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A Study Related to The Assessment of Vitamin A Deficiency in Children Aged (3-6) Years and Survey the Knowledge of The Mothers

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Abstract

The present study was taken with the objective to study the socio-economic profile of the subjects, assess the anthropometric measurements of the pre-school children aged (3-6 yrs.), assess the clinical symptoms of the subjects, mother's knowledge pre and post- test regarding vitamin A with questionnaire. A total 50 mothers aged 25- 35 years were randomly selected from the two different rural areas (Uncha gaon and Machariya village) of the Moradabad city. Subjects were interviewed for obtaining general information, frequency table, anthropometric data, clinical symptoms, and mother's knowledge test with questionnaire. Mostly 32% mothers were housewife, 18% mothers were service women. Majority of the subjects 30% were illiterate and 32% mothers were eight class or intermediates but knowledge level is less about vitamin. After pre-test council were given to mothers then there is increment in knowledge level was seen regarding to vitamin A.

Anthropometric measurements (3-6years) pre-school children revealed that only 12% boys and 8% girls were normal. 20 % boys and 26% girls were GradeI (mild under nutrition).16% boys and 10% girls were (moderate under nutrition) Grade II. During clinical survey it was found that most of the children's were suffering from night blindness 58% or4% children were suffering from xeropathalmia and bitot's spots.10% children were suffering from low growth development, skin problem, teeth problems because don't intake properly vitamin A rich foods.

Data regarding knowledge level of vitamin-A among the 60% subjects were having knowledge form of vitamin A, 5% unaware regarding the same. 56% mothers were having knowledge of vitamin A rich fruits and 10% unaware. A total of 64% mothers were aware vitamin A rich vegetables and 4% mothers were not aware. Mostly 64 % mothers were aware to animals sources rich in vitamin-A and 40% mothers were aware vitamin A deficiency. After pre- test and counseling to pre-school mother's knowledge level increased. This could be attributed to the low intake of vitamin-A rich foods such as dark green leafy vegetables /yellowish fruit in the higher age groups. Green leafy vegetables are also good sources of carotene overall improvement in nutritional status of children.

Keywords: Anthropometry, morbidity, deficiency, mortality, severe.

INTRODUCTION

Vitamin A, identified in 1913, was the first fat-soluble vitamin to be discovered. A light yellow crystalline compound, vitamin A is also known as retinol, a name given in reference to the participation of this compound in the functions of the retina of the eye. Vitamin A has also been called the "anti-infective" vitamin due to its role in supporting the activities of the immune system **(Carolyn Bendanier,1997).** While retinol, or preformed vitamin A, occurs only in foods of animal origin, fruits and vegetables that contain certain carotenoids also provide vitamin A activity. Carotenoids are plant pigments, responsible for the red, orange, and yellow color of fruits and vegetables **(SommerA, 2005).**

Vitamin A cannot be synthesized by the body, thus consumption through food is necessary. It occurs in two forms in nature: plant form (As β-Carotene) and animal form (as Retinol). Plan sources contain beta- carotene; more natural form of Vitamin A. Beta-carotene has to be converted into Vitamin A in the body in order to be used by it. Fat and bile (Secreted by the gall bladder) are needed for the conversion. Vitamin A is essential to everyone. However, it is the most essential for infants and young children and pregnant and lactating women.

Vitamin A protects children against nutritional blindness and is essential for the functioning of the immune system i.e. it enhances children's disease resistance capacity and protects against illness/morbidity, and reduces deaths/mortality. Therefore, it is essential for child survival. Vitamin A deficiency means that the body's store of Vitamin A has decreased/depleted. Children suffering from vitamin A deficiency are more likely to be sick and severe Vitamin A deficiency can cause blindness in children. Severe Vitamin A deficiencies increase the chances of children dying. The primary cause is insufficient intake of Vitamin A rich foods and inappropriate breastfeeding either due to poverty or inadequate knowledge about nutrition. Infections, such as measles and diarrhea can precipitate clinical Vitamin A deficiency in children **(Shinohora A, 2005).** Infants require 350ug and children in the age group of 1 – 3 years require 400 mg of Vitamin A per day. This implies 1 tablespoon of cooked green leafy vegetable per day for a young child, 2 tablespoons of cooked green leafy vegetable per day for pregnant woman and 3 tablespoon of green leafy vegetable per day for a lactating mother's. **(UNICEF, 2012).**

A prophylactic (preventive) dose of Vitamin A supplementation should be given to all children in the age group of 9-36 months at 6 monthly intervals. However, children between 3-5 years can also be given Vitamin A supplementation at 6 monthly intervals **(DietaryReference).** Ideally, a child should have received the complete 5 doses of Vitamin A by the age of 3 years.

- At a time: Children in the age group of 9-12 months should be given 1 mi. (100,000 IU) i.e. half a spoon of VA solution (the spoon accompanies the solution bottle).
- Children in the age group of 12-36 or 12-60 months should be given 2 mi. (200,000 IU) i.e. one spoon full of vitamin A solution.
- Photo of A spoon half-filled and completely filled with Vitamin A.

Vitamin A is an essential nutrient and is needed for the normal growth, development and functioning of the human body. It is called a micronutrient because it is needed only in very small quantities. Vitamin A is essential for normal vision, and is required for the normal growth and development of the young child.

It is also necessary for tissue formation and the functioning of the immune system and normal reproduction **(Dandona R,2001).**

Vitamin A deficiency is the leading cause of preventable blindness among children. This deficiency poses a serious health risk by lowering resistance to common infections, causing repeated illness and untimely death. Even when it does not blind, Vitamin A deficiency gives rise to serious and often permanent eye defects that can tragically limit a young child's potential. Worldwide an estimated 230 million preschool-aged children suffer from varying degrees of vitamin A deficiency **(Carvanjal FC,2002).**

The primary cause of Vitamin A deficiency is an inadequate dietary intake of this nutrient. Early discontinuation of breast-feeding and inappropriate weaning foods deprive the child of a rich source of Vitamin A. Young children under the age of five are not often given Vitamin A rich foods even when they are available and this contributes to the deficiency. Vitamin A deficiency can be aggravated by other factors such as malnutrition and unhygienic environments which cause frequent infections which depress the appetite and result in reduced food intake and increased utilization of stored Vitamin A. Breastfeeding women become deficient when they do not get enough Vitamin A to replace what they pass on to their infants **(Kotocha,2009).**

Vitamin A deficiency lowers resistance to common infections such as diarrhea and respiratory diseases and may interfere with the normal growth of a child. When children who are deficient in Vitamin A contract measles, they are more vulnerable to blindness and death. Children in Vitamin A deficient populations are estimated to have a 23% greater risk of dying compared to children who are not deficient **(Adeldza TA,2009).** Dryness of the eyes, usually called xerophthalmia, is in early warning sign of blindness. If left untreated it can rapidly lead to ulceration followed by scars on the cornea and may cause blindness. About 17 million children in the world show eye signs of vitamin A deficiency and are at risk of becoming blind **(WHO,1974).**

It is possible to meet the daily requirement of vitamin A through plant foods, but this is not easy because some foods may not be available or affordable. Carotene-rich fruits and vegetables are important sources of Vitamin A and are particularly needed by people who are at risk of Vitamin A deficiency. Information and education play an important part in changing dietary habits. People can start including Vitamin A rich foods once they are aware and motivated to do so for their own well-being. Informed consumers can also demand foods rich in vitamin A, thereby encouraging the food processing industry to respond to this demand by producing fortified products **(Emina.J.B.O,2011).** Vitamin A supplementation programmes provide a large doses in capsule form. As the body can store this Vitamin for long periods, one dose can meet an individual's needs for a number of months. For effective distribution of Vitamin A capsules it is important to have a functioning health care system that can provide supplements on a regular basis. Periodic Vitamin A capsule distribution programmes to large populations who are at risk have been successful in many countries including the Philippines, Bangladesh and Indonesia. Supplementation is particularly suited to those who are in greatest need of Vitamin. National Vitamin A supplementation programmes adhere to internationally prescribed **(Mburu.R,2008).**

Consider this all I have selected this study to assess the knowledge level of mothers on Vitamin A supplementation.

