Original Research Article

Prevalence and Factors of Malnutrition among children under 5 years of age in Frash Town Islamabad

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Abstract

Aim and Objective: This study was conducted with the aim to estimate the prevalence of malnutrition and associated factors among children under 5 years of age in Frash Town Islamabad. Methodology: It was a cross sectional descriptive study. 400 children under 5 years were selected by using non probability convenient sampling. *Analysis:* Descriptive statistics was used to find the frequencies and percentages while inferential statistics was used to determine the association between nutritional status of under 5 children and different variables. *Results:* Out of 400 subjects, 21% had normal nutritional status 20% were at risk of malnutrition and 77% were found to be malnourished. Statistically significant relationship was found between nutritional status of under 5 children and socioeconomic status, parent's education. *Conclusion:* Overall results showed that 77% of the children under 5 were malnourished. There is a need to plan composite interventions to elucidate the factors that place children at greater risk for malnutrition.
Keywords: Malnutrition, Stunting, Underweight, Wasting, Children.

INTRODUCTION

Rational for Research

Malnutrition is a serious problem all over the world including Asian countries. Pakistan is one of the countries where almost 40% to 50% of the population of under five children is malnourished including urban and rural areas. A lot of research studies had been done in different areas of Pakistan but very few studies have focused on prevalence of malnutrition and associated factors and there is a need to identify the prevalence of malnutrition and its associate factors. Estimates of the burden of malnutrition will provide vital information on preventable ill-health, and indicate the health gains possible from interventions to prevent the risk factor. Identifying and understanding of the associated factors for childhood malnutrition in Pakistan will aid in planning and budgeting for the nutritional needs of children by the policy-makers. It will also serve as a baseline for other future studies geared towards monitoring nutritional status.

Although balanced nutrition is most important for human body which keeps individual healthy and provide energy for survival and also essential for good health. Nutritious and balanced diet comprises of seven different food components which are proteins, fats, carbohydrates, vitamins, minerals, fibers and water. The prime malnutrition does not start from insufficient or too much intake of nutrients, it is due to lack of primary health care and also other social and environmental factors [1]. Malnutrition occurs because of the society where population growth may lead to insufficient food supply. In other words, we can say that malnutrition is the lack of proper and unbalance nutritional deficiency in the body or insufficiency of adequate healthy nutrients in the food. It is the condition when we are not having enough healthy food in our routine diet that causes different health problems.

There are several nutrients like protein, carbohydrates, fat, minerals and vitamins which are very necessary for the growth and development in the childhood. Malnutrition occurs in all ages (childhood, adulthood, and older adults). Here we will be discussing malnutrition in under five because malnutrition is very common in children at the age between 6-59 months. That is the growing age where if deficiencies occur, the child will suffer abnormal growth. In developing countries malnutrition is associated with 54% of 10.8 million deaths in children under five year of age [1].

According to previous studies among six Asian countries more than 12 million children are suffering from severe acute malnutrition (SAM). In Afghanistan 0.6 million children suffered from severe acute malnourished, 0.6 million children in Bangladesh, 8.0 million children in India, 1.2 million in Indonesia, 1.4 million in Pakistan, and 0.6 million children in Yemen [2].

Study shows that in developing countries almost 20 million children under five-year age experience severe acute malnutrition which leads to the death of nearly one million children per year [3].

In Asian countries including South Asia70% of children are malnourished and one in every two children is underweight [4]. The associated factors which lead to malnutrition are the lack of food intake and cheap quality food intake due to poverty. Infectious diseases caused due to lack of immunity against harmful infectious agent in malnourished children. We can say that malnutrition occurs in pregnancy and continue after birth in the baby that's why he/she cannot develop physically as well as mentally. Malnutrition is a condition which results from consuming an unhealthy diet which leads to different health problems. Sufficient nutrients are essential in early growing age for healthy growth and development, proper organ formation maintaining proper functions in the body such as empower immune system, neurological and cognitive development. Well-nourished human development produces healthy and skilled individual who think critically and contribute to their communities for their betterment. In Pakistan, malnourishment in children, especially those less than five years, is a major challenge with their health. In spite economic factors are the leading point with this continuous problem. Various income groups (low income, middle income, high income) in urban and rural areas are affected by malnutrition after the age of six months when start weaning food, which fulfill the nutritional requirements of the children in their growing age. Unfortunately, in the poor families, parents do not fulfill the nutritional requirement of their children due to poverty (low income) and illiteracy (lack of knowledge about balance diet). Food security is another critical problem in poor families. In another words food security is a condition in which all citizen shave access to adequate, safe and healthy foodstuff to assemble their nutritional requirements and food choices for a dynamic sound and strong life. If we talk about developing countries, Pakistan is one of the countries where children are suffering from moderate to severe malnutrition.

