Nutritional Factors Associated With Tonsillitis Among the School-going Children of District Mardan

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Abstract—The aims of the study are to explore Nutritional factors associated with tonsillitis among the school-going children of aged 4 to 15 years in the local area of District Mardan. Institutional based cross-sectional study design was used. In the current research work a total of 500 samples were isolated from school-going children. In which 150 (30%) were found positive for nutritional deficiency with Tonsillitis. The samples collected from male and females students of age 4-15 years. Among the all samples nutritional anemia was found more frequent 60(12%), leading by malnutrition 50(10%), moderate prevalence were shows by underweight 20(4%) and stunting 16(3.2%) prevalence rate. while very low frequency was shows by wasting 4(1.6%) while the prevalence of tonsillitis was 45(9%) respectively. Out of 500 children the number of male was slightly higher than females. Nutritional Anemia and malnutrition were observed in the study in the school-going children respectively. The prevalence of nutritional Anemia among the study population varied with age. Children of the 12–15 years group had a significantly high prevalence of nutritional Anemia compared with the lower age group. It is concluded that all the nutritional factors strongly correlated with tonsillitis infection.

Keywords: Anemia, BMI, nutritional status, malnutrition, Undernutrition

I. INTRODUCTION

Variety of poor outcomes including growth retardation, historically, the science of nutrition developed in and development of psychosocial difficulties. Water low 1995 of disease entities brought about reported that etiology of linear growth retardation is by inadequate diet[1].Nutritional status is the condition of multi-factorial but has been explained by three major health of an individual as influenced by nutrient intake factors: poor nutrition, high levels of infection and utilization in the body[2]. In developing world, approximately nutrients in preparation for rapid growth of adolescence 146 million children are underweight[3].Therefore, it becomes very important to know the nutritional status of school going children; the building machine was used to measure the body weight to the blocks of state and country and hence the present nearest 0.5 k[4]. Malnutrition is a major public health problem in Pakistan, a South Asian nation with over 130 million people. Half of its children aged five years or less are stunted, over a third (38%) are underweight, and a quarter of all births are low birth weight [5]. These high levels of malnutrition contribute to about half of the 740,000 child deaths that occur every year in Pakistan [6]. In view of the scale of the problem in children under five, nutritional programmes in Pakistan during the last few decades have been targeted at this age group. However, malnutrition is a significant problem in older children as well, a fact that is often overlooked by policy makers and program managers[7]. Though little is known about the state of nutrition in this older group, studies conducted in the 1980s indicate that malnutrition is a significant problem in this population, with prevalences ranging from 47-70% in male school children in rural Pakistan[8].The situation among school-aged children in urban squatter settlements in Pakistan is even less well known. These settlements contain a large proportion of the rapidly growing urban population,with high levels of malnutrition already documented in the under-five child population[9].To assess the nutritional status of 7-10 year old Anthropometric. Nutritional assessment is a depth evaluation of an individual food, nutrient intake lifestyle and their medical history. Nutritional assessment of collecting information in order to make decisions about the nature and cause of nutritional related health issues that can effect an individual. we can evaluate the nutritional status of an individual by using these components whether, he or she is obese overweight or underweight. Because obesity and overweight may lead to chronic diseases such as diabetes, heart failure, hypertension and so on. While under nutrition can lead to osteoporosis getting frequent ill, teeth, skin and hair problems, iron deficiency anemia, malnutrition, pre-mature birth. In 2015, the