- Low dietary intake of Vitamin A-rich foods. The body can best absorb Vitamin A from animal sources, such as liver, milk, eggs, and cheese, fortified foods. However, dark green leafy vegetables and yellow fruit and vegetables are also good plant sources of vitamin A.
- Failure to receive high-dose vitamin A capsules (VAC) every six months.
- Rapid depletion of vitamin A in the body because of illness or infection. Pneumonia, chronic diarrhea, and measles all lead to a rapid, and potentially fatal, depletion of Vitamin A among children.

In India Most of the mothers have inadequate knowledge regarding sources of vitamins A and vitamin A Supplementation due to illiteracy, poverty, lack of communication.

Vitamin A deficiency in India

India has the highest prevalence of clinical and subclinical vitamin A deficiency among South Asian countries; 62% of preschool children were reported to be deficient in vitamin A. These dramatic results suggested high mortality rate, leading to an annual 330,000 child deaths. Estimates confirmed 31% to 57% preschool children to be the victims of subclinical vitamin A deficiency. Women of childbearing age excessively suffered from night blindness, with 5% pregnant women manifesting subclinical vitamin A deficiency. Among these 5%, about 12% were severely affected with night blindness during pregnancy. International Institute for Population Sciences, India, confirmed higher prevalence of night blindness among pregnant women, with higher percentage among rural population compared to urban folks (rural 13.7%, urban 6.4%) **(Pal R,2009).**

India, being a very vast country, represents a variety of socio cultural and economic settings. This corresponds to the diversified magnitude of vitamin A deficiency prevalence in the region, e.g. the number of children with vision problem significantly varied from region to region. Despite tremendous efforts directed at all levels to curtail vitamin A deficiency in India, the prevalence of subclinical vitamin A deficiency still exists as one of the highest in the world. High magnitude of productivity loss owing to higher prevalence of malnutrition in India has been reported. Consequently, Government of India recommended vitamin A supplementation programme with every six months interval starting at an age of 9 months among infants until they reach five years of age. Another strategy to combat vitamin A deficiency is applied in the form of supplementation of a massive dose to prevent nutritional blindness among preschool children in India **(Kotecha PV et al., 2009).**

NUTRIENT SUPPLEMENTATION FOR CHILDREN UNDER FIVE YEARS

Vitamin A is an essential nutrient for the proper functioning of the immune system and the healthy growth and development of children. Insufficient intake of vitamin A in children can dramatically increase the risk of death, blindness, and illness, especially from measles and diarrhea. Nutrient supplementation for children under five years pertains mainly to administration of vitamin A because the nutrient has been ascertained to be of public health concern in most underdeveloped countries of the world. Vitamin A supplementation refers to the percentage of children ages 6-59 months old who received at least one high-dose vitamin A capsule in the previous six months **(UNICEF,2012).**

Methods of Assessing Vitamin A Deficiency

Xerophthalmia classification was traditionally used to identify populations with vitamin A deficiency. Currently night blindness and dark adaptometry have been proposed as population assessment methods. Serum and breast milk retinol concentrations are used to identify vitamin A deficiency risk. Retinol binding protein (RBP) and serum retinol are used to determine if serum retinol concentrations are depressed by infection. Other methods are relative dose response and modified relative dose response tests **(Tanumihardjo, 2004).**

Consequences of Vitamin A Deficiency in Children

Vitamin A deficiency (VAD) is a major public health nutrition problem in the developing world . It especially affects young children, among whom deficiency can cause exophthalmia and lead to blindness, limit growth, weakens innate and acquired host defines, exacerbate infection and increase the risk of death. It is the leading cause of preventable blindness in children and increases the risk of disease and death from severe infections. It is also becoming clear that vitamin A deficiency can extend through school age and adolescent years into adulthood **(Keith and West, 2002).**

LIMITATIONS OF THE STUDY

- The study was limited on mothers of school children in(3-6 yrs) rural and urban area.
- The study was limited on sample size, study area and time.
- Age limit of school children was (3-6 yrs) boys/girls.
- The knowledge between pre-post test on prevent of vitamin A deficiency diseases.

OBJECTIVES OF THE STUDY

- To assess the anthropometric measurements of school going children (3-6 years).
- To assess the clinical symptoms of school going children (3-6years.).
- To assess the nutrition knowledge of the mothers through interview and questionnaire method.
- To associate the knowledge between pretest and post test with selected socio-demographic variables.

REVIEW OF LITERATURE

Health Link, 2003 Vitamin A, also known as retinol, is a fat soluble vitamin which plays as essential role in vision, reproduction, cell division and differentiation. It maintains the surface linings of the eye, respiratory,urinary and intestinal tracts.

Dibley et al., 2001 it is essential for the functioning of an individual's immune system. It is essential for proper fetal development right from the embryonic stage**).** Thus adequate vitamin A status is important for maintenance of good health and prevention of disease. Improvement in the vitamin A status of deficient children has been shown to enhance their resistance against disease and as a consequence significantly reduce morbidity and mortality from infectious disease and at a low cost

Kirkwood, 2001 It is therefore believed that improvement of vitamin A status in children 6 months -5 years in endemic areas can substantially reduce their risk of mortality and morbidity

McLaren, 2001 The first clear sign of severe deficiency of vitamin A is night blindness and this means the person can not see in dim light. Other signs include Bitot's spot, cornel dryness, corneal ulcers, kerato-malacia, corneal scars which may result in blindness, xerophthalmia including various other clinical

manifestations of vitamin A deficiency that affect the eyes and vision This may lead to irreversible blindness or death if the deficiency is not corrected.

Healthlink, 2003 Mild degree of vitamin A deficiency may increase children's risk of developing respiratory and diarrheal infections, decrease their growth rate, slow bone development, and decrease their likelihood of survival from serious illness.

Layrisse et al., 1998 The deficiency affects the integrity of the epithelial tissues, enzymatic, autoimmune, gene regulation and vision systems. It also decreases resistance to infection, increases the increases incidence of diarrhea, respiratory tract infection and parasitic infections such as malaria. In the 2001 MMS, 69% of preschool children with malaria parasitemia had VAD compared to only 44% who had no malaria parasitemia and were vitamin A deficient ($p<0.05$). **Shinohara et al., 2005** VAD is also known to contribute to the development of anemia by inhibition of iron absorption by phytates and polyphenols .

Cusick et al., 2005 study done in Kazakhstan showed that serum iron and retinal concentrations were significantly correlated Another study done in Zanzibar showed that vitamin A mobilized iron from stores and stimulated the production of new erythrocytes.

