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Statistical Analysis of Food Supplements in School Going Children

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ABSTRACT

The main objectives of the study were to determine the types of nutritional supplements consumed by school going children, to identify the reasons for consumption of nutritional supplements in aforementioned children including perceived benefits and to determine the relationship between the food supplements and academic record.
The study population included 300 male and female students (47 were for pre-test) in Grade 1-7 from Private and Public schools and the students of 4 to 12 years age. A total of 300 semi-structured interviews (47 interviews were as pre-test) conducted. In this study, we took the students from a lower-middle and middle classes background (determined by the school Principal using parental income). Main steps of research methodology were pre-testing of the questionnaire and then noted the timings and gaps identified from the pre-testing and improved the questionnaire on the basis of the initial results. Next step was to take written permission from the school's principals and higher authority to conduct the aforesaid study. 58.2% students were using multi-vitamins especially in the form of milk and its products. Drinks from food supplements were well-known among children, especially in school going children because of their good taste. Most of the school going children, 47.3% were taking food supplements for their better health and 23.3% students were using for their better performance in the class. As per advice of doctors, only 26.8% children were using them for protection from diseases. Proper diet and nutritional supplements may benefit children of all ages by boosting immunity and optimizing health. Weight status of most of school going children (271) was fallen into the normal range i.e. BMI (18.5-24.9) and only 45 students were overweight i.e. BMI (>25). Multi-vitamin and mineral supplements including calcium supplements were the most popular supplements consumed by children aged 4-12. This might be related to the nutrition knowledge of the public that children need good nutrition for growth and development. It was found that students who were taking regular food supplements were intelligent and their academic records mostly fall into 60% or above. Among them, 52.4% students got the marks in between (80-100) % and 42.1% fall into (60-80) %, while only 5.5% students were below average. 58.2% students were using multi-vitamins especially in the form of milk and its products.
Most of the school going children were taking food supplements for their better health and some students were using for their better performance in the class. Multi-vitamin and mineral supplements including calcium supplements were the most popular supplements consumed by children aged 4-12.
KEYWORDS: Boosting Immunity, Multi-vitamins, Mineral Supplements, Sampling Data, Correlation variants, Regression Equations, ANOVA Test, morbidity, Nutrition intervention strategies

1. INTRODUCTION

The comprehensive purging or diminution of micronutrient deficiencies, predominantly iodine, vitamin A and iron deficiencies are place goals at several International meetings. Nevertheless micronutrient malnutrition is still widely prevalent among children in developing countries and almost certainly the main nutritional problem in the world pretentiousness imperative public health problems with long-term effects on human resources and national economic growth. Above and beyond iron deficiency anemia, vitamin A deficiency and iodine deficiency disorders, deficiencies of zinc, vitamin B12, folate and others are increasingly recognized (Grillenberger, 2006).

Vitamin and mineral supplements have been set or recommended by physicians for a diversity of reasons. Both iron and vitamin C supplements have been found to assuage iron deficiency anemia and its sequelae. Less clear is the role of supplementation in humanizing children's nutrition status. Multivitamin treatments have been used to augment the performance and behavior of children with Down syndrome, although results have been ambiguous. Other work has found that vitamin and mineral supplements did not enhance the astuteness of children in the wide-ranging population (Stella, et al. 1997).

Classification of dietary supplements:

At the time of researches and studies, we assess the pervasiveness of supplement use, the type used, promptness of use and use of solitary or numerous supplements. Supplements, health foods and serviceable foods are all referred to as 'Dietary supplements' despite of which types of foods they are considered to be by the general public. Based on the

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nutritional distinctiveness of the supplements, we usually classified dietary supplements into eight categories for descriptive statistics: “vitamins and minerals”, “vitamins”, “minerals”, “lipids”, “Chinese herbal”, “protein and formula food”, “other health promotional foods” and “unknown”. The “unidentified” is defined as supplement without clear label or definite components. Moreover, dietary supplements are also generally categorized as ‘Nutritional Supplements’ (Shih, et al. 2007).

Scientific reports indicate increasing popularity of many supplements in children. The Dietary Supplement Health and Education Act (Public Law 103-417, 1994) defines a dietary supplement as a “manufactured goods probable to supplement the diet that bears or contains one or more of the following dietary ingredients: a vitamin, mineral, amino acid, herb, or other botanical or a dietary substance for use to supplement the diet by increasing the total dietary intake; or a concentrate, metabolite, constituent, extract, or combination of any ingredient described above; and intended for ingestion in the form of a capsule, powder, soft gel, or gel cap, and not represented as a conformist food or as a sole item of meal or the diet” (Brian, et al. 2003).

Vitamin and mineral supplements have been given or suggested by physicians for an array of reasons. Both iron and vitamin C supplements have been found to alleviate iron deficiency anemia and its sequelae. Other work has found that vitamin and mineral supplements did not improve the aptitude of children in the general population. Furthermore, supplements have been used for prevention of the common cold, improvement of children's appetite, improvement of cognitive performance and augmentation of growth (Stella, et al. 1997).

According to the U.S. FDA, dietary supplements are defined, in part, as products intended to supplement the diet that bears or contains one or more of the following dietary ingredients: a) a vitamin, b) a mineral, c) an herb or other botanical, d) an amino acid, e) a dietary substance for use by man to supplement the diet by increasing the total dietary intake, or f) a concentrate, metabolite, constituent, extract or a combination of any ingredient described. This definition is in accordance with the German regulations. In our study, only supplements containing vitamins were considered. Supplements accessible only through direction, or supplements with vitamin D combined with fluorine for infants only, were debarred. Supplements were subdivided into 4 groups: 1) combination products that contained 1 vitamin and 2) mineral, 3) vitamin-only products that contained 1 vitamin and no minerals, and 4) special products for special purposes (Wolfgang, et al. 2006).

Nutrition intervention strategies in the control of micronutrient deficiencies:

Supplement-based approaches and food fortification have been the most commonly used strategies for micronutrient deficiency control and have been successful in several countries because they are relatively cost-effective, easy to deliver and have a rapid impact. Food fortification programs have been more or less triumphant in the control of certain micronutrient deficiencies, through salt iodization, because they can provide the micronutrients inexpensively over a long time period (Grillenberger, 2006).

