

A STUDY ON FOOD REFUSAL AMONG URBAN MIDDLE
AND UPPER SOCIO-ECONOMIC CLASS CHILDREN

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Dr. Md. Asirul Hoque

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GIFT

DEDICATED TO MY DEAR PARENTS
MY DEAR WIFE FATEMA BEGUM
AND
CHILDREN TINA AND FAHIM

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বিশ্ববিদ্যালয়
গ্রন্থাগার

**A STUDY ON FOOD REFUSAL AMONG URBAN MIDDLE
AND UPPER SOCIO-ECONOMIC CLASS CHILDREN**

**This Thesis is submitted to the University of Dhaka for the award of
Doctor of Philosophy**

by

Dr. Md. Asirul Hoque

DIGITIZED

382485



**INSTITUTE OF NUTRITION AND FOOD SCIENCE (INFS)
UNIVERSITY OF DHAKA
JULY, 1999**

ACKNOWLEDGEMENTS

It was a great pleasure to have Professor Quazi Salamatullah, as my supervisor. The wholehearted gratitude goes to my supervisor for his constant and active supervision. It was not possible to come to this stage without his sincere support.

My heartfelt thanks to Professor Mamunar Rashid who was my co-supervisor, without his enthusiastic support and supervision it was difficult for me to start and to come to this stage.

I wish to acknowledge sincerely to Mr. Mokbul Hossain Bhuyan, Jhilu Bhai and their family for their contributions beyond moral support, their honourary service and active computer support helped me to continue my work. I am deeply grateful to Dr. Mahmudur Rahman, Dr. Mojibor Rahman, Dr. M. Hasan Ameen, and my thanks go to them for their encouragement and technical support as well as guidance.

For my data collection work, I am grateful to Nibedita Nursing Home management personals for allowing me to work and to use their facilities and also for their honest cooperation. I would like to give thanks to Resident Physician, Children Out Patient Department of PG Hospital for allowing me to collect data. I am grateful to the parents of the study children for their kind cooperation and support.

I am grateful to Mr. M A Hannan, Professor MA Sattar, Professor S T Khanum, Dr. Zahin, Mr. Shariful Huq, Lucky and Monu for their honest help during my study.

Thanks to Dr. A.M.M. Anisul Awwal, Dr. Iftikhar Hussain, Dr. Samsun Nahar and Mr. Zakiuddin Ahmed for their encouragement. Thanks to my office, Bangladesh Integrated Nutrition Program and computer stuff Sayeed, Samina, Mokbul and Salim for their cooperation and support.

I wish to acknowledge the cooperation of the University Grant Commission and its secretary Mr. M. Shahidullah for the financial assistance given for the data entry.

The Government of Bangladesh deserves my special thanks because I was given permission and deputation for the work.

Last of all my highest thanks to Nayeem, Masud, Mahbub, Bazlu, Nasim, sisters and relatives for their sacrifice and heartiest support.



Summary

Food refusal (refusing to eat the required quantity and quality of food) is a common complaint faced in Dhaka City and elsewhere in the country dealing with children coming from middle and upper socio-economic families. The occurrence of malnutrition should commensurate in those who complain of food refusal. In this study, an extensive field survey was undertaken by interviewing the mothers, examining the children and measuring their food intake during the previous 24 hours. To see how far the statement by mothers complaining about the food refusal of their children was consistent with their (child's) food intake and nutritional status. This study was an attempt to assess the food refusal problem and to identify its determinants and whether possible to solve the refusal problem by counseling.

This was a descriptive study, a portion of which was quasi experimental. The study design had two groups - a food refusal and non-refusal group. The study places were children's clinic, outpatient unit and a chamber of a nutrition specialist in Dhaka. The age group of children was 1-14 years. From experience two in three children refuse to take food. The sample size was 500 out of which 268 were middle and 232 upper socio-economic class. The refusal group computed 350 children and non-refusal group 150. A subset of 50 food refusal children was taken for follow up. Counseling was repeated at intervals of one month for the first two rounds and after a gap of 3 months a final round of follow up was observed. As the study was both qualitative and quantitative in nature, determination of sample size was not attempted, but determined arbitrarily. The method of systematic random sampling (every 5th child) was used for data collection. Food composition tables and databases were prepared for the study. Energy and nutrient contents from prepared foods were calculated. The difference in food refusal between the two groups was not significant. Age group, meal frequency, period of food refusal and the degree of food refusal based on mother's reporting in the two socio-economic groups showed no association with food refusal. To see the type of food usually refused by the children, the mothers were asked to mention the commonly refused items from different food groups. In both classes individual food item refusal varied within the food groups. In cereal group, rice refusal topped the list (50.4%) followed by parata (40.2%) and ruti (36.4%), while only 27.5% children refused loaf. In protein group, fish, meat and egg refusal rates were 47.4, 29.4 and 26.8% respectively. The palatable groundnut refusal rate was the lowest (17.2%). Overall the refusal rate was higher in vegetable group than that in fruit group. 58.5 and 62.0% children refused coloured leafy vegetable and other vegetables. But the citrus fruit refusal rate was higher than other fruits. Milk and milk product refusal varies within groups.

Children were selected from same socio-demographic status and to see this parent's education, occupation, income, number of children in the family, birth order and birth weight were observed and showed no association with food refusal.

Food refusal was significantly higher in presence of parasitic infestation ($p < 0.05$). In anaemia and riboflavin deficiency refusal was significantly higher ($p < 0.0001$ and $p < 0.05$). While mother's patience was not satisfactory the food refusal was significantly higher ($p < 0.001$). In refusal and non-refusal group 73.9% and 32.3% mother forced their children during feeding. The refusal was significantly higher in force feeding group ($p < 0.0001$).

In food refusal and non-refusal group 88.4% and 78.8% children were taking energy less than RDA ($p < 0.05$). Iron intake was significantly lower in refusal group ($p < 0.05$). Majority of children from both groups was taking nutrients less than RDA. Normal intake was found to improve when UK NRI values or UK LNRI values were used as reference. Thiamin and niacin intake were significantly lower in the refusal group ($p < 0.05$ and < 0.005). In refusal and non-refusal group, 12.6 and 10.4% children were stunted, 10.6 and 9.0% were wasted and 16.9 and 12.0% were underweight respectively. Nutritional status in both refusal and non-refusal groups was not significantly different.

In the follow-up cases, counseling showed significant improvement of energy and protein intake. Counseling improved the iron and other nutrient intake. Although counseling failed to bring significant change in forced feeding behaviour, it improved both the intake and nutritional status.

LIST OF CONTENTS

	Page
List of Tables	
List of Figures	
List of Plates	
 Chapter 1: Introduction	 1
1.1 Introduction	1
1.2 Hypotheses and Objectives of the Study	5
 Chapter 2: Literature review	 6
2.1 Introduction	6
2.2 Food refusal and food item of the basic food groups	12
2.3 Food refusal and socio-demographic characteristics	12
2.3.1 Education and occupation	12
2.3.2 Parents income	14
2.3.3 Number of children in the family	14
2.3.4 Birth order	16
2.3.5 Birth weight	16
2.4.1 Food refusal and parasitic infestation	18
2.4.2 Food refusal and force feeding and mother's patience	19
2.5.1 Energy and protein intake of the children and nutritional status	23
2.5.2 Iron intake and anaemia status of the children	27
2.5.3 Vitamin A intake and nutritional status	33
2.5.4 Riboflavin, thiamin and niacin intake and nutritional status	38
2.5.5 Vitamin C intake and nutritional status	41

2.5.6	Calcium intake and nutritional status	42
2.6	Nutritional Status	45
2.7	Counseling	49
Chapter 3: Materials and Methods		50
3.1	Research Approach and Techniques	50
3.2	Research Setting	50
3.2.1	Development of research design	50
3.2.2	Study Places	50
3.2.3	The sample, sampling technique and sample size	50
3.2.4	Research instrument	51
3.2.5	Data collection:	51
3.2.6	Preparation of food composition tables and data bases for this study	52
3.2.7	Determination of energy and nutrient content of food	53
3.2.8	Data management	54
3.2.9	Data analysis	54
Chapter 4: Results		55
4.1.1	The status of food refusal	55
4.1.2	Food refusal, age group and socioeconomic class	55
4.1.3	Mean meal frequency	55
4.1.4	Period of food refusal	56
4.1.5	Mean period of food refusal	56
4.1.6	Degree of food refusal	56

4.2	Food items refusal of the basic food group	56
	Cereal group	57
	Protein group	57
	Vegetables and fruits group	57
	Milk and milk products group	57
4.3	Food refusal and demographic characteristics	58
	Mother's education	58
	Mother's occupation	58
	Father's education	58
	Father's occupation	58
	Per capita monthly income	59
	Number of children in the family	59
	Birth order	59
	Birth weight	59
4.4.1	Food refusal and parasitic infestation food	59
4.4.2	Food refusal and micronutrient status	60
	Nutritional anaemia	60
	Vitamin A deficiency	60
	Riboflavin deficiency	60
	Vitamin C deficiency	61
4.4.3	Food refusal, mother's patience and force feeding	61
4.5	Food refusal and energy and nutrient intake	61
	Energy intake	61
	Protein intake	62
	Iron intake	62
	Calcium intake	62
	Vitamin (s) intake	62
4.6	Food refusal and nutritional status of the children	63
Chapter 5: Counseling		88
5.1	Counseling	88
5.2	Effect of counseling on energy and nutrient intake	88
5.3	Effects of counseling on force feeding and energy and nutrient intake.	89

Chapter 6: Discussion	100
6.1 Status of food refusal	100
6.2 Food refusal and food items of the basic food groups	101
6.3 Summary	104
6.4 Food refusal and socio-demographic characteristics	104
6.4.1 Parent's income	106
6.4.2 Birth order	107
6.4.3 Birth weight	108
6.4.4 Summary	110
6.5.1 Parasitic infestation	111
6.5.2 Food refusal, mother's patience and force feeding	113
6.5.3 Summary	115
6.6.1 Food refusal, energy and nutrient intake pattern of the children	115
6.6.2 Protein intake pattern	119
6.6.3 Anaemia, food refusal and iron intake	122
6.6.4 Food refusal and calcium deficiency and calcium intake	125
6.6.5 Food refusal, vitamin A deficiency and vitamin A intake	127
6.6.6 Food refusal, riboflavin, thiamin and niacin deficiency and intake pattern	130
6.6.7 Food refusal, vitamin C deficiency and vitamin C intake	134
6.6.8 Summary	135
6.6.9 Nutritional status	136
6.7.1 Effect of the counseling on food intake and nutritional status among food refusal children	137
6.7.2 Counseling and balanced diet	138

6.7.3	Feeding during illness	141
6.7.4	Mothers attitude during feeding their child	141
6.7.5	Effects of counseling, energy and nutrient intake and nutritional status	142
6.7.6	Force feeding, energy intake and nutritional status	143
6.7.7	Summary	143
 Chapter : 7 Conclusion and Recommendation		 145
 Bibliography		 146
 Annexure I List of Food Items		 157
 Annexure II Questionnaire		 196

List of Tables

Chapter 2

Table	Description	Page
Table 2.1	Energy intake (Kcal/d) in different age group as recommended by UK&WHO EAR 1993, USAAER1989, FAO/WHO/UN 1985, FAO/WHO 1974 and Canadian RDA, 1983.	24
Table 2.2	Protein intake (gm/d) in different age group as recommended by UK&WHOEAR 1993, USA AER1989, FAO/WHO/UNU 1985, FAO/WHO 1974 and Canadian RDA, 1983.	25
Table 2.3	Iron intake (gm/d) in different age group as recommended by UK&WHO, EAR RNI, LRNI (1993), USA (1989) and European RDA, 1993.	28
Table 2.4	Vitamin A intake (μ gRE/d) in different age group as recommended by UK&WHO,EAR RNI, LRNI (1993), US (1989) and European RDA, 1993.	34
Table 2.5	Riboflavin intake (mg/d) in different age group as recommended by WHO, UK EAR, RNI, LRNI (1993), USA (1989) and European PRI, 1993.	38
Table 2.6	Thiamin intake (mg/d) in different age group as recommended by WHO, UK EAR, RNI, LRNI (1993), USA (1989) and European PRI, 1993.	39
Table 2.7	Niacin intake (mg/d) in different age group as in different age group as recommended by WHO, UK EAR, RNI, LRNI (1993), USA (1989) and European PRI, 1993.	40
Table 2.8	Vitamin C intake (mg/d) in different age group as in different age group as recommended by WHO, UK EAR, RNI, LRNI (1993), USA (1989) and European PRI, 1993.	41
Table 2.9	Calcium: Selected Examples of Calcium intake recommendations by age group.	42
Table2.10	Calcium intake (mg/d) in different age group as recommended by WHO, UK EAR, RNI, LRNI (1993), USA (1989) and European PRI, 1993.	44