Clinical Assessment

WHO / FAO, 2004 Another method of assessing VAD is clinical assessment for overt signs of vitamin A deficiency. These are mainly eye (ocular) changes (Xerophthalmia) including night blindness and cases of measles and sometimes, diarrhoea. Clinical assessment is effective only for clinical VAD, which affects only a small proportion of the population globally. Sub-clinical VAD on the other hand, is the cause of widespread morbidity, mortality and disorders associated with vitamin A deficiency

Dietary Assessment

Mclaren& Frigg, 2001; WHO/FAO, 2004 This method is less a measure of vitamin A status than levels of dietary intake. It provides complementary information not available otherwise and has the advantages of being less invasive, less expensive, being able to be used for large populations and provides insights for dietary interventions Rapid and simplified Food Frequency Questionnaires (FFQs) can be used to identify groups at risk for inadequate intake of vitamin A and thus at risk for Vitamin A Deficiency.

Sources of vitamin A

Vitamin A can be obtained from different sources as outlined below:

Breastfeeding: **Allen, 2001** Breast milk is a natural source of vitamin A. Breast milk plays a role in helping to protect a child from diarrhea and malnutrition, thus reducing the risk of developing vitamin A deficiency.Infants who are exclusively breastfed by well-nourished mothers for the first six months of life receive enough vitamin A to maintain health, permit normal growth, and build sufficient liver stores of vitamin A

Fortification: **Nilson et al,1998** This is the process of adding extra vitamin into our usual food source. This requires no change in people's food habits and characteristics of the food Most fat free milk and dried non-fat milk solids sold in the US are fortified with vitaminA.

Another study by **CDC (2001)** on VAD among children in Federated States of Micronesia found a >20% prevalence of VAD in children 24-59 months. The WHO considers VAD prevalence of >20% among children aged 6-71 months a 'severe public problem'. These findings are similar to those reported from survey conducted in Malawi. The knowledge of mothers on the importance of vitamin A is low in Malawi.

Methods of Evaluation of Mothers Knowledge

Hill Z, Kirk B, Kendall C, Adjei E, and Arthur P. CT. (2007) described the Factors that affect the adoption and maintenance of weekly vitamin A supplementation among women in Ghana. To identify regimen, individual, community and cultural factors that affect adoption and adherence to weekly vitamin A supplementation in Ghana. Fifty semi-structures interviews were conducted with women who would be eligible for vitamin A supplementation, 30 with husbands and 13 with drug sellers, birth attendants and health workers. Six focus group discussions were also conducted with women. These interviews were followed by a 4-month capsule trial with 60 women. Data from a previously conducted communication channel survey of 332 women were also reviewed. The study was conducted in Kintampo District in Central Ghana. Participants for the semi-structured interviews and focus groups were selected from four villages and the district capital, and women in the capsule trial were selected at random from two villages. Knowledge of vitamins was low and taking 'medicines' for long periods and when healthy is a new concept. In spite of this, long-term supplementation will be accepted if motives are explained, specific questions answered and clear instructions are given. Successful supplementation programmes require appropriately designed information, education and communication strategies. Designing such strategies requires pre-programme formative research to uncover barriers and facilitators for supplementation

METHODOLOGY

RESEARCH DESIGN:

Research design is purely and simply framework of plans for a study that guides data collection and analysis. It is conceptual structure with in which research is conducted.

LOCATION OF THE STUDY:

Study was conducted in the Moradabad city, U.P.

SAMPLE DESIGN:

The purposive random sampling method was used for the data collection information.

SAMPLE SIZE:

A sample is a smaller representation of a large whole which is technically known as universe or population. The value of sampling is that it saves time, money and energy. The present study was conducted on a group of school going children aged (3-6years) and mothers aged (25-35years) of Moradabad city.

SAMPLE SELECTION :

For the study purpose, school going children aged group of (3-6 yrs.) was selected randomly.

DATA COLLECTION:

There are a number of tools which could be used for collection data depending on the nature of the study. For the present study, structured questionnaire comprising of open ended and closed ended questions was formulated as per the objective of the study.

FORMULATION OF QUESTIONNAIRE:

The framed questionnaire contained well defined, simple, short and easy to understand questions. Questionnaire comprised of multiple choice and open-ended questions. The information to be collected through the questionnaire was divided under the following sub headings;

- General Information.
- Anthropometric measurements.
- Dietary intake pattern by using food frequency method.
- KAP (knowledge Attitude and Practices) questionnaire.

GENERAL INFORMATION: This included information regarding Name, Age, Sex, Height, Weight, Socio-economic factor, food habit, Education, Occupation of respondent, numbers of children.

ANTHROPOMETRIC MEASUREMENTS:

Body measurement such as weight and height are important tool in the evaluation of nutritional status of individuals and groups. Anthropometric measurements are physical measurement that provide an indirect assessment of body composition and development. Anthropometric measurement although genetically determined are strongly influenced by nutrition. Correctly recorded and interpreted they reflect the pattern of growth and physical status of individuals and indicate how individuals deviate from the average at various ages of body size, build and nutritional status.

- **HEIGHT:** Height reflects the skeletal growth. Height was measured by using a height meter. The subjects were asked to stand upright against a wall with heels, hips and shoulders touching the wall and without shoes. Height was recorded up to the nearest 0.1c.ms.
- **WEIGHT:** The Weight is the most widely used simple and reproducible anthropometric measurement for the evaluation of nutritional status. The weight was measured using a commercial balance scale to the nearest 0.1 kg. The subjects were asked to remove their footwear and wear minimal clothes before being weighed.
- **BODY MASS INDEX (BMI):** The body mass index (BMI), or Quetelet index, is a statistical measure of body weight based on a person's weight and height. Through it does not actually measure the percentage body fat, it is used to estimate a healthy body weight based on a person's height.

The body mass index (BMI) of the subjects was calculated using formula which as follows:

BMI= (Child weight / weight of normal child of same age) x 100

S. No.	NUTRITIONAL GRADE	WEIGHT FOR AGE (% of NCHS)
1.	Normal	>90
2.	Grade I(Mild Under Nutrition)	75 – 89.9
3.	Grade II (Moderate Under weight	➢ 60 – 74.9

4.	Grade III (Severe Under nutrition)	< 60

(WHO 2004)

FOOD FREQUENCY QUESTIONNAIRES (FFQ)

The food frequency questionnaire consists of a list foods and a selection of option relating to the frequency of consumption of each of the foods listed (e.g. times per day, daily, weekly, monthly . FFQs are designed to collect dietary information. FFQs normally ask about intake within a given time frame and therefore aim to capture habitual intake. The length of the food list can vary depending on the nutrients or food interest. Although there are difficulties implicit in calculating the absolute nutrient intake of individuals from food frequency questionnaires, they are useful for gathering information on groups of individuals as well as for looking at habitual intake of a range of food.

ANALYSIS OF THE DATA: The method used for data analysis included coding of the data, tabulation and diagrammatic representation.

RESULT & DISCUSSION

This chapter presents results of the study conducted in Moradabad city. The results are organized as per the objectives of the study. The objectives of the study were as follows to establish the socio demographic and socio-economic characteristic of the household mother's to determine nutritional knowledge of mother's and to assess the anthropometric measurements of among school going children and clinical symptoms to determine nutritional status of the children (3-6 years) and to determine Vitamin A deficiency in children.