According to WHO report about the children of under-five, it shows that almost 87% of under 5 children in the developing countries are suffering from Protein–Energy Malnutrition (PEM) [5]. The results of the report based on a national report. A cross-sectional study was conducted between 1980 and 1992 in 79 developing countries, including Africa, Asia, Latin America and Oceania. According to this study most of the children were suffering with malnutrition. The indicators such as (wasting, stunting, and underweight) were visible in these areas. In Latin America and Asia prevalence of malnutrition was low and moderate respectively. Most countries have very high prevalence of underweight and mainly in Africa found mixture of both high and low prevalence. 80% of children were found stunted mainly in southern Asia. It was estimated that about, 43% of children in developing countries were stunted. Finally, it was suggested that efforts should be made rapidly to ensure economic development [5]. According to a report of Pakistan one out of every three children is malnourished, 30–40% of Pakistani children have stunted growth and >14% of children having low weight for their height (wasting) [6].

In Pakistan malnutrition is very common in poor families especially in rural areas where people have lack of awareness about healthy food. Although they have healthy environment but people are mostly illiterate and they don't have knowledge regarding nutritious food. Study reported that the determinants of malnutrition in Pakistani children were multiple and widespread at individual, family, and community level [6]. Analysis of biological, maternal, socio-cultural, environmental, and politico-economic factors pointed that most of these determinants were interconnected and interlinked. There is a need to resolve this issue and make plan for interventions at community level. Therefore, this study is carried out with the aim to determine the prevalence of malnutrition among children under 5 years of age in Frash Town Islamabad and to determine factors associated with malnutrition among children under age 5 year of age.

RESEARCH AIM AND OBJECTIVES
To assess the nutritional status and its associated factors children under 5 years of age.

Objective
The main objectives of the study are
1. To determine the prevalence of malnutrition among children under 5 years of age in Frash Town, Islamabad.
2. To identify the factors associated with malnutrition among the children under five years.

Operational Definitions
According to (WHO) "The term malnutrition can be defined as the insufficient, excessive or imbalanced consumption of nutrients".

Stunting
Stunting is defined according to the WHO is for the "height for age" value to be less than two standard deviations of the WHO Child Growth Standards median.

Wasting (Moderate malnutrition)

It is defined as a weight-for-age between -3 and -2 z-scores below the median of the WHO child growth standards. It can be due to a low weight-for-height (wasting).

Body Mass Index

According to WHO (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m2).

$$\text{Weight for Age} = \frac{\text{Weight of the child}}{\text{Weight of the reference child of the same age}} \times 100$$

$$\text{Weight for height} = \frac{\text{Weight of the child}}{\text{Weight of the reference child of the same age}} \times 100$$

METHODOLOGY

Study Techniques:

Mixed method approach was used as some of the information was qualitative and some was quantitative.

Study Site

The present study was conducted in the area of Frash town, Islamabad, Pakistan from January -March 2018.

Study Population

The study population under study was children under 5 years of age.

Inclusion Criteria

All the children without any abnormalities or chronic diseases, whose mothers were willing to take part in the study, were included.

Exclusion Criteria

Children who were suffering from any chronic disease or congenital abnormalities were excluded from study.

Study Duration

This study was conducted over a period of three months.

Study Design

This was a cross-sectional community based survey.

Sampling Techniques

The researcher used convenient sampling techniques to collect the data from the participants.