List of Tables

Chapter: 4

Table	Description	Page
Table 4.1.1	Distribution of children in food refusal and non-refusal groups by socioeconomic classes.	64
Table 4.1.2	Distribution of children in food refusal and non-refusal groups by age group and socioeconomic classes.	64
Table 4.1.3	Distribution of children in food refusal group and non-refusal groups by mean meal frequency, sex and socioeconomic classes.	65
Table 4.1.4	Distribution of children and the period of food refusal by socioeconomic classes.	66
Table 4.1.5	Distribution of children and the mean period of food refusal by age groups and socioeconomic classes.	67
Table 4.1.6	Distribution of children and the degree of food refusal by socioeconomic classes.	68
Table 4.2.1	Distribution of food refusal children and the presence and absence of food refusal by the food items within each food groups.	69-70
Table 4.3	Distribution of children in food refusal and non-refusal groups by socio-demographic characteristics of the family.	71-72
Table 4.4.1	Distribution of children in food refusal and non-refusal groups by the presence and absence of parasitic infestation .	73
Table 4.4.2	Distribution of children in food refusal and non-refusal groups by micro-nutrient status.	74
Table 4.4.3	Distribution of children in food refusal and non-refusal groups by mother's patience and force feeding.	75
Table 4.4.4	Distribution of children in food refusal and non-refusal groups by the presence and absence of force feeding and patience status of mother.	76

Table 4.5	Distribution of children by food refusal and non- refusal group and their energy and nutrient intake.	77-78
Table 4.5.1	Mean intake of energy and nutrient in food refusal and non-refusal group among 1-3 years age of the children.	79
Table 4.5.2	Mean intake of energy and nutrient in food refusal and non-refusal group among 4-6 years age of the children.	80
Table 4.5.3	Mean intake of energy and nutrient in food refusal and non-refusal group among 7-10 years age of the children.	81
Table 4.5.4	Mean intake of energy and nutrient in food refusal and non-refusal group among 11-14 years age of the children.	82
Table 4.5.5	Distribution of children by food refusal and non-refusal group and their percentage of total calorie from protein, fat and carbohydrate and age groups.	83
Table 4.6	Distribution of children in food refusal and non- refusal groups by nutritional status (z-score).	84
Table 4.7	Distribution of children in food refusal and non-refusal groups by nutritional status (Waterlow Classification, H/A)	85
Table 4.8	Distribution of children in food refusal and non-refusal groups by nutritional status (Waterlow Classification, W/H)	86
Table 4.9	Distribution of children in food refusal and non-refusal groups by nutritional status (Waterlow, Wasting and Stunting)	87
Chapter: 5		
Table 5.1	Change in energy intake in children in the pre counseling and different rounds of counseling.	90
Table 5.2	t-test (pair) showing the effects of counseling on energy and nutrient intake.	90
Table 5.3	Change in energy intake and nutritional status of the forced fed children in the different rounds of counseling.	91
Chapter: 6		
Table 6.1	Energy requirements of children by different age group in year 1974,1985 and 1993	118
Table 6.2	Percentage of energy from protein, fat and carbohydrate intake in this study and the pattern found in Malaysia, Republic of Korea, Japan and Philippine.	121
Table 6.3	Calcium requirements (various RDAs) by age groups in food refusal children.	126

Table 6.4	Riboflavin intake in food refusal group by age groups compared with various RDA standards (mg/day).	131
Table 6.5	Thiamin intake in food refusal group by different age categories compared with various RDA standards (mg/day).	132
Table 6.6	Niacin intake in food refusal group by different age categories compared with various RDA standards (mg/day).	133
Table 6.7	Vitamin C intake in food refusal group by different age categories compared with various RDA standards (mg/day).	135

List of figures

	Description	Page
Figure 4.1	Distribution of children and the degree of food refusal by the socio-economic classes	92
Figure 4.2.1	Distribution of children and the presence of food refusal by the food items of cereal group and socio-economic class children.	93
Figure 4.2.2	Distribution of children and the presence of food refusal by the food items of protein group and socio economic class children.	94
Figure 4.2.3	Distribution of children and the presence of food refusal by the food items of vegetables and fruits group and socio economic class children.	95
Figure 4.2.4	Distribution of children and the presence of food refusal by the food items of milk and milk products group and socio economic class children.	96
Figure 4.6.1	Distribution of children in food refusal and non- refusal groups by nutritional status (H/A SD).	97
Figure 4.6.2	Distribution of children in food refusal and non- refusal groups by nutritional status (W/H SD).	98
Figure 4.6.3	Distribution of children in food refusal and non-refusal groups by nutritional status (W/A SD).	99
Figure 5.1	Balanced diet.	139
Figure 5.2	Time schedule in planning diet	140

CHAPTER 1

Introduction

1.1 Introduction

Malnutrition means disordered nutrition. Protein energy malnutrition is a pathological state resulting from relative or absolute deficiency of one or more essential nutrients and/or calorie (WHO, 1985). Under nutrition is a global problem and it is more common in developing countries. The child nutrition situation in South Asia is far worse than that of Sub-Saharan Africa (ACC /SCN, 1997). The same report has shown more than half of the world's under weight children live in just three countries-India, Bangladesh and Pakistan. The prevalence of malnutrition among under five children is highest in Bangladesh (UNICEF, 1998). Malnutrition is the most common public health problem in Bangladesh and acts as a major obstacle to development. Malnutrition is related to food intake, caring practice, and health service facilities for the people. The nutritional status of the children is directly related to food intake. In the poor ²socioeconomic classes, food deficiency is an important cause of malnutrition but in the middle and upper socioeconomic classes malnutrition could be related to food refusal.

The nutritional status of infants up to six months of age is generally found to be relatively good. Mother's milk meets most of the needs of this age group and the children maintain their nutritional status relatively well (Roy, 1988). Until the age of about two years babies can still receive an important amount of nourishment from breast milk (Talukder, 1984). Recent report has shown most of the 'malnutrition drama' is already over by the second birthday (Nutrition and Poverty, ACC/SCN, 1997). Children's physical growth is very rapid during the first year of life (ICC, 1987). But breast milk is not enough after 4 months of age. In nearly all children, growth tends to falter after 6 months unless additional food is given (Waterlow, Ashworth and Griffith, 1980). Breast-feeding and proper dietary practice at this age are essential for prevention of malnutrition in young children. Feeding practice is the outcome of the interaction of such variables as socioeconomic status, literacy status of the parents and consciousness about health (Sharma, Sharma and Purohit, 1997).

Age of introduction of complementary feeding in Bangladesh was 9.5, 18.0, 35.6, 44.2% by 1, 4, 5-6, and 13-24 months respectively (Halida, 1998). 17% urban Dhaka

and 3% of rural mothers supplemented their babies with rice in the first nine months (Kabir, 1986). Early introduction of solids is more common in urban than in rural areas. In the high socioeconomic group, most of the mothers started solids earlier than in lower socioeconomic group (Banik, 1975). The availability of an alternative to human milk is the most important factor for reducing the incidence of breast-feeding and the start of early weaning (Evan and et al, 1976). Commercialization and propaganda for baby food have eroded the impact of feeding practice, which mainly affect mothers of middle and upper socioeconomic class of urban population (Nasirullah et al, 1983). Early introduction of weaning food is more common in urban middle and upper socioeconomic classes than in rural areas (Pant and Chothia, 1990).

Malnutrition is particularly serious in children below three years of age group (Reddy, 1987). Physical growth and mental development in early life within three years of age is most important. In a study in the rural areas of Bangladesh it was found that half of the children from well to do/ well off families were underweight; three fourths of them were stunted and one fourth of them were wasted (Hussain, 1991).

Malnutrition is often caused due to ignorance of parents about child-care (Pollitt, 1973). Ignorance may be due to lack of nutrition education. In a study it was shown that 65% mothers of high income group of urban population diluted the milk mainly because they believed that this facilitated digestion and 50% mothers were not in favor of feeding the sick child with small frequent meals (Pant and Chothia, 1990). The monotony of the diet may act synergistically with the consequences of repeated infections and results in chronically depressed appetite (Walker, 1990). Mother's literacy rate is very poor in Bangladesh, only 5.2% mother's education level are SSC and above (BBS, 1995-96).

Bangladesh is one of the poorest countries of the world. Nutritional status is both an effect and a cause of income-earning opportunities. Household income may not be the most important constraint to the growth of an infant (Nutrition and Poverty, ACC/SCN, 1997).

Morbidity and mortality among young children is extremely high. Infant mortality rate is still very high in Bangladesh, 71/1000 live birth (UNICEF, Progotir Pathey 1997). Low birth is a common problem related to maternal malnutrition. Intrauterine growth retardation is associated with nutritional status of the mother, 30-50% child had born with low birth weight (UNICEF, 1996 & 1997).

Mortality and morbidity rate is higher in babies with low birth weights. Where food, caring and health service facilities are good during pregnancy, the outcome is also

good. In low birth weight babies iron reserve is poor and they are prone to develop nutritional anaemia in infancy. Morbidity is a major factor in causing food refusal, hindering the development of children. The intake of most nutrients is depressed by approximately 10% during febrile illness (Brown et al, 1989). Infection and parasitic infestation may affect nutritional status by diminishing intake (Alleyne et al., 1988).

Anorexia is common in anaemia (Gosh, 1966) and vitamin deficiency (FAO, 1988). Mechanical entities that interfere in food intake also can cause malnutrition (Brown-Bieber and Zia, 1983). It is now recognized that one of the major constraints of the health of infants is inadequate energy intake but several factors may be responsible for causing malnutrition (Waker, 1990).

Children with limited appetites and food refusal typically demonstrate poor weight gain or even weight loss, and are diagnosed as failure to thrive (FTT); management of their food avoidance is designed to make the eating process enjoyable and nutritionally adequate (Arvedson, 1997). Patience and understanding, plus recognizing the child's need to gain familiarity with the caregiver, will increase the chance of successful feeding (The Care Initiative, Unicef, 1997).

Bangladeshi children who were both wasted and stunted have 3-7 times higher risk of mortality compared to normally nourished children (Chen and Choudhury, 1980). Malnutrition is not the problem of the poor socioeconomic classes only, but it is also the problem of middle and upper socioeconomic class (Hasan and Ahmed, 1988; Bairagi, 1983).

Nutritional status of the child depends on nutrient intake, its quality and quantity. In early life infants know how to drink but they learn to eat after introduction of semisolid/ solid foods. The problems vary in different ages: regurgitation, suckling problems and dysphagia are more often present in children less than 3 months of age, loss of appetite and/or food refusal are more common children more than 3 months of age (Genero, Morelto, Fait and Guariso, 1997).

Care and counseling can improve food intake. The patience of the mother is also an important factor in caring practices (Unicef, 1998). Food refusal is a commonly cited problem in the middle and upper socioeconomic class children of urban Dhaka. Regarding food intake of their children mother's most common complain is –“My child refuses to take food” or “My child is not taking food adequately”.

This study is an attempt to assess the status of food refusal and to identify its determinants, to identify the qualitative and quantitative food intake pattern, and also to assess the nutritional status of the children. An attempt is made to correlate the claim of mothers that their children take food inadequately and the nutritional status of their children. This study also tries to show the effects of counseling on food refusal.

1.2 Hypotheses and Objectives of the Study

Hypotheses

1. Food refusal amongst children is associated with food intake pattern.
2. Food refusal is associated with certain food items within each basic food group.
3. Reported food refusal is not always associated with reduced nutritional status of the child.
4. Food refusal is associated with some other factors like micronutrient status, mother's attitude etc.
5. Counseling can improve food intake amongst food refusal group as well as improve their nutritional status.

General objectives

1. To assess the degree and type of food refusal and to identify its determinants.
2. To assess the effects of counseling on food refusal.