The role of micronutrients in morbidity:

Protein-energy malnutrition results in reduced number and functions of T-cells, phagocytic cells and secretary immunoglobulin an antibody response and a reduction in levels of many complement components. Diseases such as diarrhea, acute lower respiratory tract infections, measles and malaria are among the top ten causes of death in sprouting countries and there is corroboration that the clinical ending of these infections is affected adversely by nutritional deficiency. The negative effects of diseases on growth might be mediated through a decrease in food intake, impaired nutrient amalgamation, direct nutrient losses, increased metabolic requirements and/or catabolic losses of nutrients and, possibly, impaired transport of nutrients to target tissues. Now there is confirmation that even reasonable deficiencies of individual nutrients such as few minerals and vitamins, mainly zinc, iron and vitamin A unfavorably affect the immune system (Grillenberger, 2006).

The American Academy of Pediatrics (AAP) states that “a diet based on the Food Guide Pyramid provides sufficient amounts of all the vitamins a child needs.” Although advocating a healthy diet first and foremost, the AAP does feel there are situations where vitamins are compulsory, above all if the child is a very picky eater or has a poor diet. According to the AAP, 20% of children do not get enough vitamin D based on this finding; the AAP has started recommending vitamin D supplementation for infants and children. Because breast milk is a poor source of vitamin D, entirely breast-fed babies should receive 200 to 400 international units of vitamin D daily as recommended by a pediatrician. Older children who don’t drink at least 17 ounces of vitamin D fortified milk also need supplements if they don’t get regular sunlight exposure (Kindy, 2008).

Kindy in 2008 formulated a chart for recognition of natural and synthetic supplements.

Statement of the Problem

Micronutrient malnutrition is widely prevalent among children in developing countries and probably the main nutritional problem in the Pakistan posing important public health problems with long-term effects on human capital, performance and national economic growth.

Objectives of the study:
The objectives of the study are

1. To determine the types of nutritional supplements consumed by school going children.
2. To identify the reasons for consumption of nutritional supplements in aforementioned children, including perceived benefits.
3. To determine the relationship between the food supplements and academic record.

The study is designed to answer these initial questions in order to devise future nutrition education programmes and health endorsement activities at public/private levels.

Hypothesis:
The food supplements are not commonly used by school going children for the prevention of deficiency diseases, improvement of children's appetite, enhancement of cognitive performance and augmentation of growth.

Significance:
In order for research to be valuable, the perceptions and attitudes of the population towards nutrition education and supplementation should be analyzed. Very often supplementation is perceived as an additional health risk caused by possible problems with toxicity described due to deficiency of certain vitamins and minerals.

Additionally, supplements have been used for prevention of the common cold, improvement of children's appetite, enhancement of cognitive performance, and augmentation of growth. Given the fact that children are often difficult and changeable eaters at the preschool and school age, supplements are often used to improve their diets.

Assumptions where applicable:

1. It is generally assumed that certain supplements are primarily used by students who participate in organized sports.
2. Once parents understand that supplements can greatly enhance their children's diets as well as improve health; they need guidance on how to get their children to be consistent with taking food supplements.

METHODOLOGY

The study population was 300 male and female students (47 students for pre-test) in Grade 1-7 from Private and Public schools and the students of 4 to 12 years age. A total of 300 semi-structured interviews (47 for pre-test) conducted. In this study, we took students from a lower-middle and middle classes background (determined by the school Principal using parental income).

The outcome measures used in this investigation were whether the child was given any supplements at least 3 days a week in the 30 days before the interview and the type of supplement the child received. The choices of supplements provided to respondents were multivitamins-minerals with iron, multivitamins-minerals without iron, iron, vitamin C, and fluoride drops or tablets. Respondents provided information on any other types of supplements not included in these categories.

Delimitations:
The study was delimited in only school going children

Inclusion Criteria:

1. Boys and girls between ages 4-12 years
2. Good general health at screening
3. Understands and is willing, able and likely to comply with all study procedures and restrictions

Exclusion Criteria:

1. Severe anemia
2. Cardiovascular disease on clinical examination or history
3. Any underlying respiratory disease with impairment of lung function
4. Physical disability Children consuming nutritional supplements (tonics, syrups, tablets or chews) and/ or health food drinks on a regular basis
5. Recent history (3-months) of serious infections, injuries and/ or surgeries
6. Participation in any nutritional study in the last 1 year
7. Any known food allergies like peanut allergy, gluten allergy

Procedure of the Study:
Micronutrient malnutrition is broadly common amongst children in developing countries and may be the main nutritional problem in the Pakistan pretentiousness vital public health problems with long-standing possessions on human

capital, recital and national economic growth.

Purpose of the study was to assess the prevalence, type and regularity of supplement used among school going children. Study was conducted in schools of urban and peri-urban areas of Lahore city. Parents of the children were also involved in the aforesaid study. Exclusive & inclusive criteria were set before conducting the study.

Sampling Data, Observations, Tests and their Results

Research Design:

This Study project comprised a method that used in order to realize goals. In-depth interviews were conducted and recorded the comprehensive comments. The study population was 300 male and female students (47 for pre-test) in Grade 1-7 from Private and Public schools and the students of 4 to 12 years age. A total of 300 semi-structured interviews (47 for pre-test) were conducted. In this study, students from a lower-middle and middle classes background (determined by the school Principal using parental income) were taken.

The outcome procedures used in this exploration were whether the child was given any supplements at least 3 days a week in the 30 days before the interview and the type of supplement the child received. The choices of supplements provided to respondents were multivitamins-minerals with iron, multivitamins-minerals without iron, iron, vitamin C, and fluoride drops or tablets.

Sample:

Total sample size for this study was 300 male & female students of grade 1-7 and age limit were from 4 to 12 years. A formal data collection, pre-collection activity was one of the most crucial steps in the entire process. First step was the identification of schools for the collection of data on planned questionnaire. Then after it special permission was taken from the concern authority of identified schools. Parents were actively involved at the time of filling the questionnaire. 47 questionnaires were filled as pre test and recorded and analyzed them and also noted the time of filling of each questionnaire. Then finally questionnaires were filled with 300 school going children and the analyzed them on SPSS.