Sample Size Estimation

The sample size was calculated by taking the prevalence of malnutrition among under 5 year children from a recent study which was 44%, with standard confidence interval which was 95% and margin of error (d) used 5%. (National Nutrition Survey Pakistan-2011) With given prevalence total sample size was calculated for this study which came out to be 378 children. Following formula was used [7].

$$N = t^2 \times p\,(1-p)/m^2$$

Where

N= sample size

t^2= confidence level which is taken as 95%, and its value is 1.96 for 95%

p= the prevalence of malnutrition under five years and taken from previous study (National Nutrition Survey-2011) that is 44% and value taken as 0.44.

m^2 = margin of error taken as 5% and its value is 0.5

By putting the values in the formula, we get the sample size

$$N = t^2 \times p\,(1-p)/m^2$$
$$N = (1.96)^2 \times 0.44\,(1-0.44)/(0.5)^2$$
$$N = 378.47$$

The calculated sample size was 378 and 5% adjusted for the non-response rate or attrition rate, and the final sample size came to be 400.

Data Collection Tool

Self-constructed tool was developed to assess the malnutrition among children under 5 years of age. Variables such as socioeconomic status, demographic data, and dietary assessment indicators were included in the questionnaire. In the socioeconomic status some questions were developed such as no. of persons in the family, earning members in the family, father/mother education, father/mother occupation, total household monthly income. In demographic data we developed such type of questions like total number of children in the family, under five children in the family, sex of the child, age of the child in months, birth interval in years, age of mother at birth, and others.

Data Collection Method

Data gathered through structured assessment tool and household survey on the daily basis which took almost 45 days. Interviews of mothers were taken and anthropometric measurements of children were also recorded. Assessment tool was developed in English and was translated in Urdu so as to remove any language barrier.

Variables of Interest

In this study following important variables were identified:
1. Total earning members in the family
2. Monthly income of the family

3. Education status of the parents
4. Socio-economic status of the family
5. Wasting and stunting
6. Mother occupation
7. Birth interval between children
8. Clinical symptoms of severe malnutrition

Data Analysis

After making the codebook and assigning proper codes to all questions data was entered in the SPSS. Before starting analysis data was checked for errors. Both categorical and continuous variables were checked and after cleaning of data it was analyzed statistically using SPSS 22.0 version.

RESULTS

In the present study data from four hundred households with children under the age of five years was taken from Frash Town Islamabad community. Mean age of the children under study was 26.9 ± 14.5 months. 56 % of the children were male and 44% female. Out of 400 hundred families 52% were living as nuclear and 48% as joint family.

Table-1: Number of earners in family

Earning Members	Frequency	Percentage (%)
1	196	49
2	124	31
3	52	13
4	20	5
5	8	2

Above table is showing that 49% families dependent only on 1 earner, 31% dependent on 2 earners, and 13% were dependent on 3 members, 5% are dependent on 4 earners and only 2% were dependent on 5 earners.
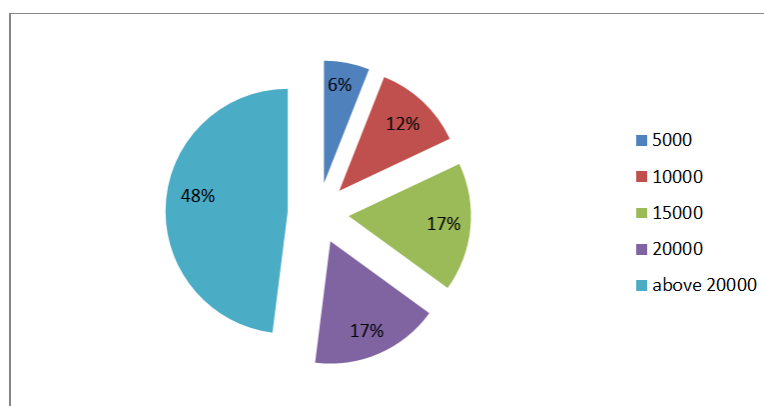

Fig-1: Monthly income of family.