Specific Objectives

3. To determine the status of food refusal: meal frequency, period of food refusal and degree of food refusal.
4. To detect the food items of the basic food groups often refused by children.
5. To identify the demographic characteristics of those children's family with food refusal.
6. To identify additional determinants associated with food refusal.
7. To assess 24 hour recalled food intake by the children in terms of energy, protein, iron, calcium, vitamin A, riboflavin, thiamin, niacin and vitamin C
8. To assess the nutritional status of the children, using H/A, W/H and W/A.
9. To show the effects of counseling on food refusal.

Chapter 2: Literature review

2.1 Introduction

Malnutrition is a common worldwide problem. The prevalence of child malnutrition is far higher in South Asia than in any other region of the world. It is estimated that worldwide there are 167 million underweight under five years old children of whom 90 million are living in South Asia. More than half of the world's underweight children lives in just three countries--India, Bangladesh and Pakistan. Although the rate is lowest in Sri Lanka, it is higher than in many countries (Jonsson, ACC/SCN, 1997). Bangladesh has the highest number.

One of the causes of malnutrition is reduced intake of food, which may be due to lack of household food availability. Lack of household food availability is one of the main reasons why children do not get enough to eat whether they are sick or well (Bairagi and Levinson, 1979).

On the other hand Engle (1992) provided evidence that food availability in the household is a relatively poor measure of actual food intake over the course of the day. To improve prediction, variables to be considered as well are:

1. Feeding timing and frequency
2. Food quantity and calorie density
3. Child appetite and child refusal
4. Active feeding behavior by caregiver, and
5. Believes about children's feeding.

In a recent study, families with no reported food shortage showed 46%, 77%, 81%, 69% and 80% severely underweight children in Gujarat, Maharashtra, Karnatak, Uttar Pradesh and Rajasthan respectively (Deepti Chirmulay, ACC/SCN, 1997). Children in high socioeconomic class were taken to pediatricians or modern medicine practitioners or to private practitioners for advice in early illness (Rebecca and Michele, 1998).

Parents and others who feed children need to avoid counter productive behavior as well as act to promote good nutrition by more active means. Parents must distinguish between expressions of real physiological need on the child's part and other emotional and physical needs that are sometimes expressed in food terms. The child's normal strivings for greater independence mean that temporary refusal to eat, dawdling, and the use of food and eating to attempt to exert control over the parent are inevitable. The generalized poor appetite may be due to many causes, like; small size of stomach for the age, small appetite compared to other children in the family; poor appetite at a particular time of day such as supper especially after exhausting play and numerous snacks in the late afternoon; poor appetite due to falling ill or recovering from an illness; and wide variations in physical activity from day to day (Dwyer, 1993). Because food must be eaten in small amounts frequently, storing it hygienically is most important in the period from 6 to 18 months. During the critical period of the second year of life, children may not yet be able to signal desires for food effectively, or may be unable to obtain food on their own. At this age language development and gross motor skills may increase a child's ability to obtain food (The Care Initiative, UNICEF, 1997).

Families should be suits to allocate high-density foods to the child, and be sure that the child gets a fair share of the family food. Greater variety foods given to children in this period seems to have a positive effect on overall intake (Savage king and Burgess, 1992).

Most of the investigators reported that children were not eating all of the foods offered to them. This food leaving may be a function of poor-quality, low nutrient-density food, poor tasting food, child illness and loss of appetite, inappropriate timing of food, failure to assist the child, or the caregiver offering too much food initially. In a study with 123 Bangladeshi children between 4 to 33 months it was found that, the more often they finished their food, the higher was their nutrition status (Zeitlin et al, 1989).

The most recent report (UNICEF, 1997) showed that the person who is responsible for the feeding may influence the child's willingness to eat; often children will refuse

food if the preferred caregiver is not present. Patience and understanding, plus recognizing the child's need to gain familiarity with the caregiver, will increase the chances of successful feeding. Rather than providing an opportunity for interactions and cognitive and social enhancement, feeding can become a time of conflict with intrusive ineffective caregiver strategies and high levels of child refusal. A responsive caregiver, who can adapt to child refusals with gentle encouragement, can often increase food intake.

If a child has anorexia or a poor appetite, extra encouragement may be necessary for adequate nutrient intake. Caregivers have been observed to encourage feeding only after seeing that the child is refusing to eat, which may simply result in fruitless battles. The feeding situation may also influence food intake of young children. Children can be fed on a regular basis each day, sitting in a prescribed place with food easily accessible, or at the time that the caregiver finds convenient. If the main meal is prepared late at night, children may fall asleep before it is completed. Children can be easily distracted, particularly if food is difficult to eat or not particularly tasty. If supervision of feeding is not adequate, other siblings or even animals may take advantage of a young child's vulnerability and take food away, or food may be spilled on the ground. The best feeding situation for a child is a special place that is consistent from day to day, and protected from distractions and intrusion.

Family food may be prepared with tastes that the child is not ready for, such as spices, and ideally food for the child should be removed before spice is added. Children's access to food needs to be protected during this critical stage.

Encouragement of autonomy, exploration and learning by caregiver can improve children's intellectual development and nutritional status. Young children are born with ability to learn, but they need the encouragement and freedom to be able to develop that ability. Several studies in developing countries found that malnourished children who had been given verbal and cognitive stimulation had higher growth rate than those who had not (Super et al., 1990). Caregiver needs to provide safe condition to play, encourage exploration and provide learning opportunities in addition to good nutrition. Caregivers are the child's first teacher, children at all ages watch and copy

adults and older siblings, and can learn from a kind of guided apprenticeship to do adult tasks without specific training. Children learn from games, play and guided imitation. Caregivers who allow children to play and who interact with them frequently can stimulate their cognitive, language, social, and motor development.

It was reported that food refusal was associated with lower height for age and weight for age among 80 Nicaraguan children aged 12 to 18 months (Engle, 1995).

Three behavioral influences on intake are:

1. Adapting the feeding method to the child's Psychomotor abilities (e g., spoon handling);
2. Feeding responsively, including caregiver's encouragement to eat, attention to the child's appetite, timing of feeding, child versus caregiver, control of eating, and affectionate or warm style of relating to the child during feeding; and
3. The feeding situations including freedom from distraction, a consistent feeding , schedule, and supervision and protection during eating.

Adapting to children's changing motor skills can require close attention by the caregiver, since these abilities change dramatically during the first two years of life. The time required for a child to eat a certain amount decreases with age for solid and viscous foods, but not for thinner puree.

The frequency of feeding needed for infants to meet energy requirements, depends on the energy density of the foods. Due to their stomach sizes, frequent feeding is essential. Higher frequency feedings of low nutrient density food could have an adverse effect on breast milk intake and on total nutrient intake (Brown, Allen & et al., 1996). If frequency should be increased, between meal snacks are recommended. Non-breast fed child need food more often and in greater amounts, with special attention to the protein, micronutrient and energy qualities of the diet.

Dettwyler (1986) conducted a study in 4 to 36 month old children in Mali and the mothers of the children were categorized according to their attitude scale, representing four attitudes:

1. Calling children to meals,
2. Trying to make foods like,
3. Purchasing small treats, and
4. Using medical care

It was found that this combination of attitudes was a better predictor of child weight for age than socio-economic class.

Engle et al., (1990) in Guatemala reported that a significant predictor of food ingested at a meal was the number of requests before the meal and number of requests for more food during the meal. Parental encouragement was unrelated to food ingestion.

In Nicaragua, poor nutritional status of 12-18 months old children was associated with child's refusal but was unrelated to maternal encouragement to eat (Eagle et, al., 1990,1993).

In Bangladeshi diet for children there is no increased provision for the increased calorie for catch up growth. Nutrition education can make improvements in nutritional status but the improvement may be limiting by all the other factors affecting nutrition (Elizabeth , 1992).

2.2 Food refusal and food item of the basic food groups

Refusal to take food is qualitative or quantitative. To make the food, balanced food quality placed a strong role. To maintain the quality or to make the food, balanced food items within each food groups play a strong role. From cereal group the major food items are rice, wheat and their products. Rice is the main food in Bangladesh, Sri Lanka, Burma, China, Japan and in India- mainly in West Bengal, Assam and South India. Wheat is the most widely used cereal in the World. The Punjab, Uttar Pradesh and Pakistan over 70% of total calorie intake has come from wheat (Antia,1989).

Food items prepared from rice, wheat and from other food may vary widely. Refusal of food items vary within each food group is common. Sattar (1992) has conducted a

study in urban Dhaka on food intake of 2-5 year old children of dissatisfied and satisfied mother about their children's intake revealed that roti, aloo bhazi, egg, milk, rice, suji, semai, porata, bread, khichuri and banana were usually used as breakfast. In majority cases of dissatisfied mother it was observed that milk and egg were given in addition to ruti and fried potato (aloo bhazi) at breakfast. At mid-day meal, majority of dissatisfied mother was given fish, meat, pulses, milk and vegetable in comparison with children of satisfied mother. Protein and vegetables were given to larger number of children of dissatisfied group. 60.5% dissatisfied mothers were giving milk at bedtime. Author found that large number of dissatisfied mother gave banana and milk as snacks in mid morning and mid afternoon. Larger number of dissatisfied mother gave noodles to the children at afternoon. He also found that 93.4% satisfied mother in comparison with 78.4% satisfied mothers give milk to their children. Dissatisfied mothers give large quantity of milk than satisfied group of mother.

The thickness or bulk of food can prevent children from eating enough food because small children have small stomachs (WHO, 1988).

Khan has studied (1980) in rural Manikgonj and Joypurhat and found that cereals represented the most important food groups with increasing age. Dark green leafy vegetables never assume an important role in the diet of children under the age of six months. Foods from meat, fish and poultry group is given to children on a regular basis only after the second year of life. He has shown that before 15 months of age none of these village children were given vegetables. Consumption of fruits by children is seen not frequently in the area of Manikganj and Joypurhat.

Food refusal during illness was studied recently have shown (Elizabeth, 1992) leafy vegetable, spinach is generally avoided during diarrhoea because they are thought to be indigestible. Pumpkin is avoided because it is thought that it will exacerbate the diarrhoea. Oil is also avoided during diarrhoea because it is thought to be hot and indigestible.

Snacks are commonly consumed by school aged children, primarily after school and in the evening. Bakery products and soft drinks are the most frequently chosen snack foods.

Families should be suits to allocate high-density foods to the child, and be sure that the child gets a fair share of the family food. Greater variety foods given to children in this period seems to have a positive effect on overall intake (The Care Initiative, UNICEF, 1997).

Engle et al. (1990) in a Guatemala study reported that a significant predictor of food ingested at a meal was the number of requests before the meal and number of requests for more food during the meal. Parental encouragement was unrelated to food ingestion.

2.3 Food refusal and socio-demographic characteristics

2.3.1 Education and occupation

Adult education is highly correlated with child nutritional status, are as access to health services and the availability of safe drinking water. Education in an adult family member, either man or woman is associated with better child nutrition (Deepti Chirmulay, ACC/SCN, 1997).

Vella et al (1994) conducted a study in Northern Uganda and showed that children who were <29 m old at baseline were at high risk for linear growth faltering in the following 2 years; income, mother's education and presence of stunting at baseline were significant predictors of stunting. The linear growth is influenced by environmental factors. It is a dynamic process continuing beyond the first 2-3 years of life and the probability of catching up is very similar across all age groups < 5 years old. Recovering from stunting is more associated with mother's education than with income.

Victor et al. (1992) shows maternal education has effects on child health, which is partly independent from that of other socioeconomic factors.

In Kuwait a study has shown that the educated and employed mothers were more liable to have slightly smaller babies compared to the illiterate or unemployed mothers(Amine and Awad, 1991).

A positive relationship appears to exist, for each of the three indicators, a higher percentage of the children of the literate mothers fewer of normal status or had mild malnutrition than the children of the illiterate mothers. Maternal literacy and nutritional knowledge exerted significant intervening effects on at most two of the selected anthropometric indicators. Mother has significant nutritional knowledge which is effective in improving the nutritional status of their children (Christian Pand et al., 1988).

Mother's education has a significant and positive effect on caloric intake of children in first year of life. Mother's education is negatively associated with calorie intake and calorie adequacy after one year of age (Chaudhury, 1984). Sattar (1992) has shown nutritional status of the children is directly related to mother's education-levels.

In another study in urban Dhaka, Rahim (1993) has also found, 93.3% malnourished children were among mothers who were exposed to primary education, 76% among 6-10 years of schooling, 66% among SSC pass mother and 50% malnutrition were among mothers with HSC level education.