Collection of data:

A written permission was taken from the principals of respected identified schools. Then pretesting of questionnaires was done and gaps were identified. In-depth interviews were conducted by the researcher and recorded detailed notes. The notes were recorded exactly where possible in order to record accurate quotations from participants.

Statistical tests used to analyze the data:

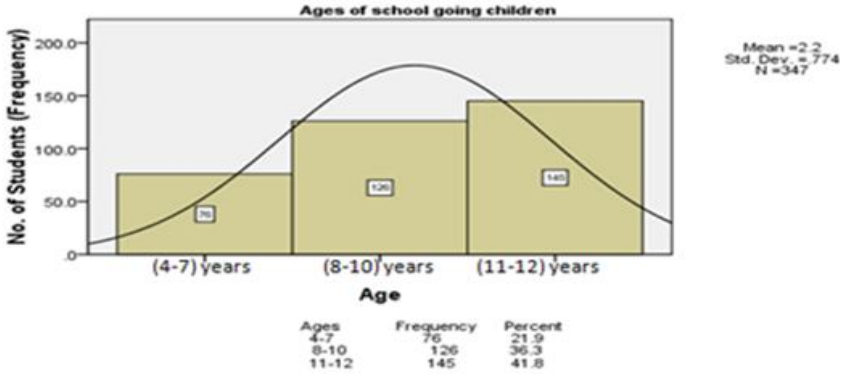
The research tabulated the statistics & developed one way and two ways frequency supply. I also applied the most recent and advanced statistical techniques and decision models in this research of discovering additional findings. SPSS version 16 was used for analysis data and statistical tests were used in some combination with tables and/or graphs. Descriptive statistics were used to summarize the data and included things like average, range, standard deviation, and frequency. The t-test gave an indication of the separateness of two sets of measurements, and was used to check whether two sets of measures were essentially different. This analysis was appropriated to compare the means of two groups. The Q-test was also applied in this thesis for unequal samples.

Analysis of Data:

This study was conducted with 300 male and female students of Grade 1-7 from Private and Public schools and their ages varied from 4-12 years. A total of 300 semi-structured interviews were conducted. In this study, we took the students from a lower-middle and middle classes background. The choices of supplements provided to respondents were multivitamins-minerals with iron, multivitamins-minerals without iron, iron, vitamin C, and fluoride drops or tablets. The outcome measures used in this investigation were whether the child was given any supplements at least 3 days a week in the 30 days before the interview and the type of supplement the child regular used. At the time of wide-ranging examination their height in feet and weight in kg were considered and noted. Academic proceedings and extracurricular activities of the children were noted during the interview through questionnaires and their school records. All forms were checked by researcher in the field to permit immediate revisits for gross errors or missing data and once again checked and cleaned. The data in the forms were entered in SPSS program. The data then were printed and checked for errors against the forms and range checked by computer. Growth, weight, height and other body measurements were some of the paraphernalia used to identify populations in which nutritional inadequacies were reflected by retarded growth and development.

In this study age limit of interviewees was 4-12 years. Maximum interviewees were fallen under the age of 8-12 years (41.8% were 11-12 years and 36.3% were 8-10 years of age). While on the other hand only 22%, 76 out of 347 were interviewed on specific formats fell into (4-7) years. Age is main check & limitation factor of this study.

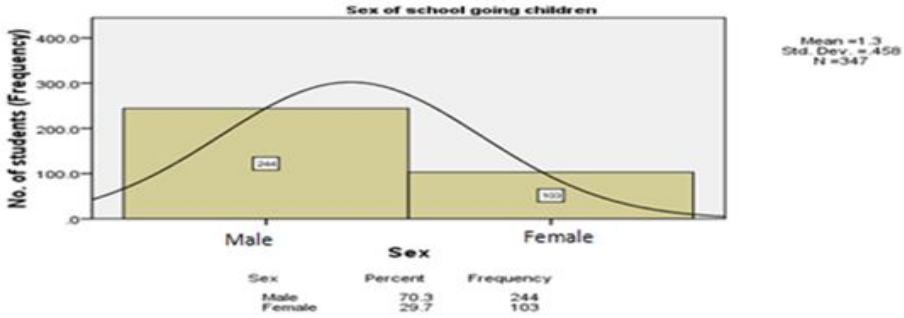
Measurement of Ages of school going children



Ages	Frequency	Percent
4-7	76	21.9
8-10	126	36.3
11-12	145	41.8

This study was conducted at different schools of Lahore city, particularly at peri-urban areas. When study was analyzed, it was found that 70.3% students were male and 29.7% were female on gender prospective. Both male & female students were involved during the study.

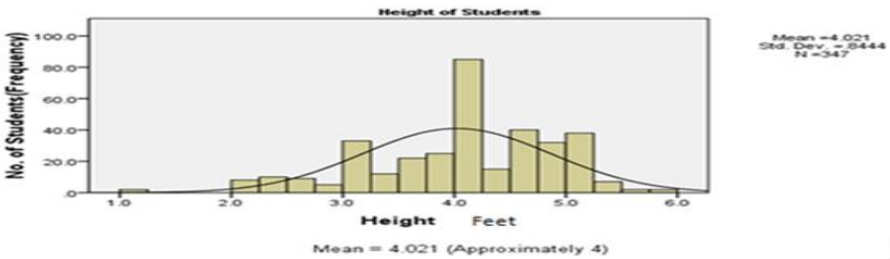
Measurement for Sex of school going children



Sex	Percent	Frequency
Male	70.3	244
Female	29.7	103

Height was an important indicator and very intimately associated with the usage of food supplements among school going children. Height was measured without shoes. Height generally correlated better with socioeconomic status than did measures of weight. Height was measured in feet and maximum students fell in betweens (4-5) feet, 200 out of 347 (57.6%) students while the height of 61 (17.57%) students fell into (3-3.5) feet. Height was the key element for determining the health among school going children.