Total monthly income of the household is given in Figure-1. About 48% of the families having monthly income above 20,000 Rupees, 17% of the families having monthly income of 20,000 Rupees, 17% families having monthly income 15,000 Rupees, 12% families having 10,000 Rupees, whereas only 6% of the families in this study having monthly income of 5,000 Rupees.
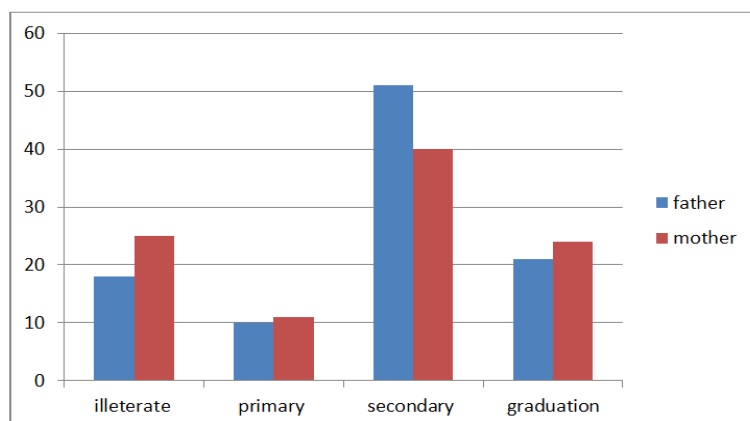

Fig-2: Parents education status

As shown in Figure-2, 18% fathers and 25% mothers were illiterate. 10% fathers and 11% mothers were having primary education, 51% fathers and 40% mothers were having secondary education and 21% fathers and 22% mothers were having graduate level of education.

As for as regarding mother's occupation 86% of the women were housewives and only 14% were working including, handcraft, and work in the farms and servant work. On the other hand, 41% of the fathers were doing government/private jobs, 30% doing their own business, 22% labor work and only 7% were unemployed.

Table-2: Socioeconomic status of family

Socioeconomic status	Frequency	Percentage
High SES	44	11
Moderate SES	180	45
Low SES	176	44
Total	400	100

Socioeconomic status (SES) of the family was measured and classifies into three main categories, including high SES, middle SES, Low SES. 11% families were living with high socioeconomic status, 45% were living with moderate socioeconomic status, and 44% were living with low socioeconomic status. As above showing results of SES given in Table-2.
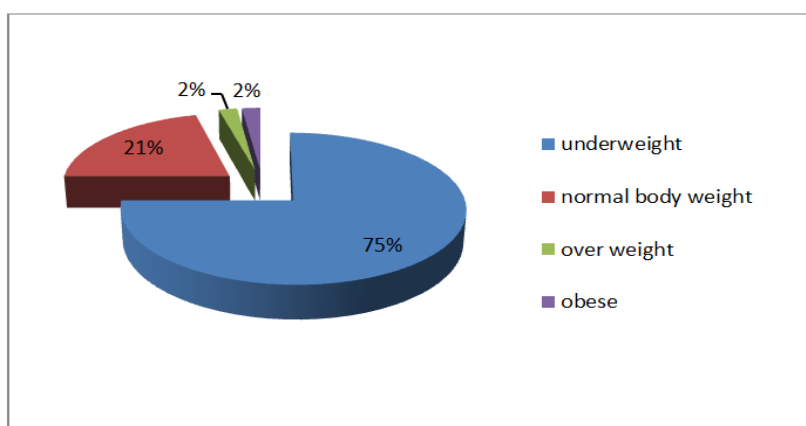

Fig-3: Distribution of body mass index

Body mass index of children was measured and classifies into four categories including underweight, normal, overweight and obese. 75% children were underweight, 21% children were normal body weight, 2% children were overweight and 2% children were obese. The results are given in Figure-3.

stunted and 35% were wasting. In the present population stunting is much more common than wasting as it is evident in the above table.

Regarding growth percentiles on the growth charts 63% of children were less than 5th percentile, 24% were between 10th -50th percentiles which is in the range of two standard deviations of below the normal and shows variations to the normal. Only 7% were above the 90th percentile and 6% between 50th -90th percentiles. As for wasting is concerned 35% were less than 5th percentile, 38% between 10th -50th, the normal percentile 19% falling and only 8% were above 90th percentile.

Table-3: Wasting and Stunting.