BBS (1994) study showed that stunting rates were 49.6, 26.1, 22.3, 8.3 and 0% when mothers education levels are no education, 1-5 class, 6-9 class pass, SSC-HSC pass, BA above respectively.

BBS (1987) has shown in another study in urban area that when mothers were graduates or more educated their children were not stunted or wasted.

BBS (1991) again shows a strong positive impact of mother's education on nutritional status of children. Even two-three years of schooling tends to improve the child's nutritional status. Secondary education has additional positive effect.

In another study it was found that father's education, appears to have very little effect on dietary intake and dietary adequacy of pre-school children in rural Bangladesh. Better educated parents should be able to provide their children with a more nutritious diet at any income level because of their increased knowledge, on the other hand educated women when worked outside the home with a resulting drop in time spent on child care. This may lead to reduce breast-feeding and early weaning (choudhury, 1984).

2.3.2 Parent's income

Economic structure is the basic determinants for child survival, growth and development (Unicef,1997). Household income poverty may not be the most important constraint to the growth of infants (Deepti Chirmulay, ACC/SCN, 1997).

In the region of South America several countries have shown significantly higher rate of obesity among children. South America has had rapid economic expansion, as seen in quickly rising gross national products per capita. Access to safe water and access to healthcare services remains high. Immunization coverage has improved and is relatively high. Dietary energy supply was relatively high and has remained constant, which the fertility rate (about three births per woman) has been decreasing slowly.

National Nutrition Survey (NNS) of Philippine (1993) has shown that professional, technical and urban group's income was high and their per capita energy and nutrient was also higher than low income group. Food availability in the household is a poor measure of daily food intake (Engle, 1995).

Malnutrition rates remain high in many areas and rates of improvement are slow, one of the reasons may be the inadequate care but not the income.

2.3.3 Number of children in the family

Care of the children is related to education, income and number of children in the family and with other determinants. Food intake and nutritional status of the children are related to care. Food refusal and its relation to number of children in the family were not previously studies. Refusal to take food is related to food intake and nutritional status. Number of children in the family or size of the family is related to nutritional status of the children and it was reported in many studies. Family size greater than seven children in a Nigerian family results in a higher incidence of Kwashiorkor (Allenye, 1988).

Pelto et al., (1991) conducted a study in Solis Valley in highland Mexico and revealed that children from large household are significantly shorter and consume diet of poor quality protein.

BBS (1992) in their study shows that stunting rates increase with the increase of family size and it was also same for wasting.

After two years BBS (1994) has reported that, as a number of children increases in both rural and urban area, stunting and wasting rates also increased.

Increased family size may adversely affects the nutritional status of every member of the household including pre-school children, because it may be associated with decreased per capita human inputs. The lower the dependency ratio, the higher the nutrient intake of preschool children (Choudhury, 1984).

The connection between high birth rates and malnutrition is most obvious in the individual family. Young children need much more food in proportion to their size (FAO, 1984). The World Bank Surveys show that the desire in Sub Saharan Africa for large families is the highest in the world at 7.5. Cultural and socioeconomic factors in African community supports large family size, results a decline in food availability and intake (FAO/WHO/OAU, SPECIEL paper no 18,1989).

Rahim (1993) has shown, as the number of children increased the rates of malnutrition were also increased. In another study has shown, mean family size was 4.11 ± 1.16 and 4.55 ± 1.74 in dissatisfied and satisfied mothers respectively. In families where mothers were dissatisfied about food intake by their 2-5 years old children, 61.85% of children were found normal and 38.15% were found with different grade of malnutrition (Sattar, 1992). Children are exposed to greater risk of energy deficiency and have a negative effect on the nutritional status (Nutrition and development-a global assessment, FAO, 1992).

Ahmed et al., (1992) conducted a study in urban Dhaka on 242 school children aged 5-12 years of age. The children were divided into three family size groups of small (up to 4 members), medium (5-7 members) and large families (8 or more). Children from smaller families showed significantly higher levels of haemoglobin and serum vitamin A compared with the children from large families.

Increased family size may adversely affect the nutritional status of every member of the household including pre-school children, because it may be associated with decreased per capita human inputs. The lower the dependency ratio the higher the nutrient intake of pre-school children (Choudhury, 1984).

2.3.4 Birth order

Food refusal and birth order have not been studied previously in Bangladesh. The first child of young mother is not experienced and proper feeding and care for the child is also difficult for the mother.

A recent report (The Care Initiative, UNICEF, 1997) has shown birth order can also have a significant effect on care practices, first born to young women may be raised by a maternal grandmother, and later born, particularly if the non-preferred gender, may receive much less care. High birth order children (fifth or higher) receive less adult attention. Some children need extra psychosocial care because of vulnerabilities such as premature, disability, or inadequate care in the past.

Children who are first or second born to a younger mother are most likely to develop malnutrition (S.Khanum 1985, INCS, 1984). An analysis of 872 cases of kwashiorkor showed that 61 percent belongs to higher birth orders (Gopalan, 1969). In a field study of 1400 pre-school children it was found that while 30 percent of the children of birth orders of four and above exhibited signs typical of malnutrition, only 17% of earlier birth orders showed such evidence. Gopalan concluded, 62% of all nutritional deficiency in pre-school children was encountered with children with birth orders of four or above (Allenby, 1988). Children of lower birth order have fewer stunted and wasted rate than those with higher birth order (BBS, 1992). Rahim (1993) showed, with the increase number of birth order after 2nd birth, malnutrition was also increased.

2.3.5 Birth weight

In many studies it was found that maternal malnutrition prior to and/or during pregnancy is more likely to produce an underweight newborn baby. The intrauterine malnutrition can be compounded after birth by insufficient food to satisfy the infant's need for catch-up growth, resulting in PEM.

Data on birth weight for the country as a whole is lacking, but the few community based studies that have been done suggest that the average birth weight may be as much as one kilo less than that in developed countries. The causes of low birth weight are complex but it is likely that poor nutrition of mothers both before and during pregnancy plays an important role (Elizabeth, 1992).

In a recent report, presented in the 3rd report on World Nutrition Situation (ACC/SCN, Dec, 1997) has shown Bangladesh, India and Pakistan have the highest rates of LBW in the world (50%, 33% and 25% respectively). The prevalence of low birth-weight is very high in countries with prevalence of stunting. Low birth-weight is especially high in South Asia, which also has both the highest rates and numbers of stunted children.

The most widely used anthropometric indicator of size in birth weight, which is the most diagnostic classification of fetal growth (WHO Tech. Series 854). Nutrition and development -global assessment (WHO, 1992) reports has shown, that 17.4% of newborn babies have LBW; 6.5% in developed countries and 18.8% in developing nations. Analysis by regions reveals very high rates in South Central Asia (33.5%) and in sub-Saharan Africa (15%). Rahim (1993) in his study at army colonies of Dhaka cantonment found 27% LBW. BBS (1996) shows rate of LBW in 1990 was 30%. A significant relationship exists between birth weight and socioeconomic status of mothers (Nargis Rowshan et al., 1977).

The birth weights of infants of well-fed mothers in the upper socioeconomic classes are higher on average than those of poorer mothers. Amine and Award (1991) studied in Kuwait have shown that the mean birth weight was 3.5 kg. The low birth weight is commonly due to reduced income. Birth weights are related to energy intakes of mothers during pregnancy. Maternal energy deficit limits fetal growth (Davidson and Passmore, 1986). Most children are born with low birth weight and become increasingly malnourished up to the age of two years (ACC/SCN 1997).

Eachs (1994), assessed the evolution of nutritional status of an urban community between 1986-1991 to identify specific groups for which nutritional status has worsened. 2295 in 1986 and 2373 children were surveyed, weight for height and height for age indicators were used, caused increased in the percentage of LBW, increase in the prevalence of wasting (2.9% to 4.2%) and overall decreased the stunting rate (from 16.9% to 11.0%).

2.4.1 Food refusal and parasitic infestation

In our society elderly people generally believe that refusal to take food is commonly associated with worm infection. Ascariasis, hookworm infestation, trichuriasis, pinworm infestation, giardiasis and amebiasis are parasitic infestation in Bangladesh. The same type of study was not conducted before but some findings are observed in different publication.

Brown and his associates (1980) in their study on absorption of macro-nutrient from a rice vegetable diet before and after treatment of ascariasis in children in urban Dhaka revealed protein absorption was modestly decreased (57.2% in heavy infection and 64.1% in light infection). After deworming there was a significant improvement of protein absorption. The total energy absorption improved slightly.

Mahalanefish (1976) shows vitaminA may also be absorbed with efficiently in presence of ascariasis.

Taren et al., (1992) conducted a study in the town San Felix and Alter Caballero, Republic of Panama, identify the prevalence of parasitic infestations and factors associated with malnutrition in Guaymi Indian children. The results of the study indicated that 20% of the children had a plasma vitamin A concentration less than 20 mg/dl. Significant association was identified among ascariasis, age, food diversity score and vitamin A concentrations.

Where hookworm infection is endemic (prevalence 20-30% or higher) and anaemia is very prevalent, hookworm infection is likely to be an important cause of anaemia, especially moderate to severe anaemia. Hook worm causes intestinal blood loss and the amount of blood lost is directly related to the number of worms infecting the host. A moderate infection of hookworms approximately doubles the iron losses of a child. The prevalence and intensity of hookworm infection increases with age, so that its effect is greatest on the iron status of school-age children, adolescents, and adults, including pregnant women (Rebecca and Michele. INA CG, WHO, UNICEF, 1998).

In populations where hookworm is prevalent, effective treatment of this parasitic infection has been shown to reduce the prevalence of iron deficiency and anaemia in school-aged children (Stolzfus et al., 1997).

Alleyne (Protein energy malnutrition, 1st ed., 1988) stated, hookworm is responsible for considerable red cell protein loss from the gut wall. Giardiasis is common and is significant in reducing recovery rates in malnourished children. Trichuriasis is a very common infestation, frequently responsible for chronic diarrhoea and heavy infestation may lead to rectal prolapse. Ascaris in company with other gut parasites results in loss of weight and delayed recovery. Amoebae are found in many parts of the world; infestation results in chronic diarrhoea, loss of weight and anaemia. If the child had bloody diarrhoea, the common infecting organisms are E.coli, salmonella and shigella. Diarrhoea in which no organism can be identified may be viral in origin or the result of infection outside the alimentary tract.

Simeon et al., (1995) conducted a study on the effects of treating Trichuris trichiuria infections in 407 Jamaican children aged 6 to 12 years. The children with heavy infections showed improvements with treatment that approached significance ($P=0.02$), where those with lower intensities infection did not, stunted children were improved with treatment ($P<0.04$) and there was no difference in the non-stunted children. Treatment of Trichuris trichiuria was more likely to benefit school performance in children of poor nutrition status and those with heavy infections and to improve weight gain in children with lighter infection intensities.

Major factors contributing to widespread poor iron nutrition include diets low in available iron, low intake of iron, infesting blood loss due to parasites, especially hookworm and trichuris trichiura infections (FAO/WHO Expert Consultation Report, 1988).

2.4.2 Food refusal force feeding and mother's patience

In case of food refusal, force-feeding is a common feeding practice seen in the affluent classes.

In a study in Bangladesh, it was found that the less educated mothers tended to leave much of the impetus for development up to the mature patterns of the child, whereas the more educated mothers took a much more active role in controlling, feeding, and stimulating the child (Zeitlin et al., 1990).

Recent report on Assessment, Analysis and Action to Improve Care for Nutrition (The Care Initiative, Unicef 1997) has come out with most useful information:

Active spooning of food is appropriate for a 7 months old but inappropriate for a normal 2 years old who wants to feed him. The amount of food that children consume may depend more on the caregiver's active encouragement of eating than the amount offered. Helping mothers encourage their children to eat may be as effective as telling mothers what to feed their children. Children should be encouraged to ask for more. Mothers and other caregiver who show or model for children how to eat healthy foods will encourage children's eating, especially when food quality is low. A relaxed and comfortable atmosphere without conflict will increase intake with gentle encouragement and responsive feeding, evidence shows that children will often eat more than if they are left without encouragement.

Cultures vary along a dimension of control of eating; at one extreme the caregiver has all of the control, and children should be force-fed, whereas in the other extreme, control is given entirely to the child. Neither extreme is good for children.

Passive feeding may be due to lack of time and energy, or to beliefs that children should not be pressured to eat, that the stomach knows its limits.