study on teachers indicate that 34% were overweight, 16% were anemic and 2% had thin-built. According to WHO the prevalence of obesity has been doubled and 2.8 million individuals died due to obesity and 15.8 billion were considered obese.[10] another study was conducted on females of Pakistan showed that approx 60% of the population consumed less than recommended daily allowance and 40% consumed less than 80% of the recommended daily allowance. In Pakistan 19.9% lactating females consumed calories less than 70% of the recommended dietary allowance while 54% a pregnant female in Pakistan were anemic as compare to India, were more than 50% of the populations were anemic, while iodine deficiency also has significance effects on poor pregnancy outcomes. A high mortality rate in Pakistan is due to under nutrition and almost 25 to 30% of babies under 25,00g at the birth. And low birth weight is a significant reason behind high mortality and this high mortality rate was due to poor availability and accessibility of food. Workload and pressure of house-hold work directly effects on the nutritional status of females.[12] A study was conducted on depression, anxiety and stress level of female school teachers according to the study teaching not only affect physically but also mentally because a lot of energy is used in the class rooms ,in family commitments, which is a source of stress and depression..in Egypt primary teachers take 24classes per week, while secondary level teachers took 18classesper week. The study indicated that 61.3%had teaching experience more than 10years while 91%teachers were not satisfied with their pay scale. The prevalence of severe, moderate and mild depression were (0.7%,2.8%and 19.7%),while the prevalence of extremely severe, moderate and mild anxiety level was (19.7%, 7.0% and 23.2%). These results showed that there is need to bring interventions to overcome such issues and order to prevent teachers from increasing psychological issues which would affect mentally and physically on nutritional status of teachers [13] Stunting is associated with impaired cognitive development, reduced academic achievement, and decreased physical work capacity in adulthood, with a negative cost on the economic development of societies. While the global stunting prevalence fell from 39.6 to 23.8% between 1990 and 2014, the scenario is quite different in Africa, with an increase . Nevertheless, in some localities in the Mount Cameroon area, the prevalence of stunting fell from 49.9% to 17.1% [14]. The impact of nutritional status on malaria may differ due to the heterogeneity of the population under study, species of the parasite, and other factors involved in the host and parasite relationship.

II. METHODOLOGY

This observational, cross sectional study was conducted in Takht Bhai District Mardan from May 2023 to October 2023. After ethical approval, students of 4-15 years were selected from the Govt schools located in this area. Demographic information along with weight and height of the selected children were taken and plotted to gender specific, growth charts.

The School Health Program was carried out on regular basis in the Rural Block. For the purpose of the present paper, the survey was findings from schools surveyed from May 2023 to October 2023 were included. The age of the children was determined using school records. In the schools nutritional status of children were assessed as follows: Weight: Measured using a floor type weighing scale with due respect to the standardization of the equipment and procedure. The measurements were taken to the nearest .5Kg. Height: well taken using a measuring tape applied to the wall. The measurements were taken with children barefoot with their back of heels, buttocks and head touching the wall. Readings well be taken to the nearest.

5cm.WHOz- score system were used to classify the nutritional status of children.

A. Study Area and Period

First, confirm that you have the correct template for your paper size.

B. Study Design

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C. Study Population

All secondary and primary school students (age group wise the source population, whereas sampled or selected students were the study population of this study.

D. Sample Size Determination

A Total of 500 children between the ages of 4-15 years were studied. A systematic random sampling technique was applied for sample collection.

E. Lab Investigations and Tests: All patients were subjected to:

Complete Blood count and reticulocyte count. Patients with microcytosis underwent the following:
1) Serum Iron and ferritin
An automatic hematological analyzer and Biochemistry analyzer were used for clinical examination

F. Routine blood tests

This is done to assess anemia and other vitamin and mineral deficiencies. There may be dehydration, low blood sugar and signs of severe infection as is evident by raised while blood cell counts.

G. Diagnosis of malnutrition in children

In children weight and height is measured and compared with the charts showing the expected average height and weight for a child of that age. Some children are persistently smaller for age and may be genetically so.

H. Blood tests in children

Routine blood tests in children include those for blood glucose, blood counts, urine for routine examination. Levels of iron in blood, folic acid and vitamin B 12 are also done. For protein estimation other tests including Normal ranges of ferritin 10 to 150 ng/mL for children 4 years to15 years. MCV normal range is 80 to 95 for children

III. ANALYSIS & INTERPRETATION

Before you begin to format your paper, first write and save the content as a separate text file. Complete all content and organizational editing before formatting. Please note sections A-D below for more information on proofreading, spelling and grammar.

Keep your text and graphic files separate until after the text has been formatted and styled. Do not use hard tabs, and limit use of hard returns to only one return at the end of a paragraph. Do not add any kind of pagination anywhere in the paper. Do not number text heads-the template will do that for you.

A. Analysis and Interpretation of data

Data will analyze and interpret by using M word, Origin 16 and Excel. Frequency and Percentage were calculated for all quantitative variables.