Category	Yes n (%)	No n (%)	Total
Stunting	260 (65%)	140 (35%)	400
Wasting	140(35%)	260(65%)	400

Along with BMI data for other conditions like wasting and stunting was also gathered. Table-3 shows results of wasting and stunting. As 65% children were
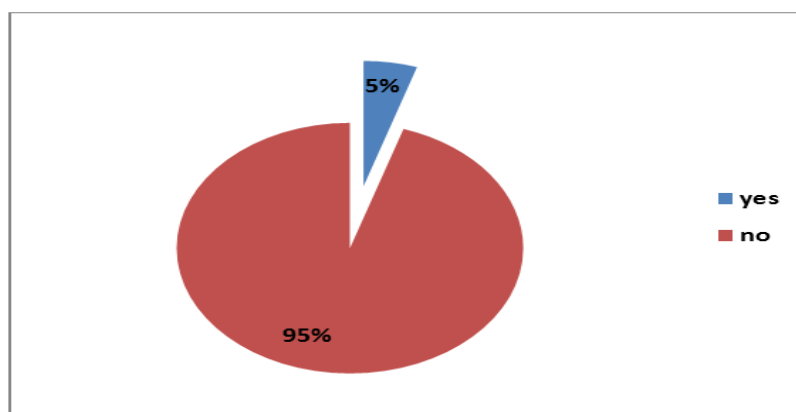

Fig-4: Presence of Bitot's spot

Above Figure is showing presence of Bitot's Spot. 95% children were present with no Bitot's Spot and only 5% children were positive Bitot's Spot.

Table-4: Visible severe wasting and bilateral pitting edema

Status	Visible Severe wasting	Bilateral pitting edema
Yes	8	4
No	392	396

Regarding symptoms of severe malnutrition including pitting edema and visible sever wasting. Results showed that 392 children were not having visible severe wasting and 8 children having visible severe wasting, as for as 396 children having no bilateral pitting edema and only 4 children having bilateral pitting edema.
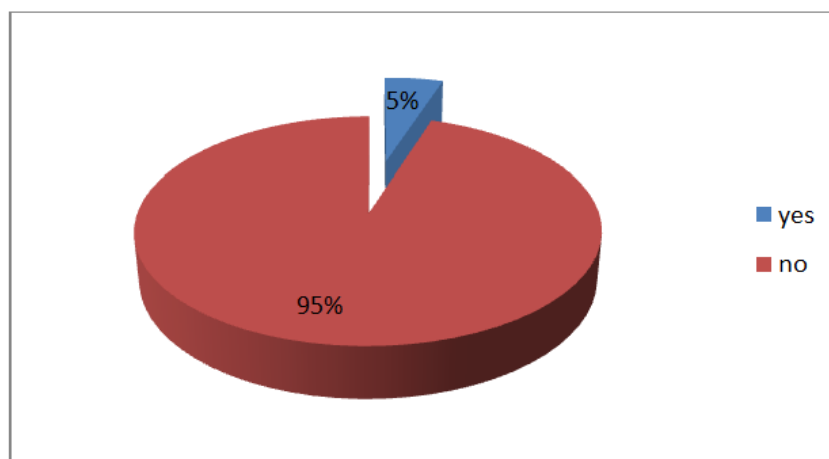

Fig-5: Presence of pale color

In the above Figure results are showing that 95% children were not found out pale and only 5% children were found with pale color.

Table-5: Association between household monthly income and BMI

Monthly Income	BMI				
	Underweight	Normal	Overweight	Obese	P. Value (chi)
5000	16	8	0	0	0.51
10,000	24	16	0	4	
15,000	52	8	4	0	
20,000	56	8	4	0	
<20,000	144	44	8	4	

To find out statistical association between monthly income and BMI categories chi square test was used. The p value came out to be 0.51 which shows that there is no statistical significant association in the test; results are given in the Table-5.

Table-6: Association between total earners in family and BMI

Total Earner	BMI				P. Value (chi)
	Underweight	Normal	Overweight	Obese	
1	132	44	8	4	0.91
2	96	28	0	0	
3	40	8	0	4	
4	16	4	0	0	
5	8	0	0	0	

To find out statistical association between total earner in the family and BMI categories statistical chi-square test was used. The p. value is 0.91 shows that there is no statistical significant association in the test; results are given in the Table-6 below.

Table-7: Association between father education and BMI

Education Status	BMI				P. Value(chi)
	Underweight	Normal	Overweight	Obese	
Illiterate	56	12	0	0	**0.59**
Primary	32	4	4	0	
Secondary	148	44	4	8	
Graduate	56	24	0	0	

To find out the statistical association between father education and BMI categories statistical chi-square test was used, there is no any statistical significance association was showed in the test. Results are given in the Table-7 above.