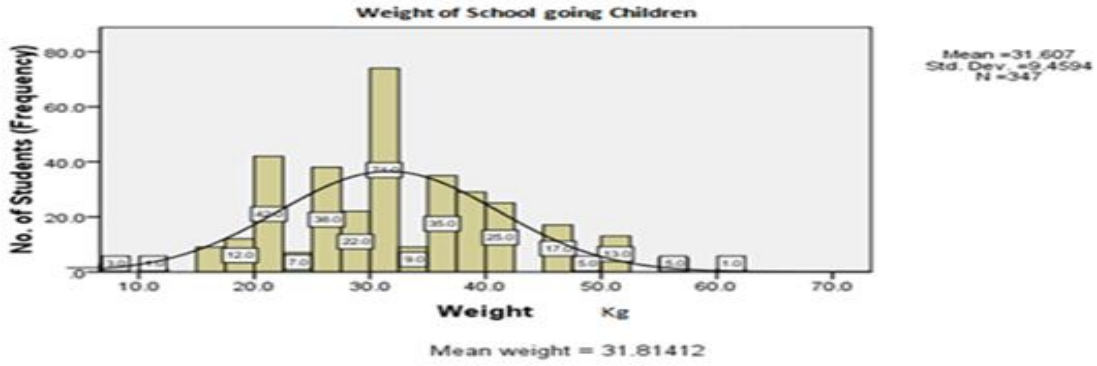
Measurement of height in school going children (Unit : ft)



Mean = 4.021 (Approximately 4)

Weight is another significant indicator and very intimately associated with the usage of food supplements among school going children. Weight is taken for individuals of all ages. Beam stability platform scales are used. They should be balanced quite a lot of times. Children should be weighted in light clothing. The weight of an individual in relation to height depends not only on the amount of the fat present but also on the casing or build of the body. Huge muscles may responsible for a relatively large weight. Maximum students 132 (38%) had weight in between (30-40) kg. Weight of an individual should be measured carefully because the common errors of measurement of weight. 110 (32%) students fell in between (20-30) kg. While only 2.5% students had weight more than 50 kg. As per WHO standards health of a student could be related to BMI. Therefore, BMI was another important indicator.

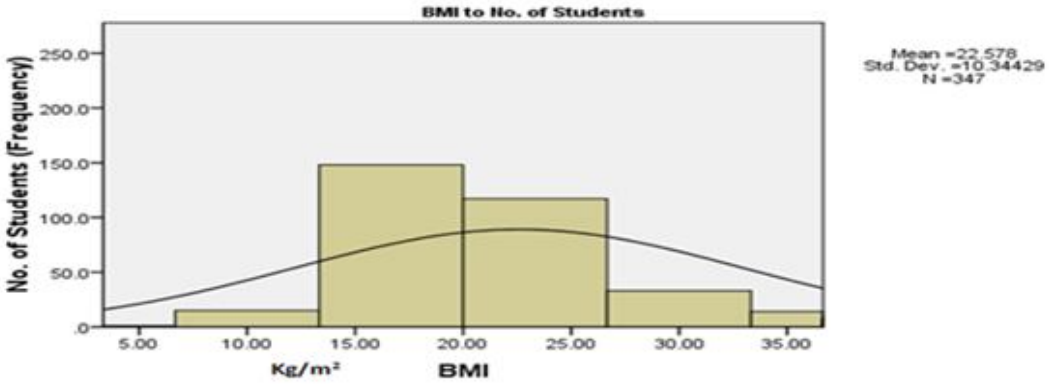
Measurement of Weight in School going Children



Mean weight = 31.81412

Body Mass Index (BMI) is a number calculated from a person's weight and height. In this research study, BMI is a fairly reliable indicator of body fatness for most school going children. Maximum students 132 (38%) had weight in between (30-40) kg. Abovementioned results indicated that the weight status of most of school going children 78% (271) was fallen into the normal range and only 13% (45) students were overweight.

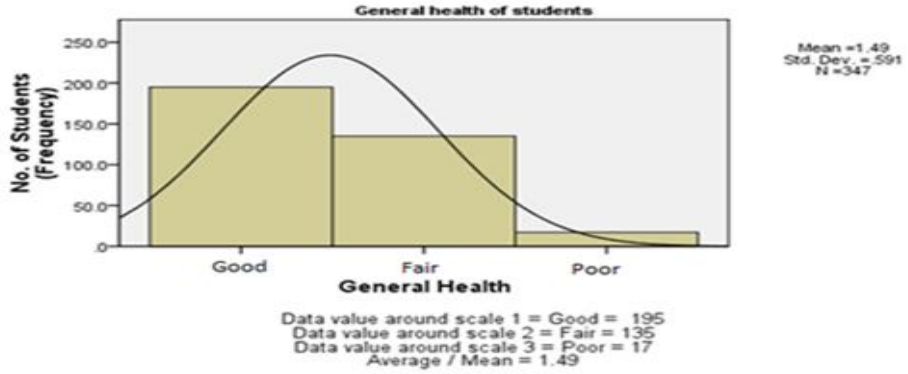
Measurement of BMI in school going children



Mean = 22.578

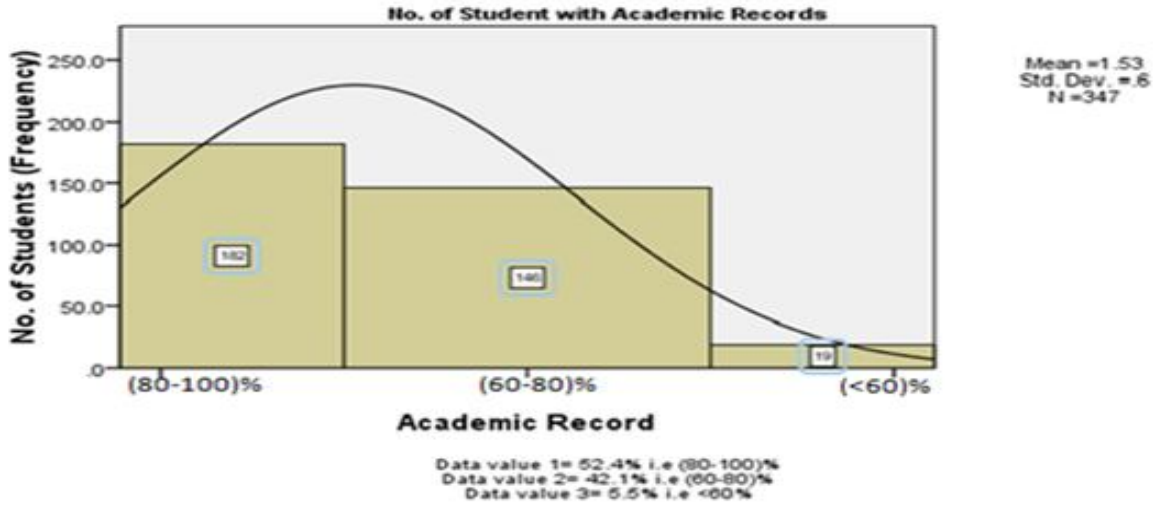
The major reason for using the food supplements among school going children was for their better health. Food supplements and their impact in the general health among school going children were very important. In this research study, a health criterion was defined on WHO standards on BMI. During the research it was found that students who were taking the food supplements as aforementioned criteria, 57.1% were in good health which is based on BMI (18.6-24.9) Kg/m2, 38% were found in fare health, based on same criteria and on the other hand only 4.9% were fallen in poor health and suffering from acute diseases such as chest infections and gastrointestinal tract infections.