The result of the present research has been discussed under the following heads:

4.1 Socio-economic profile of the subject

4.2 Dietary intake of the subject

4.2.1 Frequency of consumption of various food groups

4.3 Anthropometric measurement of the subjects

4.4 Clinical symptoms of the subject

4.5 Knowledge regarding nutrition

4.1 Socio-economic profile of the subject

S.No	Particular	N=50	Percent
1.	Age (years)		
	25 – 30	42	84%
	31 – 35	8	16%
2.	Marital status		
	Married	41	82%
	Widow	4	8%
	Divorced	5	10%
3.	BMI(Body Mass Index)		
	Under weight	5	10%

	Over weight	15	30%
	Normal	30	60%
4.	Socio-economic status		
	HIG(High Income Group)	4	8%
	MIG(Middle Income Group	25	50%
	LIG(Low Income Group)	21	42%
5.	Food habits		
	Vegetarian	44	88%
	Non-Vegetarian	6	12%
6.	Occupation		
	Servicemen	18	36%
	Businessmen	-	-
	House wife	32	64%
7.	Education status		
	Illiterate	15	30%
	Eight class	16	32%
	10^{th} Pass	5	10%
	Inter mediate	16	32%
	Graduate	4	8%
	Post Graduate	2	4%
8.	No. of children		
	Less than 2	9	18%
	Two	14	28%
	More than 2	27	54%

4.1.1: Age of pre-school children mothers

A total number of 50 pre-school children mothers participate in the study. The age of the mothers (25-30yrs) interviewed 84% and (31-35yrs) mother interviewed 16% included in the survey. **In figure 4.1.1.** Of the total number interviewed 58% were mothers from uncha gaon rural area while 52% were mothers from Machariya village rural area in Moradabad city.

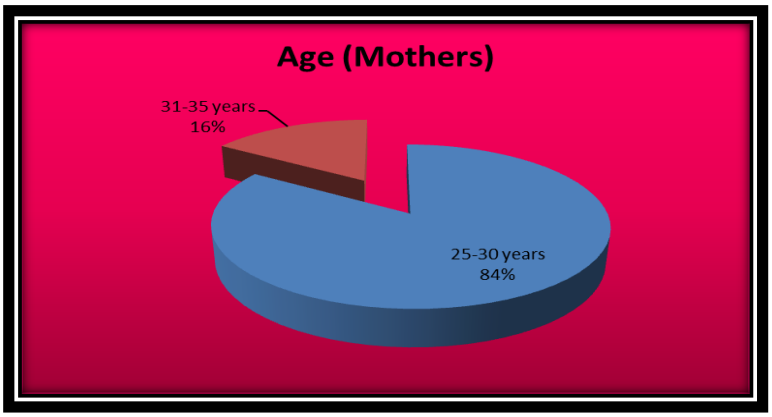


Figure 4.1.1: Distribution of Mothers Age

4.1.2: Marital status of pre-school children mothers

The mothers interviewed was married 82% of the pre-school children mother's other were widow 8% or Divorced 10% mothers participate in the study. **In figure 4.1.2.**

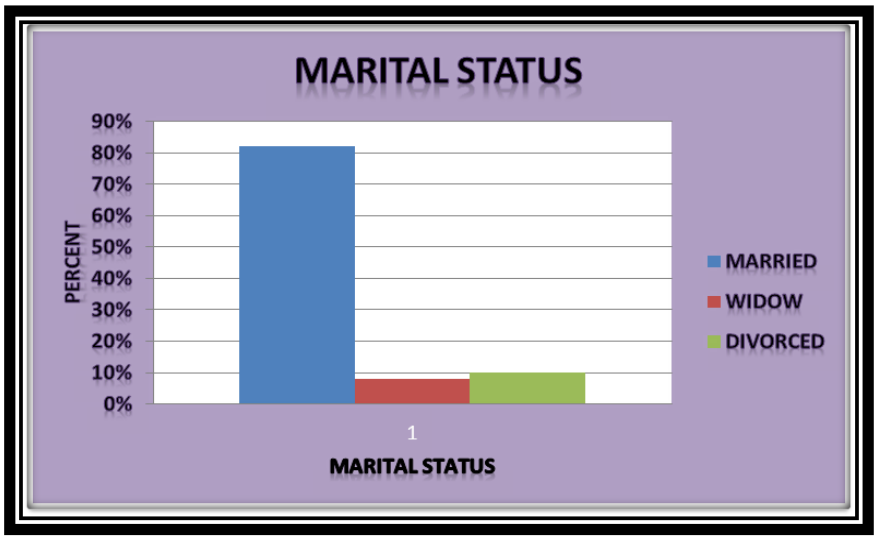


Figure 4.1.2: Distribution of Mothers Marital status

4.1.3: BMI (Body Mass Index) of Mothers

To calculate the BMI (Body Mass Index) of pre-school children mother according to height for age and weight for age. Underweight 10% mother, overweight 30% or normal 60% BMI of mothers. In **figure 4.1.3**

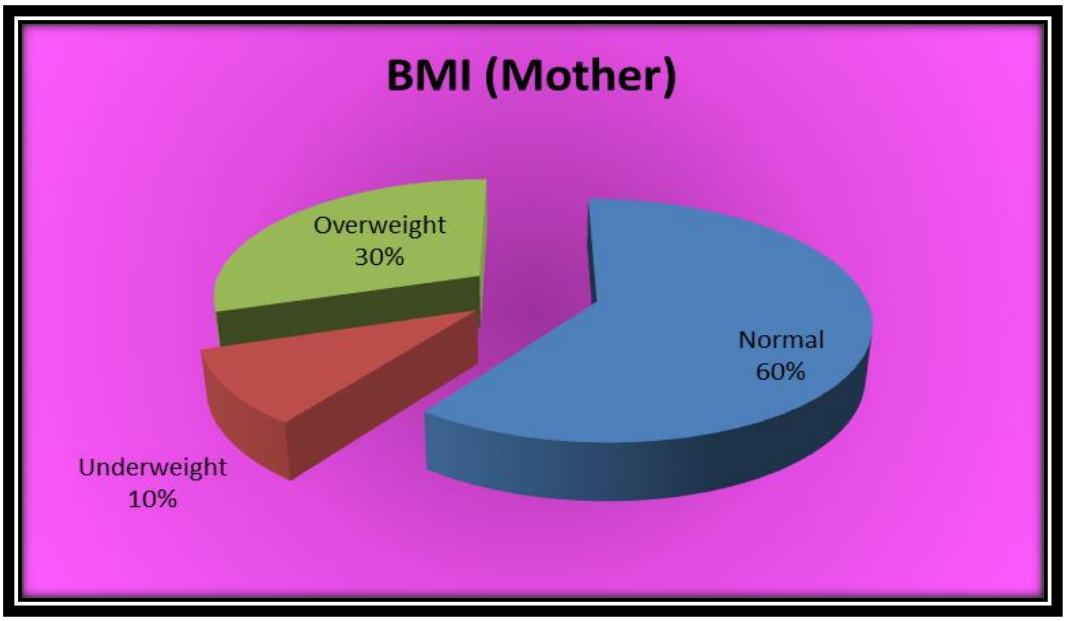


Figure 4.1.3: Distribution of Mothers BMI

4.1.4: Family socio-economic status

Regarding socio-economic status of mothers HIG (High Income Group) of family status 8% MIG (Middle Income Group) of family status 50% and42% were belong mothers LIG (Low Income Group). **In figure 4.1.4.**

Figure 4.1.4: Distribution of Mothers Socio-economic status

4.1.5: Food Habits

A total of subjects were 50 out of 44 (88%) vegetarian family and only 6 (12%) non- vegetarian family in the present study. **In table 4.1.5**