Table-8: Associations between SES and BMI

Socioeconomic Status	BMI				P value(chi)
	Underweight	Normal weight	Over weight	Obese	
High SES	40	0	0	4	0.29
Moderate SES	136	40	4	0	
Low SES	124	44	4	4	

To find out statistical association between socioeconomic status and BMI categories chi-square test was used, showed no statistically significant association P value = 0.29 The results are given in the Table-8.

Table-9: Association between Stunting and mother Education

Stunting	Mother Education				P value (chi)
	Illiterate	Primary	Secondary	Graduate	
Yes	48	32	120	56	0.1
No	48	12	40	44	

To find out the association between stunting and mother education, Results shows that there is no significant association between mother education and stunting because of p. value is 0.1.

Table-10: Association between Wasting and mother Education

Wasting	Mother Education				P value (chi)
	Illiterate	Primary	Secondary	Graduate	
Yes	32	16	64	28	0.6
No	64	28	96	72	

To find out the association between wasting and mother education chi square test was used which showed no significant association because the p. value is 0.6.

Table-11: Association between birth interval and BMI

Birth interval in years	BMI				P value(chi)
	Underweight	Normal weight	Over weight	Obese	
<2	144	40	4	4	0.001
3-4	100	32	4	0	
5-6	56	12	0	4	

To find out the association between birth intervals and BMI, children were analyzed with statistical test and results show the important findings which was a highly significant association p value 0.001.

DISCUSSION

In this present study data was collected from four hundred households through survey from Frash town Islamabad. Frash town is well populated area and some of the families were from middle class and majority of them were low class. From four hundred household's surveys, we find out that the Mean age of the children under study 'was 26.9 ± 14.5 months. 56% percent of the children were male and 44% female.52% families were living as nuclear and 48% were living as joint families. We find out that joint families were very large families almost 10 members in each family and these were 90% of families and 10% those whose family members were more than 10. Frash town is the area where 99% of the people were living as Muslims community. No any other community was living in that

area. From assessment tool most of the variables were very significant and having direct association with malnutrition. From 400 families' data collected for total earners in the family. The frequencies were found from out of 400 households, 49% of those families who were dependent on only 01earners, 31% families were those who were dependent on 02 earners, 13% were dependent on 03 earners, and 5% were dependent on 04 earners and 2% of dependent on 05 earners. The data showed that the maximum families estimated were poor because of many family members. This can be estimated to the malnutrition because family size restrictions and the existing assets for the family that affects the nutritional status of the child. One of the studies conducted in Karachi, according to the results, large household size (adjusted prevalence odds ratio, 1.7; 95% confidence interval, 1.0 to 3.8) were also associated with stunting [8]. The other variable was monthly income of the family found that out of 400 families 48% of those families whose monthly income were above 20,000, 17% were spending on 20,000, 17% we're spending on 15,000, 12% were 10,000 and 6% were spending on 5,000 monthly incomes. Regarding 48% families were fall in above 20,000 and 17% were fall in the 20,000 and 15,000. Pakistan is a developing county that's why due to large family size and low monthly income we can estimate the families were fall into low status. Parent's occupation and education are interlinked that is why we determined the father and mother educational status as well as in order in the illiterate, primary, secondary and graduation. Here we made categories for educational status. The study presents that almost 18% fathers were falling in the categories of illiterate and mothers were 25%. Almost 10% of fathers were having primary education and 11% mothers were having primary. 51% of fathers were secondary literate and 40% were mothers. 21% fathers were graduates and mothers were 23%. Here we can estimate in each category other than secondary, the father educational status was fall in low educational status and mothers were fall in little bit high but consider as low educational status. Only 51% fathers were got secondary education and 40% mothers in the category of secondary education. According to the studies, they reported that mother's literacy status had a definite association with the malnutrition of the children <3 years of age [9].