B. Ethical Consideration

1. The subjects were briefed about the study.

2. Consent was taken from the subjects after explaining the purpose of study for the collection of data.

QUESTIONNAIRE FORM

Demographics information:	General information	Dietary Habits
Child's Name: _____	Do you have breakfast every day before going to school? (Yes/No)	What is your favorite healthy food?
Age: _____Gender: _____	How many meals do you typically eat in a day?	How often do you drink water in a day?
Grade/Class: _____		
School Name: _____	Do you eat fruits and vegetables daily? (Yes/No)	Less than 3 glasses
Family background:		3-5 glasses
How many people live in the child's household.?	How often do you consume fast food? (Yes/No)	6-8 glasses
		More than 8 glasses
Male and female ratio in child's household.?	**Anthropometric Measurements**	Are you aware of the importance of a balanced diet? (Yes/No)
	Height (cm): __	
Family income status?	Weight (kg): __	Do you receive any nutrition
Hereditary diseases in family?	BMI (Body Mass Index): __	education at school? (Yes/No)

FOOD FREQUENCY QUESTIONNAIRE FOR NUTRITIONAL FACTORS ASSOCIATED WITH TONSILLITIS AMONG THE SCHOOL-GOING CHILDREN OF DISTRICT MARDAN

Food Frequency Questionnaire				
Meal Thing				
Do You Take	Always	Sometimes	Rarely	Never
Breakfast				
Lunch				
Tea Time				
Dinner				
Food Response And Reaction				
Water Intake (1glass = 250 Ml)				

$$according\ to\ who\ BMI = \frac{Weight}{Hight\ (M^2)} \dots\dots\dots\dots\dots\dots (1)$$

s.no	status	Student BMI	Normal BMI	HB level
1	Anemia	20BMI	18.5-24.9	>12,>14g/dL
2	Underweight	18BMI	18.5-24.9	<12,14g/dL
3	Malnutrition	17.3BMI	18.5-24.9	<12,14g/dL
4	Stunting	11.2BMI	18.5-24.9	<12,14g/dL
5	wasting	9.5BMI	18.5-24.9	<12,14g/dL

IV. RESULTS

In the current research work a total of 500 samples were isolated from school-going children. In which 195(39%) were found positive. The samples collected from male and females students of age 4-15 years. Among the all samples nutritional anemia was found more frequent 60(12%), leading by

malnutrition 50(10%), moderate prevalence were shows by underweight 20(4%) and stunting 16(3.2%) prevalence rate. while very low frequency was shows by wasting 4(1.6%) while the prevalence of Tonsillitis was 45(9%) respectively. Out of 500 children the number of male was slightly higher than females. Nutritional Anemia and malnutrition were observed in the study population respectively "Table 1". The prevalence of nutritional Anemia among the study population wide-ranging with age. Children of the 12–15 years group had a significantly high prevalence of nutritional Anemia compared with the lower age group "Table 2". The distribution of malnutrition by nutritional harshness is précised in "Table 1". Anemia prevalence was significantly higher among the school going children. In "Table 2", the difference between the age groups as well as nutritional status remained significant as risk factors of anemia also the main relation. Over all ratio of underweight

and stunting were found moderate among all ages and gender wise distribution of nutritional status.

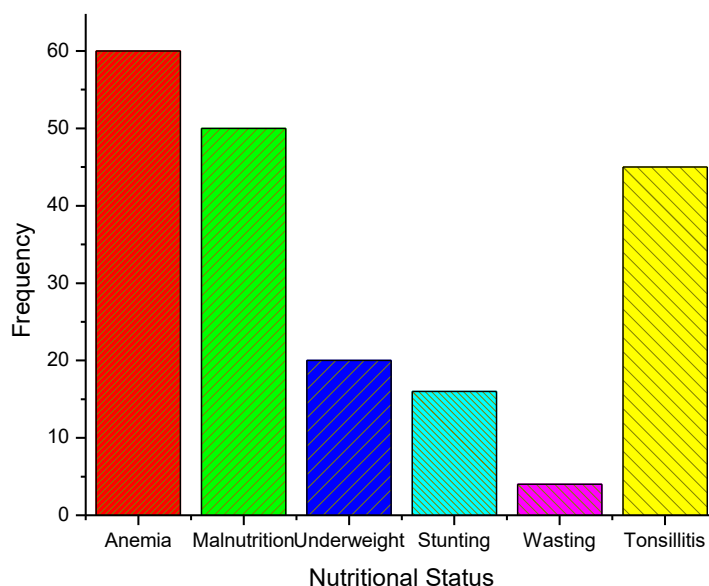| S.no	Class	Anemia		Malnutrition		Underweight		Stunting		Wasting	
		M	F	M	F	M	F	M	F	M	F
1	1st J	8	6	6	4	4	2	0	2	2	0
2	1st S	6	6	4	6	2	2	2	0	2	0
3	2nd	6	4	4	2	0	0	2	0	0	0
4	3rd	4	4	0	2	0	2	0	2	0	0
5	4th	2	4	1	0	1	0	2	2	0	0
6	5th	2	2	4	0	0	0	2	0	0	0
7	6th	2	2	4	4	2	2	0	0	0	0
8	7th	2	0	2	2	2	0	0	2	0	0
9	8th	0	0	2	2	0	0	0	0	0	0
10	9th	0	0	0	0	0	0	0	0	0	0
11	10th	0	0	0	0	0	0	0	0	0	0