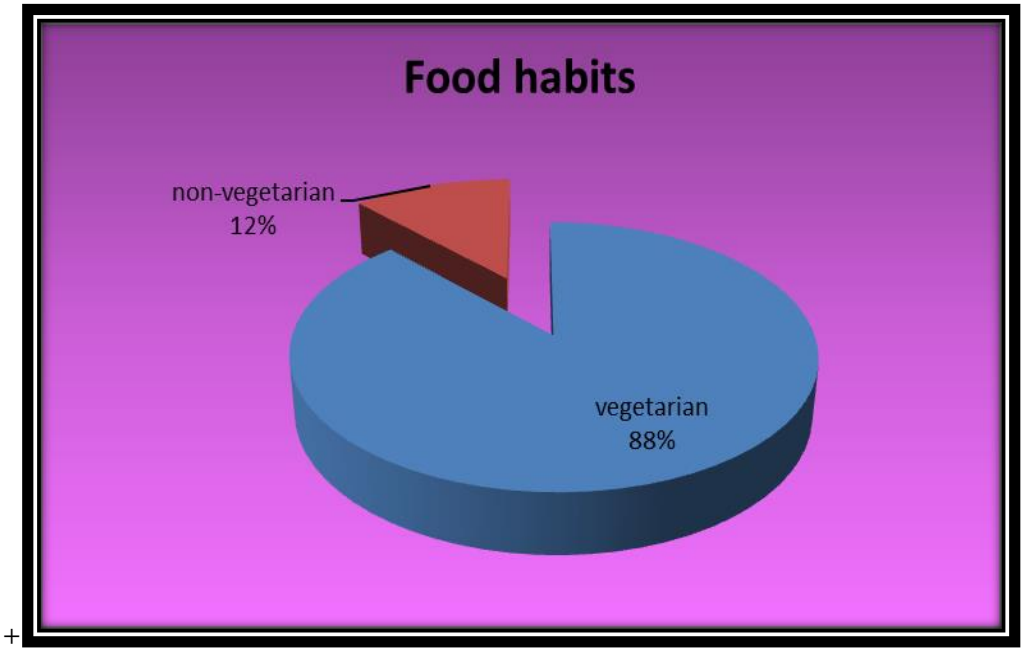


Figure 4.1.6: Distributions of Mothers food habits

4.1.6: Occupation of mothers

Majority 64% (31/50) of the mothers were house wives and 36% (18/50) mothers were service women. **In table 4.1.6.**

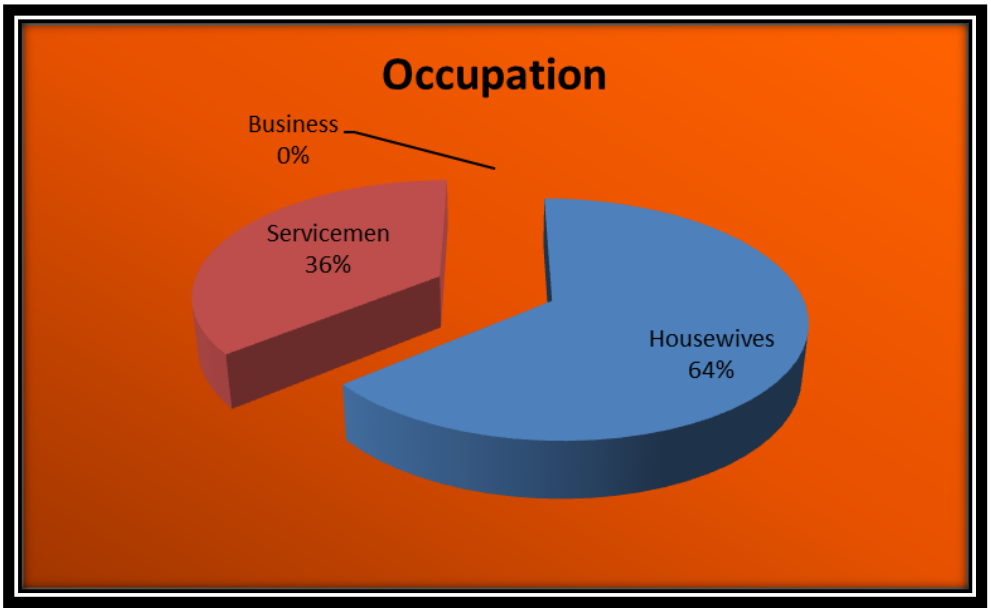


Figure 4.1.6: Distribution of Mothers by Occupation

4.1.7: Educational background of mothers

30% of all mothers interviewed did not attend any school while 32% attended eight school education, 10% mothers attended school education, Intermediate 32% mother attended school education,4% graduate mothers while less than mostly 4 percent mothers attended post –graduate education. **In figure 4.1.7.**

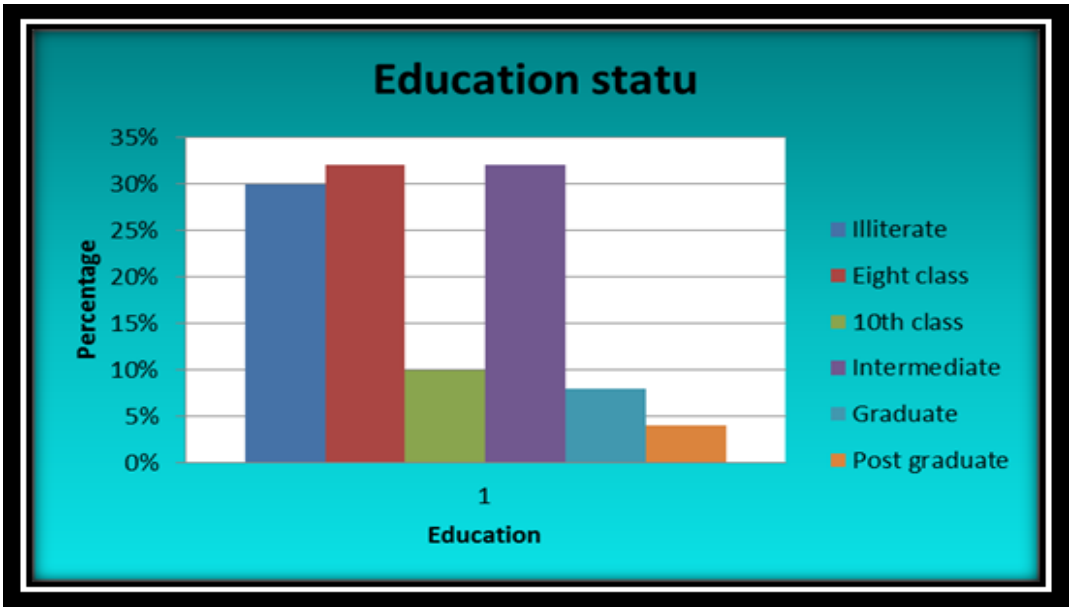


Figure 4.1.7: Distribution of Mothers Education background

4.1.8: Number of children

In case number of children 54% subject were having more than two children ,28% having two children and only 18% were having less than two children.**In figure 4.1.8.**