In Research Report III [10], in which researcher noticed that developing countries women's education and status have contributed to over 50% of the total reduction in child underweight rates from 1970-1995.Regarding mother's occupation out of 400 families 86% of the women were housewives and only 14% were working. On the other hand, 41% of the fathers were doing government and private jobs, 30% doing their own business, 22% labor work and only 7% were unemployed. That is showing another concern with low socioeconomic status. We determined the socioeconomic status into three categories such as high,

moderate and low SES. We found the frequencies that out of 400 families 11% were categories as high socioeconomic status, 45% were in moderate socioeconomic status and 44% were spending in low socioeconomic status. If we compare it with the study which was carried out in Nagpur, India, the study strongly pointed toward the significance of proper infant feeding practices, proper nutrition, parental education and improved living conditions (SES) for reducing malnutrition among under-five children. They found Out of the total 150 children 46% were underweight, 52% were stunted and 20.7% were wasted. The total prevalence of malnutrition was 63.33%. The factors associated with malnutrition were low birth weight 85%, mother's literacy 77.78%, and father's literacy 73.97, lack of exclusive breast feeding 81.25%, socio-economic-status 74.44% and incomplete immunization 76.19% [11]. Another variable measured was Body Mass Index. BMI was classified into four categories such as underweight, normal, overweight and obese. We found that 75% out of 400 children were underweight, 21% were having normal body weight, 2% were overweight and 2% were falling into obese. And 65% children were stunting and 35% wasting were present. The data were showing that stunting is much more present in the children in fewer than five than the wasting. According to [12] the influence of socioeconomic factors on the nutritional status of children, mother's age and child's age and sex was assessed. For stunting, as well as for the mean height-for-age index among children, the main determinants were economic level of the household, schooling of the mother and living in the peripheral district. According to the results influence of socioeconomic determinants on weight-for-age and wasting was less straight forward. When adjusting, in addition, for maternal and prenatal factors (mother's height and body mass index and birth weight), most of the effects of the socioeconomic determinants on the nutritional status of children persisted somewhat, but the effect of the economic level on the stunting became not significant. Regarding growth percentiles on the growth charts 63% of children were less than 5th percentile, 24% were between 10th -50th percentiles which is in the range of two standard deviations of below the normal and shows variations to the normal. Only 7% were above the 90th percentile and 6% between 50th -90thpercentiles.As for wasting is concerned 35% were less than 5th percentile, 38% between 10th -50th, the normal percentile 19% falling and only 8% were above 90th percentile.

We found out the statistical association of BMI and socioeconomic status using chi-square (P value = 0.2.). The p-value was 0.29. It means that there was no significant association of socioeconomic status with BMI. Another statistical chi-square association between monthly household income and BMI, there was no significant association find out. Regarding total earner in the family between BMI not found significant association. Another variable was to find out the

association between stunting and mother education and between wasting and mother education and chi square used for it and find out no significant association. The p-value was 0.1. The association between Wasting and mother Education, the p-value was 0.6. Regarding father education and BMI find out no any significance association. Other variable was birth interval between children was analyzed and looked for statically significance with BMI. This was the important finding and showed a highly significant association of p value 0.001. Regarding other symptoms of severe malnutrition including visible sever wasting were only 2% present, bilateral pitting edema was 1%, presence of pale color in the conjunctiva was 5%, presence of Bitot's test was 5%.

CONCLUSION

This study concluded that in Frash Town, Islamabad, 56% percent of the children were male and 44% female.52% families were living as nuclear and 48% were living as joint families. Only 51% fathers were got secondary education and 40% mothers in the category of secondary education. Regarding occupation86% of the women were housewives and only 14% were working.41% of the fathers were doing government and private jobs, 30% doing their own business, 22% labor work and only 7% were unemployed.11% were categories as high socioeconomic status, 45% were in moderate socioeconomic status and 44% were spending in low socioeconomic status.21% were having normal body weight, 2% were overweight and 2% were falling into obese. And 65% children were stunting and 35% wasting were present 75% of children were underweight showing high prevalence of malnutrition. It was also concluded that less interval in the births of children are highly associated, alongside the severe conditions of malnutrition like stunting and wasting was also present in significant amount.

RECOMMENDATIONS

- It is very important to concentrate on each of these factors and government should take interventions to strengthen the families through the improvements of incomes that are why they became financially strong and can afford their families.
- Another most important part is family planning, government should make some policies about maximize birth interval and ensure family planning services.
- The other and important thing to my colleagues and researchers to do work on malnutrition and make studies in different areas of the Pakistan to know where Pakistan is stand on malnutrition and what's

the prevalence of malnutrition in different areas of Pakistan.

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