According to Engle (1995) there are complex problems and will require patience, an awareness of cultural difference, and a willingness to look at more 'soft' data before solution emerge, but without this phase the child development revolution of survival with dignity will be lost. Economic development and urbanization, the content and context of childcare activities are changing rapidly. Intervention need to consider alternative caregiver's skills and constrains.

Lucas (1992) inform that feeding the child aged 1-6 years is often a difficult time for parents, with their concern about the adequacy of diet and their frustration with their children's seemingly irrational behavior. Struggles over control of the eating situation are fruitless; no child is forced to eat. Parents need to understand that this period is developmental and temporary. Pre-school children have less interest in food and more interest in the world around them. They are refusing previously accepted food or

asking for one particular food at each meal. This behavior may be due to foredoomed with usual foods or may be a means of asserting newly discovered independence.

Feeding is a matter of using good sense, like adults; babies may like a particular food more than another, and may be hungrier on some days than others. No two babies are the same in which foods they like more than others. Some babies prefer sweet things while others prefer salty things. Mealtime should be pleasant and 'force' must not be used in feeding. Learning to swallow semisolid food may be difficult for a baby who only knows how to suck the breast. If a particular food is refused, do not offer it again for a few days. Try something different. Patience during feeding is most important (S K Roy, *Dialogue on Diarrhoea*, 1988).

Werle, Murphy and Hudd (1993) shows by giving training to mothers to initiate regular offering of previously rejected (target) foods to provide contingent attention (e.g. specific promote, positive reinforcement) to increase their child acceptance of non preferred foods. With training mothers increased offering of target foods and used of specific prompts and increased levels of positive attention. In term children increased their acceptance of target foods and self-eating. Thus demonstrating the functional effects of parent training on in home meal times temporary increases in food refusals occurred when treatment was initiated but declined as treatment continued.

Maternal feeding behavior tends to be passive in many cultures (Bentley et al., 1992 in Guatemala; Engle et al., in Niceragua; Grantham-Mc Gregor, Schofield, and Haggard, 1989, in Jamaica). In South-western Nigeria, however, Brown et al. (1988) found that 85 percent of mothers feed their children by hand or by forcing from 6 months to 11 months, with the present declining with age. Children who refuse food can be forced-fed a liquid pap. When too much control is in the hands of the caregiver, force-feeding is continued and even intrusive pressure on children to eat, is seen (Brown et al., 1988; Dettwyler, 1989).

Six undesirable ways to feed a child are pushing food into the mouth, coaxing, nagging, bribing, threatening and smacking. Chronic food refusal has traditionally been treated with force-feeding and other physical promoting-based procedures when

positive reinforcement proves inadequate. Positive reinforcement increased acceptance only slightly and did not change negative vocalization or interruption for child (Hoch et al., 1994).

Excessive coaxing, cajoling or forcing the child to eat virtually never succeeded. In the long run the parent or caretaker who attempts to force a child to eat will end up with a worse problem than he began with (Garrow and James, 1993).

Sanders et al. (1996) in their study has shown parents of feeding disorder children were more negative and coercive in their feeding practices and engaged in higher levels of aversive instruction giving, aversive promoting and negative eating related comments. There are several significant associations between where of parental behavior children's food refusal and non-compliance in the sample as whole.

Prevention of and protection from child abuse and violence are ways of caring for children. Abuse of children beyond what is culturally acceptable results in a vulnerable adult, who may be more likely to repeat the abuse. Children exposed to aggression, and children who have been victimized are likely to repeat these roles.

Mother/caretaker when tries to force their child to eat solids or food that she/he does not like, so meal times become unpleasant for the child and refusal to eat become an important problem (Savage King and Burgen, 1992).

2.5.1 Energy and protein intake of the children and nutritional status

Energy is essential for activity, growth and rest. Age, sex, height and weight and state of nutrition of the individual and some factor influence energy requirement. The energy requirement of an individual is the level of energy intake from food that will balance energy expenditure when the individual has a body size and composition, and level of physical activity, consistent with long-term good health; and that will allow for the maintenance of economically necessary and socially desirable physical activity. In children and pregnant or lactating women the energy requirement includes the energy needs associated with the deposition of tissues or the secretion of milk at rates consistent with good health (FAO/WHO/UNU, 1985).

Food intake varies from individual to individual of the same age and sex (Widdowson and Mc Cance, 1945). Foods prepared for young children must contain sufficient energy, protein, vitamins and minerals to meet the child's needs (Engle, Unicef, 1997). The requirement for a particular nutrient or for energy is the amount necessary to ensure normal physiological functions, and to prevent symptoms of deficiency occurring (FAO/WHO/UNU, 1985). The Recommended Dietary Allowances (RDA) represent levels of intake sufficient to meet the needs of essentially all healthy people. The Department of Health of UK replaces the term RDA by DRV (dietary reference value) in 1991. Three values are used: LRNI, EAR and RNI. LRNI means lower reference nutrient intake, 2SD below EAR. EAR means estimated average requirement, which assumes normal distribution of variability. Reference Nutrient Intake (RNI) is 2SD above EAR.

Table 2.1 Energy intake (Kcal/d) recommended by UK&WHO EAR 1993, USA AER1989, FAO/WHO/UNU 1985, FAO/WHO 1974 and Canadian RDA, 1983

Age (Y)	UK & WHO EAR 1993*	USA AER 1989*	FAO/WHO/UNU 1985*	FAO/WHO** 1974	Canada** 1983
1-3	1230 M 1165 F	1300		1360	
4-6	1715 M 1545 F	1800		1830	1800
7-10	1970 M 1740 F	2000		2190 (7-9Y)	2200 M 1900 F (7-9Y)
11-14	2220 M 1845 F	2500 M 2200 F		2600 M 2350 F (10-12 Y)	2500 M 2200 F (10-12 Y)
1					1100
1-2			1200 M 1140 F		
2-3			1410 M 1310 F		1300
3-4			1560 M 1440 F		
4-5			1690 M 1540 F		
5-6			1810 M 1630 F		
6-7			1900 M 1700 F		
7-8			1990 M 1770 F		
8-9			2070 M 1830 F		
9-10			2150 M 1880 F		

Garrow and James (1993*)

Mahan and Arlin (1989*)

WHO Technical series 724 (1985*)

**Shils and Young (1988)

The desirable energy allowance of the population of Asian country (Schofield, 1990) for the age (year) 1+, 2+, 3+, 4+, 5+, 6+, 7+, 8+, 9+ the average energy need (total Kcal/d) are as 1004, 1134, 1228, 1321, 1426, 1505, 1552, 1555, 1570 respectively.

Japanese RDA for Kcal/d revised in 1984 for male and female; the recommendations are 970 and 920 for the age (year) 1+ and 1200, 1150 for the age 2+, 1400 and 1350 for the age 3+, 1550 and 1450 for the age 4+, 1600 and 1500 for the age 5+, 1700 and 1550 for the age 6+, 1800 and 1650 for the age 7+, 1850 and 1700 for the age 8+, 1950 and 1800 for the age 9+, 2000 and 1950 for the age 10+, 2150 and 2100 for the age 11+, 2300 and 2200 for the age 12+ and for the 13+ the recommendations are 2450 and 2250 respectively.

Table 2.2 Protein intake (gm/d) recommended by UK&WHO EAR 1993, USA AER1989, FAO/WHO/UNU 1985, FAO/WHO 1974 and Canadian RDA, 1983

Age (Y)	UK &WHO RNI 1993*	EAR* 1993*	PRI* 1993*	USA AER 1989*	FAO/WHO/ UNU 1985*	Canada** 1983
1-3	14.5	11.7	14.7	16.0	12	18.0(1Y) 20.0 (2-3Y)
4-6	19.7	14.8	19.0	24.0		25.0
7-10	28.3	22.8	27.3	28.0	20	31.0 M 29.0 F (7-9Y)
11-14	42.1 M 41.2 F	33.8 M 33.1 F	42.0 M 39.7 F	45.0 M 46.0 F		38.0 M 39.0 F (10-12 Y)
3-5					14	
5-7					18	
10-12					34.0 M 35.0 F	

Garrow and James (1993*)

Mahan and Arlin (1989*)

WHO Technical series 724 (1985*)

Japanese RDA for protein revised in 1984, recommended 30, 35, 40, 45, 50 g/d for the age (year) 1+, 2+, 3+, 4+ 5+ respectively. Protein requirements for the male and female children are 55 and 50 g/d for the age of 6 years + and 60 and 55 g/d for the age of 7 years + respectively. At the age of 8 +, 9+, 10 +, 11+ and 12 years + the requirements of protein are 65, 70, 75 and 80 g/d respectively for both sexes.

Nutritional wellbeing is influenced by the nutrient content of foods consumed in relation to requirements. At individual level the preference in care and feeding practices are also important determinants of dietary intakes.

FAO studies have highlighted the importance of urbanization as one of the major factors associated with changes in the pattern of food demands. Food purchases and consumption patterns in urban and rural areas in less developed countries increases in the consumption of sugar, soft drinks, highly milled cereals, and processed foods in the urban communities. Although there is usually increase in fat and animal protein consumption in urban areas, the total protein intake may decline and energy intakes are almost invariably lower in urban communities.

Animal protein intakes (g/d) are 29.2, 5.1, 31.8 in rural area and in corresponding urban intake are 30.7, 10.9, 43.3 respectively. Fat intakes (g/d) in rural area are 60.0, 15.8, 84.0 and in urban area corresponding intakes are 63.0, 19.5, 95.8 respectively (James and Schofield, 1990).

Allen et al. (1992) in their study in 67 Mexican children aged 18-30 months, have shown that growth rates were not related to energy intake but positively related to animal origin foods.

Paik et al. (1992) conducted a study on school children in urban and rural area of Korea. The study showed that animal protein intake correlated most significantly with height for age. Fat intake was a more important factor for weight for age and height for age.

In 1962-64 urban food intake was 13% lower than rural food intake and in 1981-82 urban intake was 11% higher than rural food intake (Karim and Hasan, 1989).

Hasan and Kamaluddin in their study (1984) shows children from richest rural Bangladeshi families were daily consuming 740 Kcal at the age of 1-3 years, 1361 Kcal at the age of 4-6 years and 1548 Kcal at the age of 7-9 years. Adolescent girls and boys were consuming 1991 Kcal and 1941 Kcal per day at the age of 10-12 years and 1842 and 2644 Kcal/d respectively at the age of 13-15 years. Calorie adequacy ratio declines as the child advances in age (Choudhury, 1984). Adolescent growth not

only introduces significant changes in inter individual variation in energy intake but that the changes are pertinent in the stage of growth spurt (Shobha, 1989).

Urban food consumption pattern changes rapidly, particularly with regard to consumption outside the home which is an important feature of urban life (FAO, 1991). Soltysova and Bellisle (1994) studied in ten years old children of the Liberec (Czech Republic) area shows, protein-fat-carbohydrates distribution of the diet was 11, 35 and 54%. They revealed, ingesting a health lunch at school than at home improved the daily ration of energy and many nutrients. The weight for height, BMI was normal, inspite of taking energy intake (about 8000 KJ) 10% below Czech recommendations.

In families of urban middle class healthy children per capita animal protein intake is 51.48 g/d (Alam et al., 1991).

In 1979-81, daily per Capita. protein, fat and carbohydrate intake in Bangladesh as percentage of total energy was 8.7%, 6.6% and 84.7%. During 1968-88, that scores changes to 8.5%, 9.3% and 82.2%. In 1979-81, protein, fat carbohydrate distribution of diet of Malaysia was 8.9, 18.5 and 72.6% that score changes in 1986-88 to 8.6%, 25.6% and 65.8%. Protein-fat-carbohydrate intake in Rep. of Korea as percentage of total energy in 1979-81 was 11.1, 12.1 and 76.8% that score changes to 10.9, 17.17 and 72.0% in 1986-88 (RAPA report, 1990/21). That reports show 12.7, 25.6 and 61.7% of calories come from protein, fat and carbohydrate intake in Japan (1986-88).

2.5.2 Iron intake and anaemia status of the children

Iron deficiency anaemia (IDA) is a nutritional anaemia. Nutritional anaemia means that the body can not make enough haemoglobin and healthy red blood cells because it lacks the necessary nutrients. (Savage King and Burgess A, 1992). Haemoglobin level below 11g/dl in 6 months to 5 years, 12g/dl in 6-14 years are called anaemia. Mild anaemia means haemoglobin level 10-11g/dl in 6 months to 5 years age and 10-12g/dl in 6-14 years of age group. When haemoglobin level ranges from 7-10g/dl are called moderate anaemia. Anaemia becomes severe when this is below 7g/100ml.