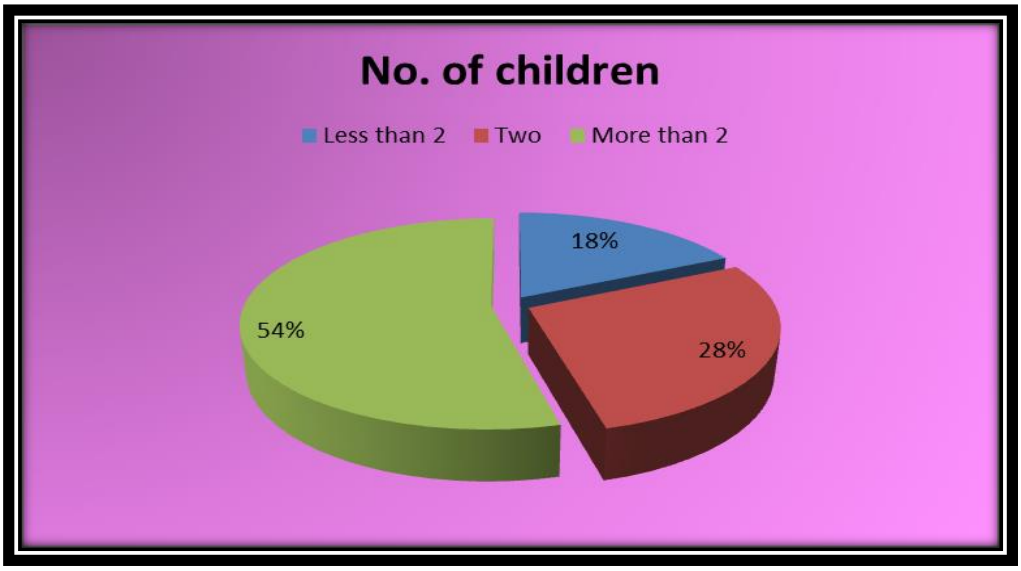


Table 4.1.8: Distribution of Mothers Number of children

4.2: Frequency of various food groups consumption

The food frequency approach asks respondents to report their usual frequency of consumption of each food items from a list of food for a specific period research can use information from food frequency questionnaires to derive dietary diversity scores. The rationale behind these scores is that greater diversity is associated with a wider range of ingested nutrients, which enhances the likelihood that the body's nutritional needs will be met .They reported positive relationships between dietary diversity and overall nutrient intake as well as certain anthropometric indices of nutritional status .Frequency consumption of cereals, pulses, green leafy vegetables, fruits, oils/fat ,meat /fish/egg/other fish food ,roots and tubers ,other vegetable, milk and milk products and sugar and jaggery is presented in **Table 4.2**

Table 4.2: Distribution of subject according to frequency of consumption of various food groups:

Food group	Daily	3/Week	2/Week	1/week	Monthly	occasionally	Rarely	Never
Cereals	100%	-	-	-	-	-	-	-
Pulses	8%	14%	26%	20%	32%	-	-	-
Green leafy vegetables	12%	6%	6%	24%	28%	24%	-	-
Other vegetables	60%	6%	4%	30%	-	-	-	-
Fats and oil	84%	-	-	16%	-	-	-	-
Fruits	8%	8%	6%	4%	18%	32%	24%	-
Milk$ Milk products	16%	10%	6%	6%	16%	24%	12%	-
Nuts $Oil seeds	-	-	-	-	24%	32%	38%	3%

Egg	-	8%	-	-	2%	2%	-	88%
Meat $ Fish	-	4%	-	-	4%	2%	2%	88%
Sugar	86%	-	-	14%	-	-	-	-

4.2.2: Consumption of Cereals and pulses

It was found that cereals, fats and oils and sugar/jaggery were being consumed daily while consumption of other food groups varied from daily to never. Cereals 100% subjects were consumed daily and mostly 32% subjects were consumed pulses in a monthly only 26% subjects were consumed pulses twice in a week. **In figure 4.2.2.**

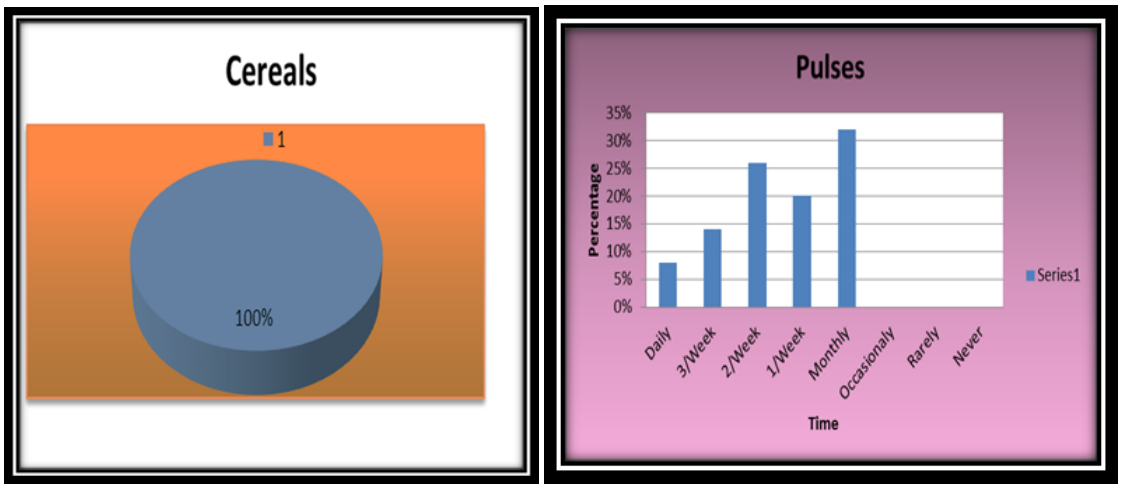


Table 4.2.2: Consumption of cereals and Consumption of pulses

4.2.3: Green leafy vegetable

The consumption of green leafy vegetables was found to be not good in present study as 12%subject were consuming green leafy vegetables daily and 28%subject were consuming monthly once time in week 24 % subject were consuming and thrice in a week 6% were subject consuming green leafy vegetables. **In figure 4.2.3**

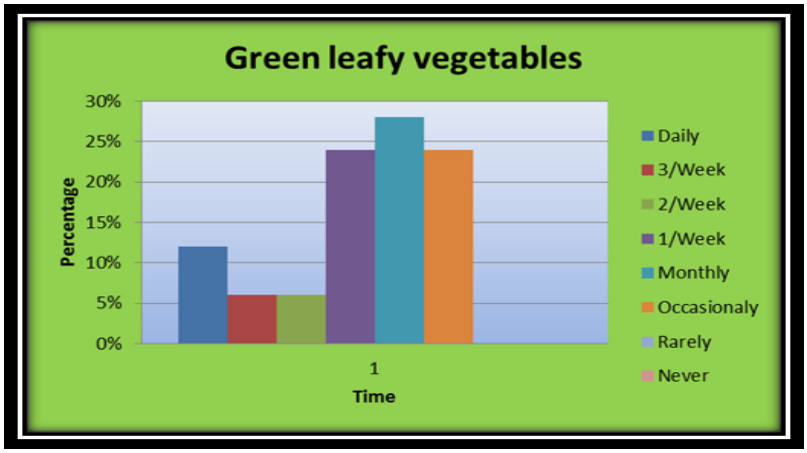


Figure 4.2.3: Consumption of Green leafy vegetables

4.2.4: Fruits

24%subjects were rarely consuming fruits and mostly 32% subject were consuming occasionally fruits .Eight percent subject were consuming daily food fruits or 8%were consuming thrice in a week**. In figure 4.2.4**