Fig. 1. Over all nutritional status of school going children

The prevalence of malnutrition and stunting varied significantly within the age group with the lower age group having higher prevalence. More males were anemic 32 (6.4%), malnourished 28 (5.6%), underweight 12 (2.4%), stunted 8 (1.6%) when compared with females nutritional anemia 28 (5.6%), malnutrition 22 (4.4%), underweight 8 (1.6), stunting 8 (1.6%) while wasting with zero prevalence rate 0 (0%) and Tonsillitis infection was 45(9%) respectively though the difference was not significant in malnutrition and stunting. The difference in prevalence of underweight among the sexes was significant with the males having a higher prevalence. Bivariate analysis revealed children of the 0–5 year's age group were significantly at odds of being malnourished "Table 3"

TABLE II.   GENDER WISE NUTRITIONAL STATUS OF SCHOOL GOING CHILDREN

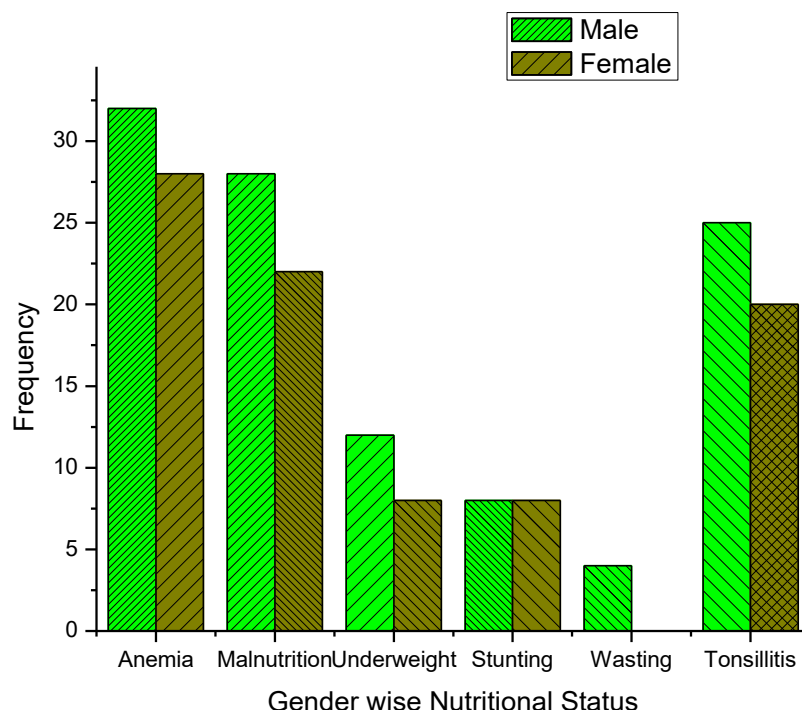| S.No	Nutritional status	Male	Female
1	Anemia	32 (6.4%)	28 (5.6%)
2	Malnutrition	28 (5.6%)	22 (4.4%)
3	Underweight	12 (2.4%)	8 (1.6%)
4	Stunting	8 (1.6%)	8(1.6%)
5	Wasting	4 (0.8%)	0 (0%)

| 6 | -- | 84(17%) | 66(13%) |

Fig. 2. Over all nutritional status of school going children

Age wise nutritional status in male shows that the high prevalence rates were found between 4-7 years of children. In which nutritional anemia 24 (4.8%) leading by Malnutrition 20 (4%) less prevalence were seen in Underweight 10 (2%) Stunting 10 (2%) while some prevalence was seen for wasting 4 (0.8%). Between the age group 8-11 the prevalence ratio were nutritional anemia 20 (4%) leading by Malnutrition 16 (3.2%) less prevalence were seen in Underweight 6 (1.2%) Stunting 4 (0.8%) while no prevalence was seen for wasting. Also high prevalence were seen in nutritional anemia and malnutrition 16 (3.2%), 7 (2.8%) very low prevalence rate were seen between 12-15 age group in underweight, Stunting and wasting Table.4