Measurement of impact of food supplements in General Health among school going children



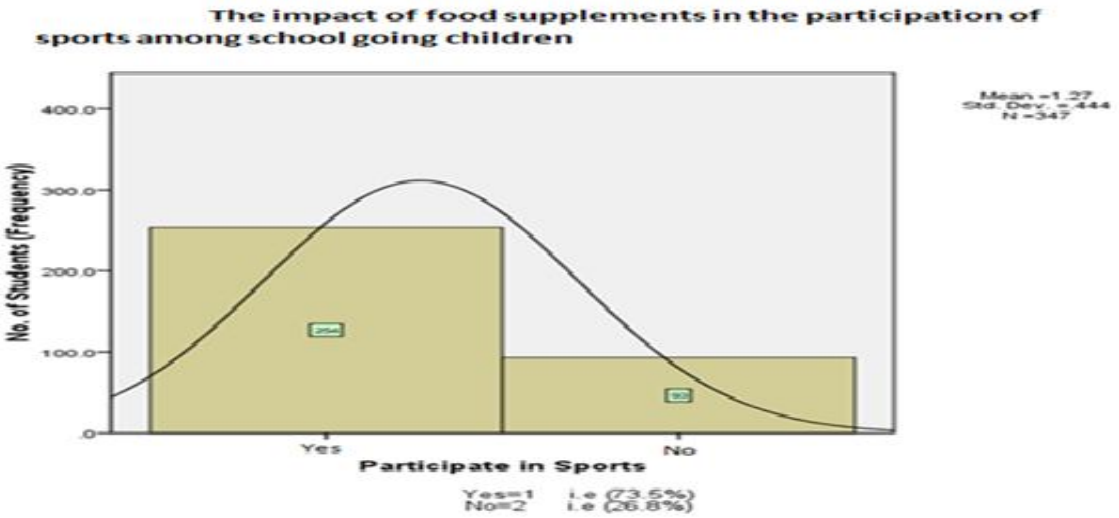
Research showed that overall intelligence was mostly developed during childhood years. The results of this study also supported aforesaid statement regarding the influence of proper food supplements intake of children on their educational proceedings. Study indicated that students who were taking regular food supplements were intelligent and their academic records mostly fell into 60% or above. Among them, 52.4% students got the marks in between (80-100) % and 42.1% fell into (60-80) %. While only 5.5% students were below average.

Measurement of impact of food supplements in academic record among school going children

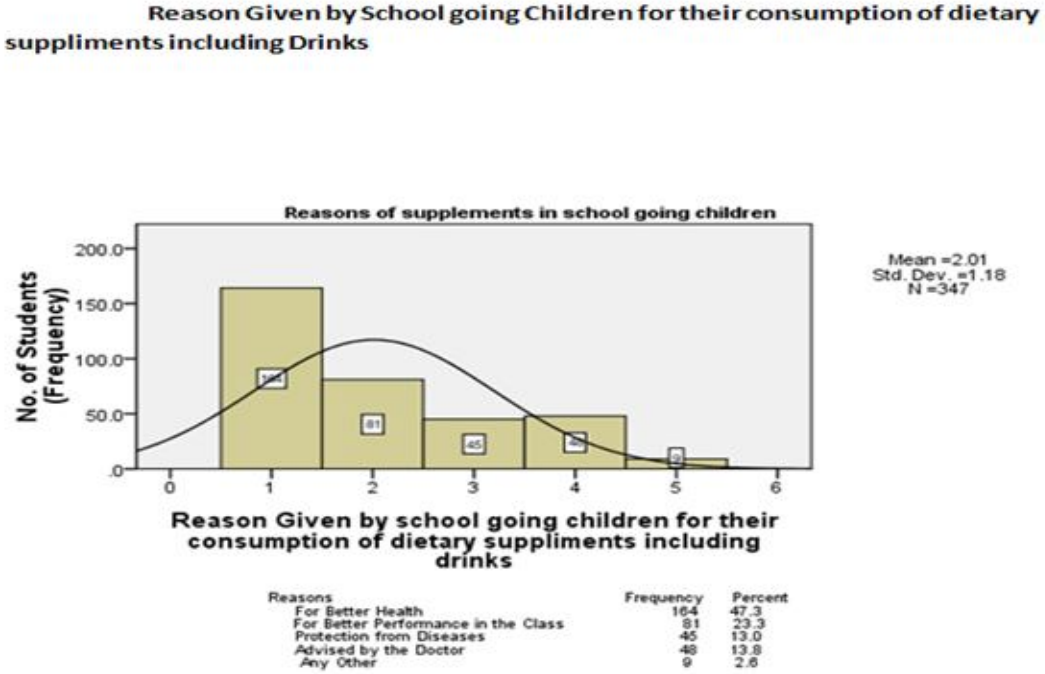


There was another feature of taking food supplements among school going children that participated in a diversity of sports in school and had varying aspirations for achievement. Certainty that vitamin and mineral supplements augmented sporty performance was common, and athletes time and again devour supplements. Sports drinks contained blends of electrolytes (salts) that the body loses during exertion and sweating, as well as vitamins, minerals, and performance-supporting herbs.

