recommended BMI categories and corresponding percentiles according to which the 5th and 85th percentile of BMI range is consider as healthy weight. Beyond these boundary values children are either considered overweight or underweight. In our case, we found the prevalence of underweight is very high (55.5%).

Regarding the impact of demographics, the study indicates to work with the following levels of population for targeted actions and interventions. District Gilgit as compared to Skardu is becoming speedily overpopulated, hence the nutrition status of children need more care and monitoring. Next focus could be the public sector schools, while keeping the private sectors schools also under monitoring. The private sector schools can be taken into confidence in this regard with the help of targeted legislations and community support. Within these specific areas of population, female students may need more attention of educationist, health department as well as parents of the children for specific targeted action. We recommend more studies into various aspects of nutrition and health for further verifications and clarification as we conducted this current study using our own limited resources.

However, based on our study, we can make following recommendations:

(a) The school management needs to include into their key responsibly to strategize for the wellbeing of schools kids in their schools, clean and hygienic environment. A continuous monitoring of school canteens and food providing workers should be made a priority to ensure cleanliness, which is a significant contributor to the nutritional status.

(2) Development and implementation of a comprehensive nutrition education curriculum for primary schools can cover topics such as healthy eating habits, balanced diets, and the importance of nutrition for growth and development.

(3) Moreover, strengthen and expand school meal programs, ensuring they meet the nutritional requirements of students by collaborating with local authorities, NGOs, and community organizations to ensure the availability of nutritious and culturally appropriate meals.

(4) Schools can organize special meeting, and events to sensitize parents in order to ensure their involvement in the movement of healthy conditions both at homes as well as at schools. To the government of Gilgit Baltistan, it is recommended to chalk out special comprehensive nutrition education programs focused on promoting healthy eating habits, educating students, parents, and teachers about balanced diets, and providing access to nutritious meals within school premises. In this regard, there is a need to create a channel maximize corroboration between education and health sectors.

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