TABLE III.   AGE WISE NUTRITIONAL STATUS OF SCHOOL GOING CHILDREN

Ages	Anemia	Malnutrition	Underweight	Stunting	Wasting
4-7	24 (4.8%)	20 (4%)	10 (2%)	10 (2%)	4 (0.8)
8-11	20 (4%)	16 (3.2%)	6 (1.2%)	4 (0.8%)	0 (0%)
12-15	16 (3.2%)	14 (2.8%)	4 (0.8%)	2 (0.4%)	0 (0%)
TOTAL	60(12%)	50(10%)	20(4%)	16(3.2%)	4(0.8%)

Age wise nutritional status in male shows that the high prevalence rates were found between 4-7 years of children. In which nutritional anemia 16 (3.2%) leading by Malnutrition 12 (2.4%) less prevalence were seen in Underweight 8 (1.6%) Stunting 4 (0.8%) while some prevalence was seen for wasting 4 (0.8%). Between the age group 8-11 the prevalence ratio were nutritional anemia 10(2%) leading by Malnutrition 8 (1.6%) less prevalence were seen in Underweight 4 (0.8%) Stunting 4 (0.8%) while no prevalence was seen for wasting. Very low prevalence rate were seen between 12-15 age group Table.5

TABLE IV.   AGE WISE NUTRITIONAL STATUS OF MALE SCHOOL GOING CHILDREN

Ages	Anemia	Malnutrition	Underweight	Stunting	Wasting
4-7	16 (3.2%)	12 (2.4%)	8 (1.6%)	4 (0.8%)	4 (0.8%)
8-11	10 (2%)	8 (1.6%)	4 (0.8%)	4 (0.8)	0 (0%)
12-15	6 (1.2%)	8 (1.6%)	4 (0.8%)	0 (0%)	0 (0%)
TOTAL	32(6.4%)	28(5.6%)	16(3.2%)	8(1.6)	4(0.8%)

Age wise nutritional status in female shows that the high prevalence rates were found between 4-7 years of children. In which nutritional anemia 7 (2.8%) leading by Malnutrition 5 (2%) less prevalence were seen in Underweight 2 (0.8%) Stunting 3 (1.2%) while no prevalence was seen for wasting. Between the age group 8-11 the prevalence ratio were nutritional anemia 5 (2%) leading by Malnutrition 4 (1.6%)

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less prevalence were seen in Underweight 2 (0.8%) Stunting 1 (0.4%) while no prevalence was seen for wasting Table.6

TABLE V. AGE WISE NUTRITIONAL STATUS OF MALE SCHOOL GOING CHILDREN

Ages	Anemia	Malnutrition	Underweight	Stunting	Wasting
4-7	14 (2.8%)	10 (2%)	4 (0.8%)	6 (1.2%)	0 (0%)
8-11	10 (2%)	8 (1.6%)	4 (0.8%)	2 (0.4%)	0 (0%)
12-15	4 (0.8%)	4 (0.8%)	4 (0.8%)	0 (0%)	0 (0%)
TOTAL	28(5.6%)	22(4.4%)	12(2.4%)	8(1.6%)	0(0%)

V. DISCUSSION

In the current research work a total of 500 samples were isolated from school-going children. In which 195(39%) were found positive. The samples collected from male and females students of age 4-15 years. Among the all samples nutritional anemia was found more frequent 60(12%), leading by malnutrition 50(10%), moderate prevalence were shows by underweight 20(4%) and stunting 16(3.2%) prevalence rate. while very low frequency was shows by wasting 4(1.6%) while the prevalence of Tonsillitis was 45(9%) respectively. Out of 500 children the number of male was slightly higher than females. Nutritional Anemia and malnutrition were observed in the study population respectively. The prevalence of nutritional Anemia among the study population wide-ranging with age. Children of the 12–15 years group had a significantly high prevalence of nutritional Anemia compared with the lower age group. The distribution of malnutrition by nutritional harshness, Anemia prevalence was significantly higher among the school going children. The difference between the age groups as well as nutritional status remained significant as risk factors of anemia also the main relation. Over all ratio of underweight and stunting were found moderate among all ages and gender wise distribution of nutritional status. [18] also conducted a study in which a total of 571 children, 348 (56.4%) were boys and 223 (43.6%) were girls. Nearly 89 (15.5%) children including 52 (10.5%) boys and 37(6.4%) girls had normal anthropometric indices. Stunting was the most frequent anthropometric failure (n=219, 38.3%) followed by wasting (n=163, 28.51%) and underweight (n=100, 17.5%) respectively. Gender disparity was observed in the distribution of malnutrition with boys having a higher frequency of stunting, wasting, and underweight than girls.