Nutritional supplements were most excellent additional into the diet bit by bit, starting with small dosages and working up to the manufacturers' optional amounts over time. Most of the students 254 (73.2%) were involved in sports activities in their respected schools, who were taking food supplements & energy drinks.

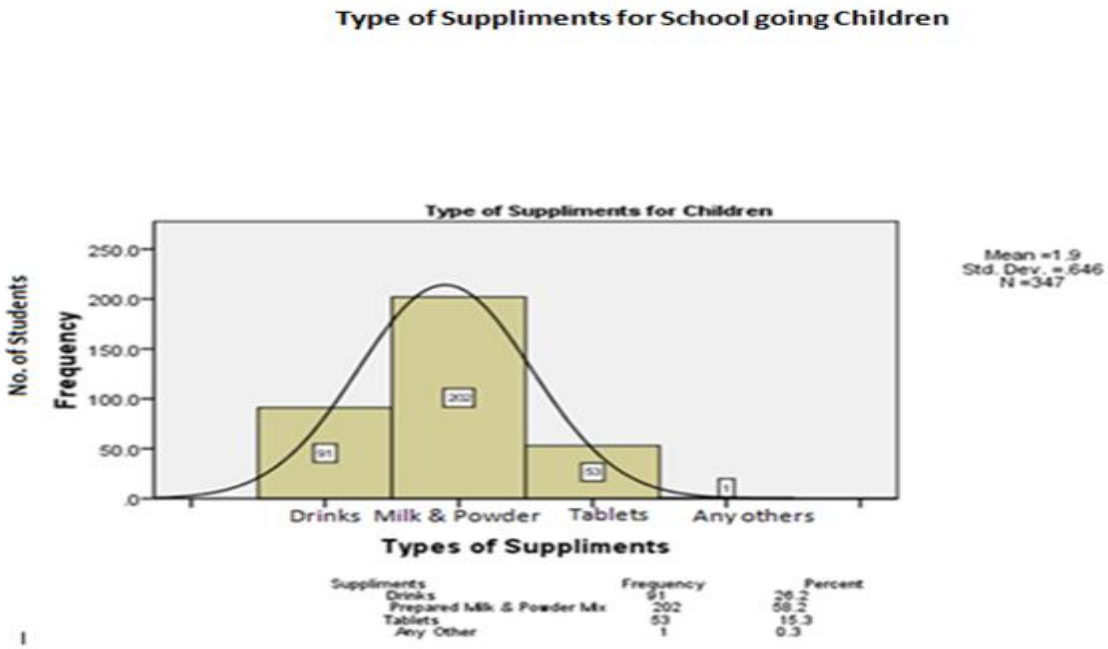


Most of the school going children, 47.3% were taking food supplements for their better health and 23.3% students were using for their better performance in the class. As per advice of doctors, only 26.8% children were using them for protection from diseases.



Drinks form food supplements were going to well-known among children, especially in school going children because of their good taste. Collective vitamin and mineral supplements and calcium supplements (mineral supplements) were the most acknowledged supplements engrossed by children aged 4-12. 58.2% students were using combined blend vitamins particularly in the form of milk and its foodstuffs. As per study's result 26.2% were taking multivitamins in the form of drinks. While only 15.3% were using the food supplements in tablets. This might be related to the nutrition knowledge of the public that children need good nutrition for growth and development. In fact, calcium supplementation had been set up to be beneficial for bone health in children. As mentioned earlier that food supplements can be classified according to their ingredients. In Pakistani market, food supplements of different International & National companies are available. Major classification of food supplements is

Sr. No	Iron Supplements	Calcium	Multivitamin	Multivitamin & Mineral (Powder Form)	Multivitamin & Mineral (Liquid Form)	Multivitamin & Mineral (Tablet Form)
1	Incremen Syrup	Calcium Tablets	Lysovit Syrup	Complan	Lederplex Syrup	Vidaylin Tablets
2	Incremen Tablet	Calcium-P Tablets	Polybion Syrup	Ensure 400 Grams	Vidaylin-L-Syrup	
3	Rubifer-F Tablets	Calcium-P syrup	Grow Vit.	Pediasure	Vidaylin-M-Syrup	
4	Ferplex Syrup	C-Con Tablets	Ginbex Syrup	Glucerna/Glucerna Plus	Bonita Mama Syrup	
5		CAC-1000	Suebex-T Syrup	Milo		
6			Surbex Syrup	Aminofer		
7			Xinovit Syrup	Similac Mom		
8			Starvit Tablets			
9			Meji Mmmailac			



Regression models are used to predict one variable from one or more other variables. In order to construct a regression model, both the information which is going to be used to make the prediction and the information which is to be predicted must be obtained from a sample of objects or individuals. The relationship between the two pieces of information is then modeled with a linear transformation. Then in the future, only the first information is necessary, and the regression model is used to transform this information into the predicted. In other words, it is necessary to have information on both variables before the model can be constructed. A transformation in regression to achieve linearity is a special kind of nonlinear transformation. It is a nonlinear transformation that *increases* the linear relationship between two variables. One way of transformation using regression equation for standard linear regression by the equation given below.

$Y = \beta_o + \beta_1 X_1 + \beta_2 X_2$

As an example we have taken BMI as a dependent variable (Y), X_1 and X_2 that is (Types of Suppliments and Academic Record) respectively are the coefficients.