This reduced hemoglobin level makes paleness in lower conjunctival mucous membrane, buccal mucus membrane, palmer creases and nail beds (Gill D. Obrien N, 1988).

Table 2.3 Iron intake (gm/d) recommended by UK&WHO, EAR RNI, LRNI (1993), USA (1989) and European RDA, 1993

Age (Y)	UK & WHO 1993*	EAR* 1993*	RNI* 1993*	LRNI 1993*	USA 1989*	EUROPEAN RDA 1993
1-3	5.0	5.3	6.9	3.7	10	
4-6	5.5	4.7	6.1	3.3	10	
7-10	9.5	6.3	8.7	4.7	10	
11-14	15.0 M 16.0 F	8.7 M 11.4 F	11.3 M 14.8 F	6.1 M 8.0 F	12 M 15 F	10 M 18-22 F
1-6						4
7-10						6

Garrow and James (1993*)

Mahan and Arlin (1989*)

In another study (1979), conducted in India indicates that average daily iron intake was 10.2mg in children aged 1-4 years, 14.9mg in children of 4-7 years old and 17.4mg in school children of 7-10 years old.

Coutsoudis A et al, (1994) in their study on nutritional status of 190 children (3-6 years) living in Besters, a typical urban shack settlement north of Durban, South Africa was assessed anthropometrically. Biochemical values were determined. 13% children were underweight and 27% were stunted, 21% children had anaemic (<11 gm/dl).

In Latin America, the iron density in the diets of people in maize-eating countries is around 8.1 to 8.5mg iron per 1000 kcal; on the other-hand, in rice-eating areas of Brazil iron density is approximately 5.2mg/1000 kcal. In industrialized countries, pre-school children mean iron intake of 7 to 8mg. Iron deficiency is the most prevalent nutrient deficiency in the world to day.

Mexican-American pre-school children's iron, intake was likely to be inadequate, <66% of RDA (Zive et al., 1993).

The nutritional status of people living in Urban Beijing City is good in general, but there is still iron deficiency anaemia in infants and children (Zhao-XH, 1992).

Cook et al. (1994) shown that the most effective long-term strategy for prevention of iron deficiency anaemia is to increase the intake of available iron in the diet.

Nutrition Canada Survey (1993) was conducted and found that iron intake was low. To solve the problem there must be a political will and a coordinated effort to make a balanced diet available to all at an affordable cost (Moffatt ME, 1995).

Iron deficiency is more likely to occur in marasmic infants in the first year of life, particularly if they were also born prematurely. Anaemia is a common accompaniment of Protein Energy Malnutrition (Alleyne GAO and et al, 1989).

An anaemic person does not feel well, feel tired, apathetic may feel dizzy, breathless, fatigue and anorexia.

Data from Bangladesh have shown a mean per capita dietary supply of 23.4mg iron per day in 1980. This represents an increase compared to 10.6 mg per capita/d in 1962 and 22.2 mg per capita/d in 1975. The iron density of the diet appears thus to have increased during that period from 4.5 mg to 12.0 mg per 1000 kcal.

Brown has reported (1985) that the impediment to adequate food intake of well children in a Bangladeshi village is actually due to availability of food. Infants need a relatively high iron intake because they are growing very rapidly. Infants are normally born with plenty of iron. However, at 6 months of age, iron content of milk is not sufficient to meet many infants' requirements and complementary foods are usually low in iron. Low birth infants are born with fewer iron stores and are at high risk of deficiency after 2 months. Where prevalence of anaemia in young children (6-24 months) is 40% or more, supplementation should continue through the second year of life

Micronutrient status, susceptibility to infections, physical activity, and behavioral development also important outcomes (Brown, et al., 1997).

Meeting micronutrient needs from complementary foods appears to be the greatest challenge. The most frequent deficiencies in a young child's diet are iron and vitamin A. Additionally some diets are low in zinc and calcium (Brown et al, 1996).

Micronutrient such as zinc or iron contained in animal products may enhance growth. Additions of even small amounts of animal products, such as liver or flood, may be helpful in adequate amount of protein, iron and zinc and perhaps vitamin B12. Recent studies have shown a strong relationship between consuming animal products and child growth.

It is practically impossible to supply enough iron from unmodified complementary foods to meet iron needs in infants prior to 12 months without fortification or iron supplementation. After the first year of life, iron needs can theoretically be met from foods such as liver, fish and beef but in most population provision of sufficient amounts of these foods is not likely.

Major factors contributing to poor iron nutrition include diets low in available iron and low intake of iron. Deleterious effects of iron deficiency anaemia hampered physical and mental performance. Abnormalities in mental performance, including apathy, irritability, impaired attentiveness, and reduced learning capacity. Infants and children require substantially more iron per kilogram of body weight than adults do. Adolescents have particularly high iron requirements during the period of rapid growth. In Asia, according to the FAO Food Balanced sheets, the total iron in the food supply percept is lower than African countries.

Bangladesh, Brunei and Pakistan derive a significant portion of their iron supply from spices and condiments.

The most common forms of iron in food are relatively insolvable and poorly absorbed from the intestine. Other factors predisposing to iron deficiency are related to evaluating changes in the diet, not only during past millennia, but also within the last century. A decreased energy intake is also likely to curtail iron intake to a degree that may result in anaemia in some children and young women. Iron is poorly absorbed from diets consisting primarily of whole grain cereals and legumes even these relatively inexpensive foods contain substantial amounts of iron (Peter R. Dallman, 1990).

Iron requirements are highest during infancy and adolescence. Male needs decrease after the adolescent growth spurt, whereas female needs continue to be high until after the menopause. Iron deficiency is the most common of all deficiency diseases in human in both developing and developed countries (Dorice M. Czajka-Narins, 1992).

Iron Deficiency Anaemia (IDA) is the most prevalent nutritional deficiency worldwide. It is a major public health problem with adverse consequences especially for women of reproductive age and for young children. Over 90% of affected individuals live in developing countries. The consequence of IDA are numerous, in infants and children this deficiency is associated with impaired physical and cognitive development.

Epidemiological criteria can be used to define severe ($>40\%$), moderate (10-39.9%) or mild ($<10\%$) prevalence of anaemia within populations (WHO, 1996, P.8 and else where). Intestinal helminthes, especially hook worm infection causing gastrointestinal blood loss, causes IDA. There are number of causes of anaemia other than iron deficiency, including malaria (weatherall, 1988), congenital haemolytic disease such as thalassaemia, and other micronutrient deficiencies especially vitamin A deficiency)

The bioavailability of dietary iron was considered the most important determinants of anaemia in every age group except pregnant women. Worldwide, at least of anaemia is due to nutritional iron deficiency, and sub-clinical iron deficiency is wide spread as IDA. In areas with high anaemia prevalence (750%), it can be assumed that almost all the population iron deficient (WHO/UNICEF/UNU, in preparation).

Non-haem iron is the most important source of iron, especially in many parts of the developing world, where a vegetarian diet is an economic necessity. Leguminous seeds are an important source of iron in many regions, however food supply data indicates that the per capita availability of leguminous seeds is declining, especially in South Asia (FAO, 1992). The availability of iron-rich foods has lagged behind that of energy and protein.

The bioavailability of iron in food is influenced by other food components and food prepared methods, Vitamin C, meat, fish and an acidic pH all enhance iron

absorption. There are many vegetables that are good sources of iron and vitamin C, and the promotion of their use in combinations that favour iron absorption should be undertaken. Phytates, polyphenols and tannins inhibit iron absorption, and decreasing the consumption of foods such as tea, coffee, chocolate and soy products reduces the intake of these inhibitors.

Iron deficiency anaemia is most prevalent and severe in young children (6-24 months) and women of reproductive age, but is often found in older children and adolescents and may be found in adult men and elderly. Iron deficiency anaemia occurs when iron stores exhausted and the supply of iron to the tissues is compromised. Iron deficiency anaemia is a severe stage of iron deficiency in which haemoglobin falls below the above cutoffs. Iron deficiency anaemia is defined as anaemia with biochemical evidence of iron deficiency. When iron deficiency anaemia is prevalent, effective control programs may yield benefits to human health. In children, beneficial effects of the anaemia control programs are improved behavioural and cognitive development, improved child survival, improved fitness and work capacity (Rebecca and Michele, 1998).

Iron deficiency is the most common cause of nutritional anaemia in the world. Nutritional anaemia is a major public health problem in developing countries. FAO Food and Nutrition Services 23(1988) shows, the highest overall prevalence of anaemia in the developing world occurs in South-Asia and Africa, 56% young children was anaemic. In Latin America and East Asia 26 and 20% children was anaemic. In developed world anaemia drops off to 8 to 18 percent in children.

Despite a seemingly satisfactory overall iron intake(on the basis of current RDA) in diets, iron deficiency anaemia is widespread not just among pregnant women but also among children and men in South East Asia Region (SEAR) countries. The poor bioavailability of iron in cereal-based diet appears to be the major factor responsible (WHO, Regional Publication, SEARO,1994).This report shows, for combating the problem of anaemia in SEAR countries, data presented from Thailand shows over 15 percent of under five in 1991 and over 18 percent of school children in 1990 were found to be anaemic. Data gathered from Indonesia in the 1980s showed that 25 to 35

percent school children are anaemic. Anaemia in cereal eating population will need an effective convergence of three major approaches. Firstly, diet will need to improve, the bio-availability can be improved by Vitamin C rich food source.

Secondly, iron supplementation and confer limited benefit.

Thirdly, iron /folate supplementation starting with adolescence needs to be evaluated. It is usually difficult to see paleness if anaemia is mild. Moderate and severe paleness can be detected by clinical observation. Sarah Bance (1992), in her study on clinical assessment of anaemia by examining conjunctiva and haemoglobin measurement by bloating paper method shows +5% range of difference.

2.5.3 Vitamin A intake and nutritional status

Food supply of vitamin A ($\mu\text{g}/\text{person}/\text{day}$) in the world, Asia, Africa, North and Central America, South America, Europe and Oceania in 1979-81 was 541, 564, 725, 437, 298, 531 and 462. Average and median production of vitamin A in industrialized countries is 650mg RE/person/day (FAO, Food and Nutrition Series No.23 1988). Both the level and sources of vitamin A intake vary in proportion of household economic condition. This FAO series also shows, at least 5 gm of fat intake per day improves the absorption and utilization of retinol and B carotene. The ingestion of protein also improves the utilization of beta-carotene.

Table 2.4 Vitamin A intake ($\mu\text{gRE/d}$) recommended by UK&WHO, EAR RNI, LRNI (1993), USA (1989) and European RDA, 1993

Age (Y)	FAO/WHO 1988 Safe	PRI*EUROPEAN 1993*	USA 1989*
1-3	400	400	400 (1-2 y)
4-6	400	400	500 (2-6y)
7-10	400	450	700 (6-10y)
11-14	500 F 550 M	600	1000 (10-14y)

Garrow and James (1993*)

**Shils and young (1988)

Vitamin A level was determined by high performance of liquid chromatography in 80 healthy children in Ankara, Turkey shows sub-clinical vitamin A deficiency is an important public health problem in approximately 30% of children (Hafun and Lezic, 1995).

Nutritional Canada survey (1993) shows vitamin A intake is low and clinical vitamin A deficiency is not seen in Urban area, sub-clinical deficiency increase (Moffatt, 1995).

A total of 1618 blind school students in nine states in India were studied to find out causes of childhood blindness shows 26.4% children were blind mainly attributed to vitamin A deficiency (Rahi et al., 1995).

230 randomly selected Urban pre-school children in Umlazi, South Africa were studied, shows, common vitamin A containing food intake were below RDA. The study revealed 6% children were at risk of developing vitamin A deficiency (Cousoudis et al., 1992).

The vitamin A intake of 183 children 3-27 months of age in rural Bangladesh were ascertained monthly from January to July 1986. Average intake of vitamin A for children come close to 100% of the RDA. Children (7.7%) who had stopped breast feeding by the end of the study were at very high risk of vitamin A deficiency where fruits were not plentiful (Zeitlin and et al, 1992).

Ahmed et al., (1992) revealed that urban Dhaka school children of 5-12 years of age group has normal serum level of vitamin A., 10-12 years of male children have higher serum vitamin A level than those of younger boys of 5-9 years of age.