While the prevalence of nutritional anemia was higher in both age groups and sexes. Nutritional Anemia prevalence was significantly higher among school-going children. The difference between the age groups as well as nutritional status remained significant as risk factors of anemia were also the main relation. The ratio of underweight and stunting was found moderate among all ages and gender-wise distribution of nutritional status. The prevalence of malnutrition and stunting varied significantly within the age group with the lower age group having higher prevalence. More males were anemic 16 (6.4%), malnourished 14 (5.6%), underweight 6 (2.4%), stunted 4 (1.6%) when compared with females anemia 14 (5.6%), malnutrition 11 (4.4%), underweight 4 (1.6), stunting 4 (1.6%) while wasting with zero prevalence rate 0 (0%) respectively though the difference was not significant in malnutrition and stunting. The difference in prevalence of underweight among the sexes was significant with the males having a higher prevalence. Bivariate analysis revealed children of the 0–5 year age group were significantly at odds of being malnourished. Similar work was also performed by[24]. Conducted a study in which out of 1500 school-going students 600(40%) were found positive and 900(60%) were found normal according to age. Gender-wise analysis shows that in male students 210(35%) were found positive for stunting and 150 (25%) male students were underweight. In overall female students, 135(22.5%) were found stunting and 105 (17.5%) were found underweight. According to age group wise between 4 to 10 years 90 (10%) female students were found stunting and 60(6.6%) were found underweight. While in the age of 11 to 15 years 48 (5.3%) students were stunted and 42 (4.6%) students were underweighted. The difference in stunted and underweight showed more boys than girls. In the pre-nursery group, more boys were stunted than girls, the ratio being 70%:30%, on the contrary, underweight was more in boys than in girls, with a ratio of 57%:43%. In the Primary section, both stunting and underweight were more in boys as compared to girls. The ratios were 54.8%:45.2% and 82.9%:17% respectively.Age-wise nutritional status in males shows that the high prevalence rates were found between 4-7 years of children. Nutritional anemia 12 (4.8%) led by Malnutrition 10 (4%) less prevalence was seen in Underweight 5 (2%) Stunting 5 (2%) while some prevalence was seen for wasting 2 (0.8%). Between the age group 8-11 the prevalence ratio was nutritional anemia 10 (4%) led by Malnutrition 8 (3.2%) less prevalence was seen in Underweight 3 (1.2%) Stunting 2 (0.8%) while no prevalence was seen for wasting. Also, high prevalence was seen in nutritional anemia and malnutrition 8 (3.2%), 7 (2.8%) very low prevalence rates were seen between the 12-15 age group in underweight, Stunting, and wasting. While a study also conducted by [19] The mean age of the sample was 9.38±4.14 with the maximum number of children (49.1%) in the age bracket of 5-9. Out of 1710 children, 54.4% had normal weight for age, 25.3% were underweight, 7.5% overweight and 12.8% were found to be obese. Stunting was found to be 26%. The prevalence of being underweight was higher than overweight /obesity, particularly in younger and higher age groups as indicated by a p-value of 0.000. Compared with females, male students had a significantly higher frequency of being underweight and stunted as reflected by p-values of 0.004 and 0.000 respectively. Univariate analysis also showed a strong association between age and nutritional status as mean weight increased from 39.22±5.21 to 63.50±4.66 and height from 35.67±5.76 to 113.73±29.22 with advancing age.

Conclusion

The findings of the study revealed that slightly above one third (39%) school going children's of Takht Bhai city were thin, underweight and malnourished respectively. The prevalence of Tonsillitis infection was also high. Based on the finding; there must be association among health sectors and education sectors of the city to address under nutrition complications of the City. As an interposition the scoters could do school based nutrition education. Health education management on Nutrition also is communicating. It is concluded that all the nutritional factors strongly correlated with tonsillitis infection.

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