BMI → Types of Supplements

BMI → Academic Record

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	23.330	2.194		10.633	.000
	Types of Suppliments	-.268	.864	-.017	-.310	.757
	Academic Record	-.160	.931	-.009	-.171	.864

a. Dependent Variable: BMI

$$BMI = \beta_o + \beta_1(\text{Types of Suppliments}) + \beta_2(\text{Academic Record})$$

$$BMI = 23.330 + (-0.268)(\text{Types of Suppliments}) + (-0.160)(\text{Academic Record})$$

We have to proof hypothesis Ho true for regression model, i.e.,

H_o : Regression is significant

H_1 : Regression is not significant

Regarding the regression model we can identify the interpretation of X_1,

X_1 = 1 Unit increase in X_1 will bring 0.268 units decrease in BMI

X_2 = 1 Unit increase in X_2 will bring 0.160 units decrease in BMI

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.031	2	7.016	.065	.937[a]
	Residual	37009.460	344	107.586		
	Total	37023.492	346			

a. Predictors: (Constant), Academic Record, Types of Suppliments

b. Dependent Variable: BMI

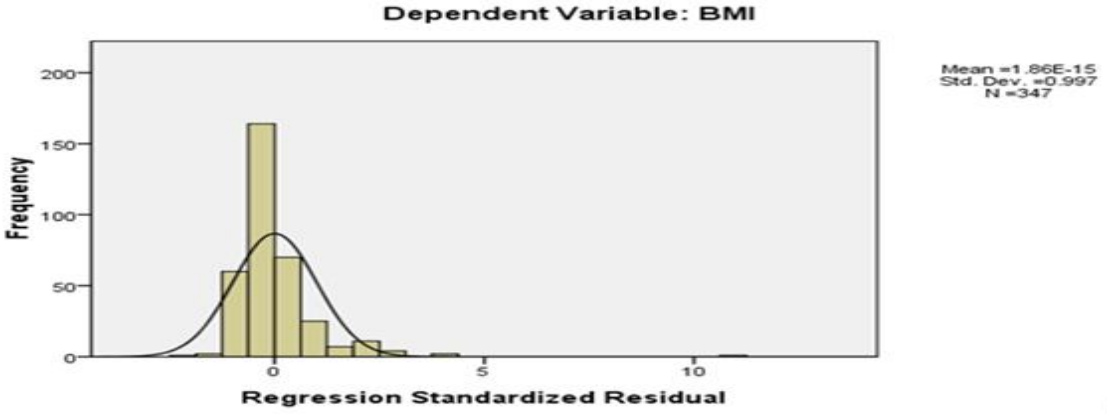
ANOVA is a method to elaborate the significance of the model. According to the ANOVA sig., P-value should be greater than 0.05.

P-value ≥ 0.05

$0.937 > 0.05$

Therefore P-value proves H_o: Regression is significant and H_o is accepted and true. Normal distribution curve is elaborated in this distribution where the relationship between the no. of students (frequency) and the regression standardized residual is calculated mean 1.86E-15 and standard deviation 0.997 captured by dependent variable BMI is shown in Fig .

Regression Distribution that shows both the relationships having the same Dependent Variable (BMI) and Predictors/Constants (Academic Record and Types of Supplements)



Type of Supplements as a dependent variable (Y), X_1 as a coefficient that is (Academic Record)
Types of Supplements → Academic Record

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.821	.095		19.140	.000
	Academic Record	.049	.058	.045	.845	.399

a. Dependent Variable: Types of Suppliments

$$\text{Types of Suppliments} = \beta_o + \beta_1(\text{Academic Record})$$

Types of Supplements = 1.821 + (0.049)(Academic Record)
We have to proof hypothesis Ho true for regression model, i.e,
H_o : Regression is significant
H_1 : Regression is not significant
Regarding the regression model we can identify the interpretation of X_1,
X_1 = 1 Unit increase in X_1 will bring 0.049 units increase in Types of Suppliments

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.298	1	.298	.714	.399[a]
	Residual	143.967	345	.417		
	Total	144.265	346			

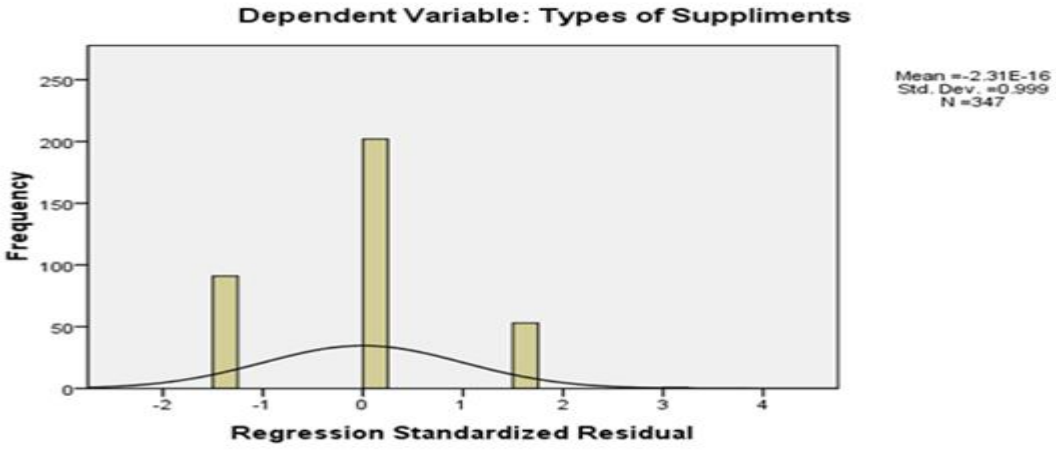
a. Predictors: (Constant), Academic Record
b. Dependent Variable: Types of Suppliments

ANOVA is a method to elaborate the significance of the model. According to the ANOVA sig., P-value should be greater than 0.05.

P-value > 0.05
0.399 > 0.05

Therefore P-value proves H_o: Regression is significant and H_o is accepted and true. Normal distribution curve is elaborated in this distribution where the relationship between the no. of students (frequency) and the regression standardized residual is calculated mean -2.31E-16 and standard deviation 0.999 captured by dependent variable Types of Supplements is shown in Figure 4.12.