Total dietary vitamin A intake was strongly associated with reduced risk of xerophthalmia (Fawzi et al., 1993).

Nandi and Tontisirin (1995) revealed that, usually the people who are most vulnerable to micronutrient deficiencies are the youngest members of each society. To date, the most sustainable and long-term solution of vitamin A deficiency is a food based one that looks at improving the overall diet as well as increasing the consumption of vitamin A rich foods. The natural elements for maintaining good health and nutritional status are adequate production of nutritionally rich foods; their appropriate processing, preservation and storage and fair distribution of those who need them the most.

Fuchs et al (1994) shows, plasma retinol measurement, but not CIC were associated with height ($P < 0.003$) and severe stunting ($P < 0.001$).

Klemn et al. (1993) revealed, a preponderance of mild xeroptalmia among 4-6 years aged children. No consistent association between weight for age status and xerophthalmia was found.

Some degree of protein-energy malnutrition, as well as shortage of other essential micronutrient such as iron and zinc almost always accompanies severe vitamin A deficiency. Inadequate dietary intake is clearly the main risk determinants for vitamin A deficiency. Overly and low socioeconomic status are high-risk determination for vitamin A deficiency (Cohen, 1989).

Talukdar (1987) retinol deficiency is almost invariably accompanied by PEM. In a prospective study 248 severely malnourished, 124 (50%) were found to have eye changes of retinol deficiency. In a Dhaka Clinical Nutrition Unit, 24% patient with PEM, had eye signs of retinol deficiency. Dietary deficiency leading to PEM. In PEM the RBP is depressed and therefore even in presence of adequate vitamin A stores, serum vitamin A levels may be low. Harrera et al, (1992) in their study shows, children living in poor and unsanitary environments, younger children, and those sick, stunted, wasted on consuming diets low in vitamin A were at a significantly higher risk of dying.

The best-defined function of vitamin A is in vision and second major function of vitamin A is in cellular differentiation, which is directly or indirectly related to appetite (Olsen JA, 1990).

In vitamin A deficiency areas, improved vitamin A intake of mothers and/or greater intake of vitamin A rich complementary foods by children would be advisable.

Vitamin A Deficiency (VAD) is caused by habitually low intake of vitamin A in relation to requirement, sustainable solutions lie in improving intake and controlling preventable factors that elevate requirement.

The prevalence rates of clinical vitamin A deficiency decreased in all regions during the period 1985 to 1995. Rates of progress were highest in South Asia, at about -0.84 percentage point per ten years followed by Eastern and Southern Africa at about -0.74 percentage points per ten years. The reduction in number from 5 millions 1985 to 303 million in 1995. Global progress in reducing clinical vitamin A deficiency is reflected by progress in reducing sub clinical vitamin A deficiency but it is not possible to substantiate this unit sufficient data from repeat surveys are available. In infancy, early childhood and pregnancy, and during lactation when breast milk carries the vitamin in a highly absorbable form from mother to infant. The major non-physiological factor that increases need is frequency of infections, including diarrhea and other febrile illnesses such as measles. Strategies for sustained elimination of

VAD, therefor, will have to consider both improving vitamin A consumption and limiting the risk of infection.

Global trends in sub-clinical prevalence estimates are less easily tracked than clinical deficiency.

Classification of Xerophthalmia and Minimum Prevalence Criteria :

XN	Night blindness	Minimum prevalence for a public health problem % 1.0
XIA	conjunctival Xerosis	Not used for assessment
XIB	Bitot's spot	0.5
X2	corneal xerosis	0.1
X3A	corneal ulceration/ keratomalacia L 1/3 corneal surface	0.1
X3B	corneal ulceration/ keratomalacia and corneal surface	0.1
XS	corneal scar	0.5
SF	Xerophthalmic fundus	not used for assessment

The prevalence of clinical vitamin A deficiency signs from National or nationally representative Survey data from Bangladesh (1983) have shown that 4.6% in 4 -72 months age group, from India (1988) 1.4% in 0-60 months, from Nepal (1996) 1.5% in 6-35 months, from Srilanka (1987) 0.5% in 0-48 months, Myanmar (1994) 0.8% in 6-60 months, Vietnam (1988) 0.6% in 0-60 months, Indonesia (1992) 0.3% in 6-72 months of age group. In Europe (1980) the rate was 4.6% in 6-71 months of age and come down to 1.5% in 1996 (6-60 months)

2.5.4 Riboflavin, thiamin and niacin intake and nutritional status

The principle signs of riboflavin deficiency in human include a rash around nose, angular stomatitis and photophobia, lacrimation, burning and itching of eyes.

The presence of symptom fatigue, anorexia and nausea causes food refusal. Deficiency of riboflavin when occur, are usually in combinations with deficiency of other water- soluble vitamins.

Table 2.5 Riboflavin intake (mg/d) recommended by WHO, UK EAR, RNI, LRNI (1993), USA (1989) and European PRI, 1993

Age (Y)	WHO 1993*	UK EAR* 1993*	UK RNI* 1993*	LRNI 1993*	USA 1989*	EUROPEAN PRI 1993
1-3	0.8	0.5	0.6	0.3	0.8	0.7
4-6	1.1	0.6	0.8	0.4	1.1	1.0
7-10	1.3	0.8	1.0	0.5	1.3	1.1
11-14	1.7 M	1.0 M	1.2 M	0.8	1.5 M	1.1 M
	1.5 F	0.9 F	1.1 F		1.3 F	1.0 F

Garrow and James (1993*)

Mahan and Arlin (1989*)

Thiamin deficiency occurs because of inadequate intake, poor absorption and increased metabolic demand. Clinical thiamin deficiency is seen in poor malnourished children, presents with loss of appetite, severe weakness, especially of the legs, sometimes paralysis of the arms and legs and sometimes cardiac failure with acute oedema of the body may develop.

In niacin deficiency, the parts of the skin exposed to sun develop a dark, peeling rash. Some people have severe diarrhoea or mental changes. Niacin deficiency can cause pellagra. Inadequate intake of niacin or tryptophen in the diet may develop this deficiency. Pellagra occurs among people who are almost wholly dependent on maize or sorghum and is still occasionally seen among populations in remote areas in Asia or Africa or among refugees (FAO and WHO, 1992).

The skin signs to deficiency diseases must believed to be associated with pellagra (Alleyne et al, 1988).

Table 2.6 Thiamin intake (mg/d) recommended by WHO, UK EAR, RNI, LRNI (1993), USA (1989) and European PRI, 1993

Age (Y)	WHO 1993*	UK EAR* 1993*	UK RNI* 1993*	LRNI 1993* Per1000 Kcal	USA 1989*	EUROPEAN PRI 1993
1-3	0.5	0.3	0.5	0.23	0.8	0.5
4-6	0.7	0.3	0.7	0.23	1.1	0.7
7-10	0.9	0.3	0.7	0.23	1.2	0.8
11-14	1.2 M	0.3	0.9 M	0.23	1.5 M	1.0 M
	1.0 F		0.7 F		1.3 F	0.8 F

Garrow and James (1993*)

Mahan and Arlin (1989*)

Table 2.7 Niacin intake (mg/d) recommended by WHO, UK EAR, RNI, LRNI (1993), USA (1989) and European PRI, 1993

Age (Y)	WHO 1993*	UK EAR* 1993* Per1000 Kcal	UK RNI* 1993*	LRNI 1993* Per1000 Kcal	USA 1989*	EUROPEAN PRI 1993
1-3	9.0	5.5	8.0	4.4	9.0	8.0
4-6	12.1	5.5	11.0	4.4	12.0	11.0
7-10	14.5	5.5	12.0	4.4	13.0	12.0
11-14	19.1 M	5.5	15.0 M	4.4	17.0 M	18.0 M
	16.4 F		12.0 F		15.0 F	14.0 F

Garrow and James (1993*)

Mahan and Arlin (1989*)

Mexican-American pre-school children's niacin intake was likely to be inadequate (Zive et al, 1993).

Food availability in Beijing is well both in quality and in quantity. The nutritional status of the people living in the city is good in general. But riboflavin intakes are inadequate in a lot of cases (Zhao-XH, 1992).

Children from richest rural Bangladesh are taking 0.32, 0.48 and 0.57mg of riboflavin daily for 1-3, 4-6 and 7-9 years of group respectively. Adolescent girls and boys are taking 0.61 and 0.67mg/d at the age of 10-12 years. At 13-15 years of age they are taking 0.64 and 0.80mg/d respectively (Nazmul and Kamaluddin, 1984).

2.5.5 Vitamin C intake and nutritional status

Vitamin C helps the body to use calcium and other nutrients to build bones and blood vessels; it helps to absorb non-haem iron and helps to destroy free radicals. Free radicals are highly reactive molecule usually oxygen-‘superoxides’ which are produced during infections and which can damage body tissues (Nutrition for developing countries, 2nd Ed). People who do not eat enough vitamin C may not absorb enough iron and may develop iron deficiency anaemia.

Table 2.8 Vitamin C intake (mg/d) recommended by WHO, UK EAR, RNI, LRNI (1993), USA (1989) and European PRI, 1993

Age (Y)	WHO 1993*	UK EAR* 1993* Per1000 Kcal	UK RNI* 1993*	LRNI 1993* Per1000 Kcal	USA 1989*	EUROPEAN PRI 1993
1-3	20	20	30	8	40	25
4-6	20	20	30	8	45	30
7-10	20	20	30	8	45	30
11-14	30	22	35	9	50	35

Garrow and James (1993*)

Mahan and Arlin (1989*)

Vitamin C deficiency, scurvy may affect children, occurs especially among refugees, displaced persons dependent upon food rations and others who lack access to fresh fruit or vegetables often as a result of severe drought (FAO/WHO, a global assessment, 1992).

Zive et al. (1993) in their studies shows, Mexican-American pre-school children's vitamin C intake were likely to be inadequate.

Hasan Ahmed shows, children from the richest rural Bangladesh were taking 5.3 mg, 8.7 mg and 10.8 mg of vitamin C per day at the age of 1-3, 4-6 and 7-9 years of age respectively. The adolescent girls and boys were taking vitamin C 9.9 and 10 mg/d at 10-12 years of age and 15.8 and 12.8 mg/d at the age of 13-15 years of age respectively. The general urban trends toward a higher consumption of meat, vegetables and fruits are essentially conditioned in these area is more closely linked to purchasing power (FAO, Food for future, 1991).

Management of anaemia in PEM depends on the severity of the condition. Absorption of iron is enhanced by vitamin C, which should be given to all children receiving oral therapy (Alleyne et al, 1988.)

2.5.6 Calcium intake and nutritional status

Recent studies suggest that there are no fundamental differences in calcium biology between people in developed and developing countries.(ACC/SCN, The 3rd report,1997).

Table 2.9 Calcium: Selected Examples of Calcium Recommendations

mg Calcium /day	USA/Canada (1997)*A mg/d	European Union (1993)*B mg/d	FAO/WHO (1962)*C mg/d
Children 1-3 y	500	400	400-500
Boy 11-18 y	1300	1000	500-700
Girls 11-18 y	1300	800	500-700

*A= adequate intake

*B= population reference intake

*C= practical allowance

There is no consensus on the dietary intake needed to ensure calcium requirements are met. The table compares current recommendations by FAO/WHO (FAO/WHO, 1962), the European Union (commission of the European committees, 1997) and USA/Canada (Food and Nutrition Board, 1997). Similar contrasts are seen between other advisory bodies. The disparities largely reflect the fact that no nutritional deficiency syndrome for calcium has been defined amongst otherwise healthy individuals, despite a wide variation in calcium intake.

Animal milk and its products are particularly rich sources of calcium in the human diet. Estimates based on recent FAO Food Balance Sheets show that there is considerable variation (400-fold range) in milk supply between different regions of the world.

There are foodstuffs in the human diet with calcium content similar to or greater than that of milk. Examples include certain leaves, nuts, shellfish and small bony fish.

In recent WHO/FAO/IAEA (WHO, 1996c) study, the range of intakes for adults was from 210 to 1650 mg/d, with a medium value of 760 mg/d. Despite the limited data for many areas of the world, it is apparent that low levels of intakes are found in countries with diet rich in dairy products. Calcium intake of populations with a low milk supply is generally close to or less than the FAO/WHO practical allowance for adults of 400-500 mg/d and considerably below the 1000 mg/d US/Canadian reference for young adults.