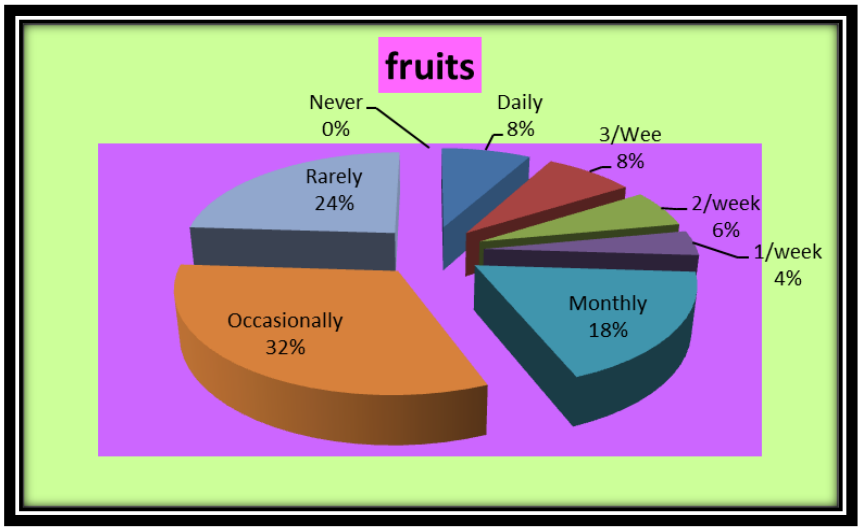


Table 4.2.4: Consumption of fruits

4.2.5: Milk and Milk products

24% of the subjects were occasionally consuming milk and milk products and 20% were consuming thrice in a week consuming and 16 %daily and monthly subject were consuming milk and milk products**. In figure 4.2.5**

Figure 4.2.5: Consumption of Milk and Milk products

4.2.6: Meat and Fish

88% of the subjects were never consumed meat and fish .4% subject were consuming thrice in a week and monthly consuming meat and fish and only 2% subject were consuming daily. **In figure 4.2.6.**

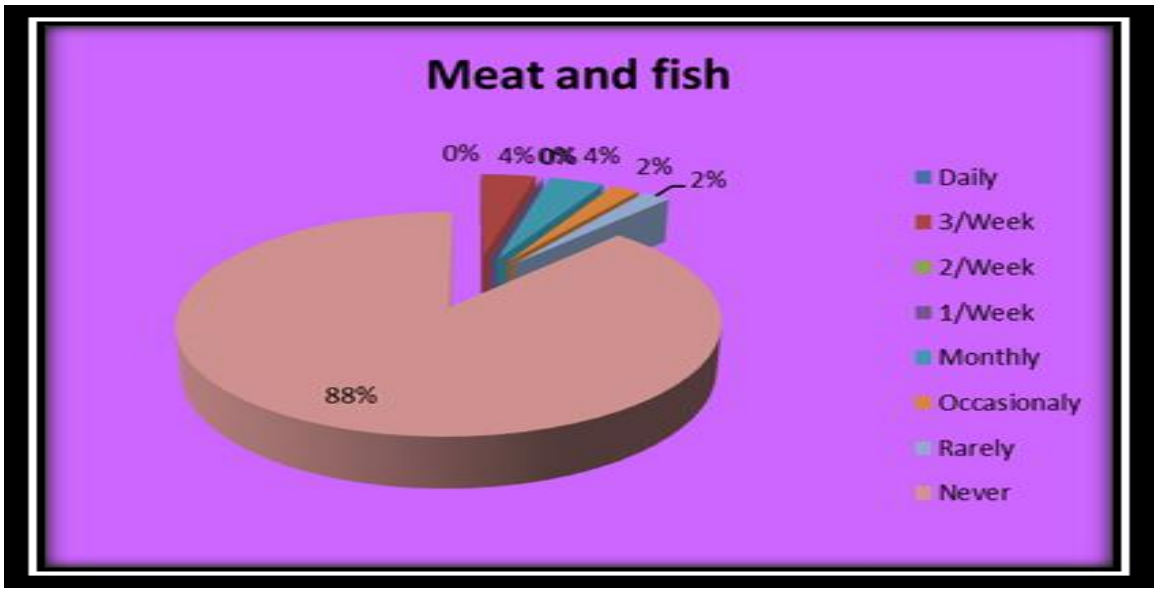


Figure 4.2.6: Consumption of Meat and Fish

4.3: Anthropometric Measurements

BMI of the pre-school children

The result regarding BMI of the subject are presented in **In table 4.3.1**

National Grade	Weight for age (% of NCHS)	Gender			
		Boys		Girls	
		N=25	Percent (%)	N=25	Percent (%)
Normal	>90	6	12%	4	8%
Grade I(Mild under nutrition)	75 - 89.9	10	20%	13	26%
Grade II(Moderate Under nutrition)	60 - 74.9	8	16%	5	10%
Grade III(Severe under nutrition)	<60	1	2%	3	6%

The result regarding BMI (body mass index) and 8% girls having normal BMI whereas 12% boys having normal BMI.Grade I(Mild under nutrition) pre-school children that 20% were boys and 26% were girls under in Grade I.16% were boys and 10% were girls under in 60 – 74.9 in Grade II (Moderate under nutrition).2% subjects were boys and 6% were girls under in <60 in Grade III(Severe under nutrition).

4.4 Clinical symptoms of subject

The consumption of food rich in vitamin A was very poor among rural school children in India. The mean intake of leafy vegetables, rich sources of vitamin A, was deficient by80-85% as against the RDA. It is possible to meet the daily requirement of vitamin through plant foods, but this is not easy because some foods may not be available or affordable .Information and education play an important part in changing

dietary habits .Children suffering from vitamin A deficiency are more likely to be sick and severe Vitamin A deficiency can cause blindness in children. 58% of children suffer from night blindness or 4%children have xeropathalmia sign of vitamin A deficiency such as Bitot's spot and 6% mother also suffer from night blindness, vitamin A deficiency is defined as a public health problem in that area.10% children were not properly growth developed and functioning of the children body. Few children were not suffering from any vitamin A deficiency. Vitamin A is essential nutrient and is needed for the normal growth development and functioning of the human body.

4.5 Knowledge regarding vitamin-A

Result regarding knowledge level of the subjects related to nutrition is presented in Table 4.5

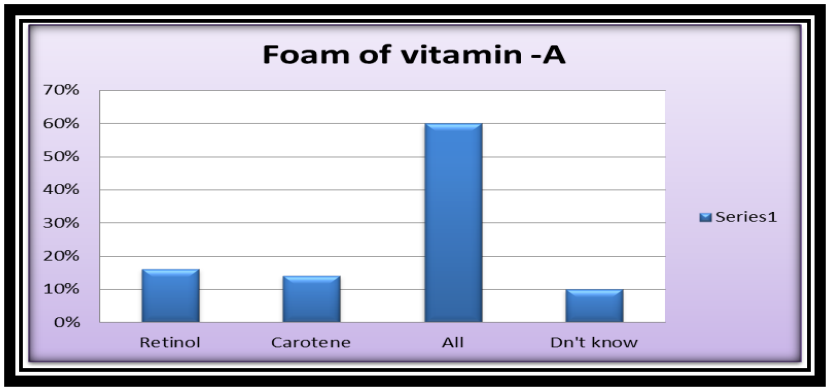
Sr.No	Subject	N=50	Percent (%)
1.	Form of Vitamin-A		
	Retinol(animal form)	8	16%
	Carotene (Plant form)	7	14%
	All	30	60%
	Don't know	5	10%
2.	Vitamin –A rich Fruits		
	Red	5	10%%
	Yellow	3	6%
	Orange	9	18%
	All	28	56%
	Don't know	5	10%
3.	Vitamin –A rich vegetables		
	Green leafy vegetables	9	18%
	Red	5	10%
	Green vegetable	2	4%
	All	32	64%
	Don't know	2	4%
4.	Vitamin –A rich animal sources		
	Milk & Milk product	10	20%
	Meat	2	4%
	Fish liver oil	3	6%
	All	32	64%
	Don't know	3	6%
5.	Vitamin-A Deficiency		
	Night blindness	1	2%
	Xeropathalmia	1	2%
	Low growth development	2	4%
	Bitot's spots	3	6%
	Corneal xerosis	2	4%
	All	40	80%
	Don't know	1	2%