Regression Distribution that shows the relationship between Dependent Variable (Types of Suppliments) and Predictors/Constants (Academic Records)



DISCUSSION

In previous studies, it was establish that higher parental education level and household monthly income were associated with higher intakes of dietary supplements by children. Combined vitamin and mineral supplements and calcium supplements (mineral supplements) were the most popular supplements consumed by children aged 4-12. This might be related to the nutrition knowledge of the public that children need good nutrition for growth and development. In fact, calcium supplementation has been found to be beneficial for bone health in children & adolescent. In addition to calcium, vitamin D is necessary for bone health and is generally deficient in the industrialized world. Children more commonly took food supplements, possibly due to the parental expectation for children in this age group to prevent colds and flu and strengthen the immune system. In addition, children predominantly took fish oil, possibly due to the presence of health information indicating long-chain polyunsaturated fatty acids and contained in fish oil is helpful for children's neurological development. Epidemiologic and experimental studies had indicated that consumption of long-chain polyunsaturated fatty acids may reduce the risk for a variety of diseases, including cardiovascular, neurological and immunological disorders, diabetes and cancer. Previous studies found that almost 50% of subjects believed that dietary supplements could be used in place of medications to treat disease, and almost 60% of subjects believed that dietary supplements could prevent disease. There is a wide variety in the level of safety and quality of these products. As the number of Taiwanese people using dietary supplements continues to increase, it is important to better understand the general public's perceptions and knowledge about dietary supplements as well as the marketing strategies used for each product. Communication between professionals and the public should be strengthened and members of the public educated to increase understanding of the special characteristics of dietary supplements. This would enable dietary supplements, where appropriate, to be more effectively used to improve health, as well as promote preventive medicine and decrease medical costs (Shih, et al. 2007).

Vitamins and minerals are necessary for proper growth, metabolism, digestion, immune system function, muscle and nerve function and detoxification processes in the liver. Scientific studies have shown that the majority of us are deficient in many essential nutrients because of poor dietary habits and other factors which may diminish nutrient levels such as caffeine, drugs, stress or pollution. A daily multivitamin can help to keep your child's energy and concentration levels at their best. Full-spectrum multivitamin and mineral merchandise in highly absorbable figure is indispensable to ensure the foundation of health. Vitamins and minerals are necessary for proper growth, metabolism, digestion, immune system function, muscle and nerve function and detoxification processes in the liver Scientific studies have shown that the majority of us are deficient in many essential nutrients because of poor dietary habits and other factors which may diminish nutrient levels such as caffeine, drugs, stress or pollution. A daily multivitamin can help to keep your child's energy and concentration levels at their best. In this study age limit of interviewees was 4-12 years. Maximum interviewees were fallen under the age of 8-12 years (41.8% were 11-12 years and 36.3% were 8-10 years of age). While on the other hand only 22%, 76 out of 347 were interviewed on specific formats fell into (4-7) years. Proper diet and nutritional supplements may benefit children of all ages by boosting immunity and optimizing health. Aforementioned study showed clearly that collective vitamin and mineral supplements and calcium supplements (mineral supplements) were the most accepted supplements obsessive by children aged 4-12 (Shih, etal. 2007).

58.2% students were using multi-vitamins especially in the form of milk and its products. Drinks form food supplements were going to well-known among children, especially in school going children because of their good taste. As per study's result 26.2% were taking multivitamins in the form of drinks. While only 15.3% were using the food supplements in tablets. This might be related to the nutrition knowledge of the public that children need good nutrition for growth and development. In fact, calcium supplementation has been set up to be beneficial for bone health in children (Grillenberger, 2006).

An assortment of factors has led to the practice of dietary supplementation in the market place. Japanese research on the popularity of dietary supplements has found that mass media broadcasts, medical care and improved economic status have been three important factors. Potential factors include malnutrition, types of diet, eating habits, pharmacological effects, food allergy, fatty acid deficiency and possibly food additives. There is rising confirmation that the requirement of glucose or any other food supplements may sway both memory and mood, particularly when intense metabolic demands are placed on the brain. Most of the school going children, 47.3% were taking food supplements for their better health and 23.3% students were using for their better performance in the class. As per advice of doctors, only 26.8% children were using them for protection from diseases. Numerous studies have shown that dietary supplements does play an vital responsibility in intelligence, brain function and development, starting from a baby's nutrition, via the mother, in the womb, throughout childhood and adolescence and even into adulthood, after active growing as ceased. Eating the right diet can not only increase your intelligence but can also prevent attention/hyperactivity disorders, mental imbalance and degenerative mental diseases. Research shows that your overall intelligence is mostly developed during your childhood years. Therefore ensuring that children receive the correct nutrition can make a big difference to their future academic performance and success in life. The brain is composed of 60% fat – this is the main component of the cell membranes of the brain neurons and also of the protective myelin sheath that covers them. The type and proportion of fats or fatty acids within the membranes play a crucial role – for example, they determine how effectively the brain neurons can

communicate. The results of this study also supported aforesaid statement regarding the influence of proper food supplements intake of children on their academic records. Study indicated that students who are taking regular food supplements are intelligent and their academic records mostly fell into 60% or above. Among them, 52.4% students got the marks in between (80-100) % and 42.1% fell into (60-80) %. While only 5.5% students are below average (Grillenberger, 2006).

Findings

1. Vitamins and minerals were necessary for proper growth, metabolism, digestion, immune system function, muscle and nerve function. A daily usage of multivitamin was helped to keep the child's energy and concentration levels at their best. In addition to calcium & vitamin D were necessary for bone health and were generally deficient in the industrialized world. Children more commonly took food supplements, possibly due to the parental expectation for children in this age group to prevent colds and flu and strengthen the immune system.
2. Multi-vitamins, mineral supplements including calcium supplements were the most popular supplements consumed by children aged 4-12.
3. It was found that students who were taking regular food supplements were intelligent and their academic records mostly fell into 60% or above. Among them, 52.4% students got the marks in between (80-100) % and 42.1% fall into (60-80) %, while only 5.5% students were below average.
4. A child, who had developed good eating habits early in life, had less health problems and obesity.
5. Good nutrition was necessary for growing children.
6. Children needed calcium and vitamins in the beverages not only sugar.
7. Collective vitamin and mineral supplements and calcium supplements (mineral supplements) were the most accepted supplements obsessive by children aged 4-12.
8. There was rising confirmation that the requirement of glucose or any other food supplements were swayed both memory and mood, particularly when intense metabolic demands were placed on the brain. Most of the school going children, 47.3% were taking food supplements for their better health and 23.3% students were using for their better performance in the class. As per advice of doctors, only 26.8% children were using them for protection from diseases.
9. Present study indicated that students who were taking regular food supplements were intelligent and their academic records mostly fell into 60% or above. Among them, 52.4% students got the marks in between (80-100) % and 42.1% fell into (60-80) %, while only 5.5% students were below average.

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