6.	Vitamin-A absorption		
	Muscles	30	60%
	Liver	14	28%
	Heart	2	4%
	Don't know	4	8%

Table 4.5: Knowledge regarding vitamin –A

4.5.1 Form of vitamin A

Mother's knowledge regarding to the form of vitamin-A i.e. Retinol (animal form) and Carotene (plant form) is 16% and 14% respectively. **In figure 4.5.1**



4.5.2 Knowledge regarding to vitamin-A rich fruits

Result regarding knowledge level of vitamin-A rich fruits.56% subject was having high knowledge level of all vitamin A rich fruits after post- test.10% mothers were having no knowledge of vitaminA rich fruits.**In figure 4.5.3.**

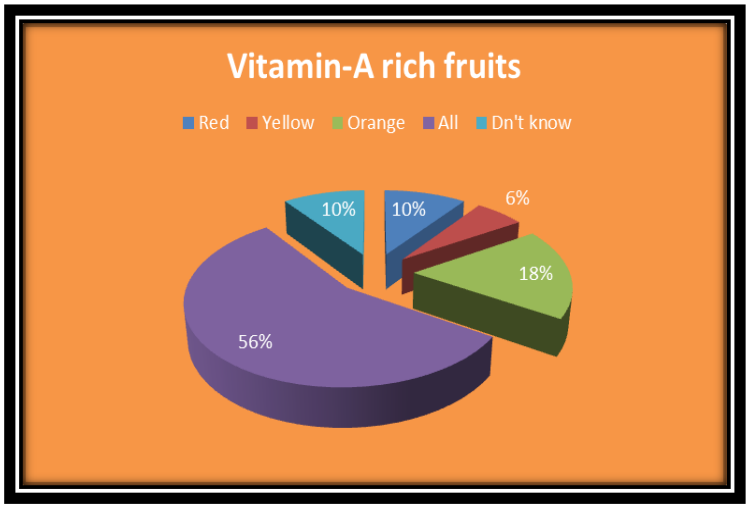


Figure 4.5.3: Knowledge regarding to vitamin –A rich fruits

4.5.3 Vitamin-A rich vegetables

Mother's knowledge on vitamin A rich vegetables in which 64% mothers having knowledge regarding same of and 4% mothers don't know about vitamin A rich vegetables.18% mothers were knowledge of

only green leafy vegetables.Only about a quarter of the mothers knew that vitamin-A help the child to see well. **In Figure 4.5.3**

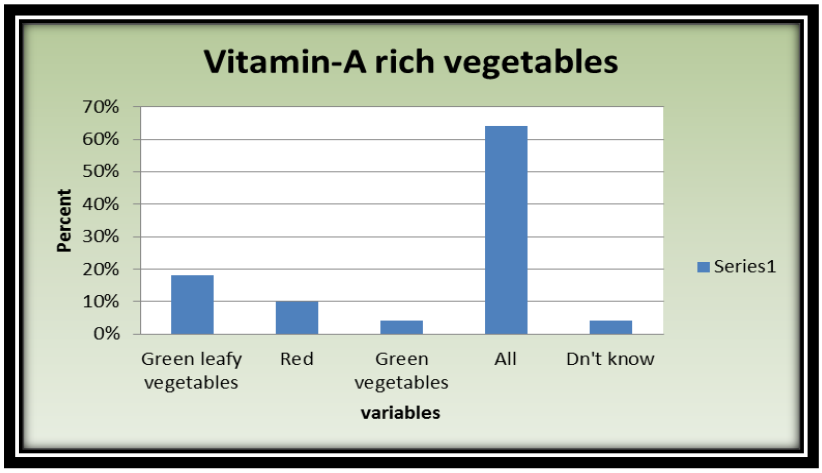


Figure 4.5.3: Knowledge regarding vitamin -A

4.5.4 Animal sources of vitamin-A

64% mothers having knowledge regarding to vitamin A animals sources in which 6% mothers were don't know about vitamin-A animal sources and20% mothers were aware about milk products rich in vitamin A.**InFigure 4.5.4**

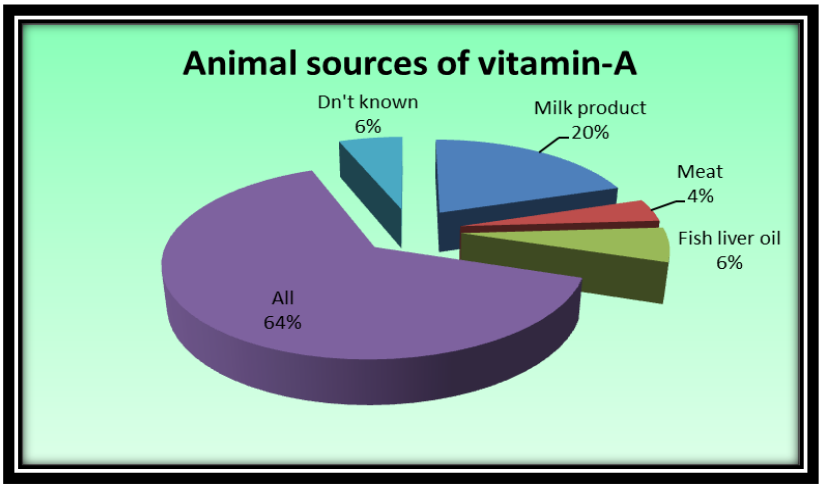


Figure 4.5.4: Knowledge regarding to vitamin-A

4.5.5 Knowledge regarding to vitamin-A deficiency

The distribution of mothers on knowledge of the uses of vitamin A in which 2% of the mothers identified night blindness as result of lack of vitamin A in a child.80% mothers were having knowledge of vitamin-A deficiency .2% mothers were don't know about deficiency of vitamin-A**. In Figure 4.5.5**

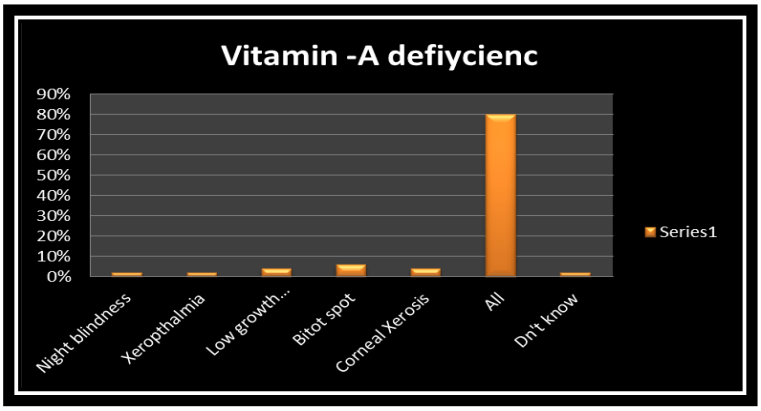


Figure 4.5.5: Knowledge regarding vitamin-A

SUMMARY & CONCLUSION

Nutrition education regarding regular intake of plant foods rich in carotene such as green leafy vegetables, yellow fruits, carrots and animal foods containing retinol like fish liver oil, fish, liver ,egg, meat, milk, butter ,cheese, and use of fortified food like vanaspati, margarine, dried skimmed milk should be strengthened and other measures like promotion of breast feeding supply of safe drinking water, maintaining proper sanitation and hygiene , prevention of diarrhea, measles, acute respiratory infections and access to basic health services should also be adopted.

The prevalence of vitamin A deficiency was higher among the children belonging to lower socio-economic class as compared to those belonging to upper and middle socio economic class.

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