Detailed quantitative studies in a rural Gambian village, typical of many in the Sub-Saharan region, have shown that, although calcium is supplied by a variety of foods and condiments, the overall calcium intake is low, at 300-400 mg/d, and only 7% comes from milk (Prentice et al, 1993; Jarjou et al, 1993).

Calcium is the most abundant mineral in the body, making up 1.5-2% of the body weight, 39% of the total body minerals (Dorice M. Czaika-Narians, 1992). More than 99% of the body calcium is present in the skeleton (Arnaud and Sanchez, 1990).

Skeletal calcium is distributed to relatively non-exchangeable pool and rapidly exchangeable pool (about 1% of skeletal calcium) the exchange component may be considered as a reserve that is accumulated when the diet provides an adequate intake

of calcium. It is stored primarily in the ends of the long bones and may be mobilized to meet increased needs of growth, pregnancy and lactation. In absence of such a reserve, calcium must be drawn from the more stable bone substance itself. Prolonged inadequate intake of calcium results in deficient bone structure (Dorice M. Czajka-Narians, 1992). Bone is constantly being synthesized and reabsorbed, it predominates in children.

Table 2.10 Calcium intake (mg/d) recommended by WHO, UK EAR, RNI, LRNI (1993), USA (1989) and European PRI, 1993

Age (Y)	WHO 1993*	UK EAR* 1993* Per1000 Kcal	UK RNI* 1993*	LRNI 1993* Per1000 Kcal	USA 1989*	EUROPEAN PRI 1993
1-3	400	275	350	200	800	400
4-6	450	350	450	275	800	450
7-10	500	425	550	325	800	550
11-14	600-700	750 M 625 F	1000 M 800 F	450 M 480 F	1200	700 M 800 F

Garrow and James (1993*)

Mahan and Arlin (1989*)

1973 National Canada Survey (Moffatt, 1995) shows calcium intakes were low. Children in the North East Thailand were followed from birth to 2 years, dietary intakes estimated by 24 hours recall shows calcium intake deficiency. Possible deficiency of calcium may be the cause of stunting (Chusilpk et al, 1992).

Food availability in Beijing is well both in quality and quantity. The nutritional status of the people living in the city is good in general. But calcium intakes are inadequate in a lot of cases (Zhao-XH, 1992).

Caregiver's affection, attention and involvement and encouragement of autonomy, exploration and learning are correlated with better nutritional status. The attention, affection and involvement that caregivers show to children influence their growth and development. Lack of consistent caregiver can create additional risks for children. Diets are of low quality, but intakes are higher than necessary often play a significant role in the development of poor nutritional status.

Poor child feeding practices or poor childcare also require priority attention. Caregiver's responses to child appetite can result in the shaping of children's behavior to reduce demand for food. Caregivers can encourage, offer more helpings, talk to children while eating, and monitor how much the child eats.

Positive interactions help children develop to their higher possible level. Talking to children is important even during infancy (UNICEF, 1997). Three kinds of resources which affect care are human resources, such as knowledge a health, economic resources and their control, and organizational resources (Jonsson, 1995). Human, economic and organizational resources have direct effects on care practices, and therefore on child growth and development.

Caregiver on the other end of the dimension is passive feeders, leaving the initiative to eat to children. The quality of care offered to women and children in this region are matters of serious concern to nutrition (UL Haq, 1997; Ramalingaswami et al., 1996 and Osmani, 1997). Information, education, and communication (IEC) is the most important activity affects care.

2.6 Nutritional Status

South Asia showed the second highest improvement in the prevalence of stunting among the six regions of the World. This region has by far the highest prevalence of stunting among the six regions at 53% in 1995. In 1995 stunting affected 53.5% of preschool children in South Asia, 39.4% in Sub-Saharan Africa, 38.3% in South East Asia, 27.8% in Middle America and Caribbean, 22.2% in Near East/North-Africa, and 12.9% in South America. About 34.1% of preschool children in China were stunted in 1992. The prevalence of stunting has declined globally from 48.8% in 1980 to 39.9% in 1995.

The prevalence of stunting is uniformly higher than prevalence of underweight. Stunting is a cumulative process of poor growth that primarily occurs before the age of three years and is not easily reversed. Median height for age Z-Score and prevalence of stunting by age group are presented in the 3rd report on the World Nutrition Situation (ACC/SCN, 1997). It has shown in the report that no clear pattern of age differentials observed across countries. Some countries have shown larger responses among children aged below two years. Others have shown the opposite and yet other shows a similar magnitude of change for all age groups.

This report shows, finding from Dominican Republic presents an improvement among children 24 months and older, but a marked deterioration among children less than 18 months, strong factor is negatively affecting the growth of young infants, possibly breast feeding. In media H/A Z-scores among younger age groups children will tend to have much smaller effects on overall stunting prevalence rates than similar improvements at older ages. In terms of rates of stunting, this translates into generally low prevalence of stunting the early postnatal period, followed by a gradual increase during the first year to reach a maximum and to stabilize at highest levels at around 24-36 months of age. The same report shows, prevalence of stunting in 36-60 months are higher, which constitutes 2/5th of the sample.

Karim et al. conducted a study (1990) on nutritional status of children in an Urban Primary School in Dhaka and showed 51% children was normal and 15% stunted, 33% wasted and the rest 2% children was wasted and stunted according to Waterlow classification. They showed 13, 49, 35 and 3% children were normal, 1st degree, 2nd degree and severe malnutrition according to Gomez Classification.

Children below 3 years of age are worst sufferers of malnutrition (MR Amin et al., 1991)

S Nahar et al. (1986) shows a positive correlation between food intake and anthropometric measurement of young children aged 1-3 year of age.

In case of stunting, the under three have slightly lower prevalence rates and in case of wasting, the under-three have slightly higher prevalence rates (UNICEF, 1990).

Weight for height of children on the first school entry as an indicator of nutritional improvement of a community (RAPA report, 1990/21).

The prevalence of wasting is greatest between 12-24 months of age when dietary deficiencies are common. The prevalence of stunting increases overtime up to age of 24 or 36 months and then shows a tendency to level off (WHO Bulletin, 1986).

In another study, 50.6% of non-slum urban children were stunted and 55.9% children from the same area were nutritionally underweight (BBS, 1994). During 1985-86 average prevalence of stunting was found to be 56.1% which decreased to 51.1 in 1989-90 and to 45.7% in 1992. There has been some improvement in nutritional status and declining prevalence of stunting is noticeable (BBS, 1994).

De-Onis and his associates (WHO, Bull. 1993), using WHO global database on children growth. Covers 87% of the total population of under 5 years of old in developing countries describing the world-wide distribution of protein-energy malnutrition, data gathered between 1980 and 1992 in 79 developing countries in Africa, Asia, Latin America and Oceanic. The findings confirm that more than a third of the world's children are affected. For all the indicators wasting, stunting and underweight, the most favorable situation low or moderate prevalence occurs in Latin America; in Asia most countries have high or very high prevalence and in Africa a combination of both these circumstances is found. A total 80% of the children affected live in Asia mainly in South Asia, 15% in Africa and 5% in Latin America. Approximately 46% children (230 million) in developing economic development will be unsuccessful until optimal child growth and development are ensured for the majority.

Children aged 1-12 years in Ludhiana, India belonging to high and low socioeconomic group, one hundred families in each group were taken for study revealed significantly higher rate of food refusal in higher socioeconomic group than low socioeconomic group (Narang et al. 1991).

In one study in India has shown most recently (ACC/SCN, 1997) that 46 and 81% severely underweight children lived in households which did not report a food shortage.

Children who are placed on severe restriction of fat during growth period may experience growth stunting. Dietary fat restriction may have some small, measurable, effects on growth (Kaplan and Lashima, 1992).

Direct and indirect underlying factors such as food intake and availability, occurrence of diseases, education, caring, access to social service, expenditure of income and time must be additionally assessed and associated with height-for-age index (WHO Working Group 1986). The response to supplementation is greater among children under 24 months of age (Gopalan et al.1973 and from Colombia, Lutter et al.1990). Children during their first two years, tend to respond more quickly to short term results or improvements compared to older children who are relatively insensitive to short term changes. BBS 1996 report has shown 43% and 25% under 5 children were moderate and severely under-weight, moderate and severe wasting rates were 15% and 2% and moderate and severe stunting rates were 31% and 33% in 1992.

Child Nutrition Survey of Bangladesh 1995-96(BBS, 1997) has shown that stunting rate was 51.4%, 8.2%was stunted and wasted, 43.1%stunted but not wasted and 8.4%wasted but not wasted. The prevalence of severe underweight was 17.9% and that of moderate was 39.5%. The severe wasting rate was 2.5% and moderate wasting was 16.6%. Compare to urban children more rural children were malnourished. The gender difference was small, severe stunting and severe underweight rates were 1.3 and 4% higher in female. The 3rd report on World Nutrition Situation (ACC/SCN, 1997) has shown the National Prevalence of Stunting from WHO Global Database on Child Growth and Malnutrition (1997) was 56.1% in Bhutan (1987), 52.0%in India (1993), in Indonesia (1995), 9.9%in Bahrain (1989), 8.5%in Qatar (1995), 4.7%in Argentina (1994) and 2.7% in Fiji (1993).

Increasing improvements in H/A Z-scores from about 6-24 months of age, with similar improvement thereafter.

The prevalence of stunted children in any country should be less than 20% by the year 2020 (Witu, 1998).

2.7 Counseling

Shabbir, Abdal and Khanam (1991) reported results of nutrition intervention programme which looked at knowledge of mother's nutritional deficiency before and after intervention. Post intervention analysis showed improvement of knowledge of mothers. Engle (1995) shows those who requested feeding more often than median (nine meal per day), ingested significantly more kcal and kcal/kg than those who requested food less often. Women who spent more time in children to eat more, had children with better growth rate (Zeitlin et al, 1989). Counseling improves knowledge and practice in all income groups.

Edib and Ahmed (1989) studied in low income pregnant women group in Dhaka city with nutrition education, the out come shows substantial improvement in nutritional knowledge dietary habits, increase weight of mothers and birth weight of babies. These improvements which occurred only in experimental group of mothers suggest the effectiveness of nutritional education programme.

Eshaque (1997) has shown proper health and nutrition education activities on individual communication are useful for better consumption of balance diet.

Decision making, problem solving, communication, critical thinking, self-assessment, and coping strategies are called life skills. When people have such skill, they are more likely to adopt a healthy lifestyle (Miller JDR and Marek T, 1996).

Chapter 3: Materials and Methods

3.1. Research Approach and Techniques

This was a descriptive type of study, a portion of which was quasi experimental. The study design has two groups – a food refusal group where evidence of food refusal was present and another non-refusal group where evidence of food refusal was absent.

3.2 Research Setting

3.2.1 Development of research design

Design of research type and preparation of interview schedule from March 1992 to June 1992.

3.2.2 Study Places

- a) Dhanmondi - out patient unit of a clinic (children).
- b) IPGMR - children out patient department,
- c) Mohammadpur - chamber of a nutrition specialist.

3.2.3. The sample, sampling technique and sample size

The sample:

The selected children of age 1-14 year from Dhaka City. Out of 500 children 470 were from 1-10 years of age and only 30 children were from 11 years+ age of group.

Sample size and sampling

A total of 500 children who fitted in the time frame of data collection were included in the study. In the food refusal group 350 children and non-refusal group 150 children were included. As the study was qualitative and quantitative in nature determination of sample size was not attempted. Due to reluctance of mother to furnish necessary information discrepancies in cell frequencies and sample size exist in some table.

3.2.4 Research instrument

- a) Interview schedule having structured and unstructured format.
- b) Weighing machine to measure weight of the children in kilogram (kg).
- c) Measuring board and measuring stand to measure length and height of children in centimeter (cm).
- d) Cup, glass, spoon and weighing machine to measure weight of food.
- e) Instrument used in pathological laboratories for blood test, haemoglobin percentage (Hb%) and stool test (routine).
- f) Computer (PC) to develop nutrient of prepared food (vide annex) and for data processing/ data analysis.

3.2.5 Data collection:

Facilities of data collection were much better in Dhanmondi Children's clinic than that in other two organizations. Three-fourth data (375 sample, 263 children from refusal group plus 112 children from non-refusal group) of the total 500 were taken from Dhanmondi organization and three fourth data (94 sample, 65 children from refusal group plus 29 children from non-refusal group) from the rest sample was collected from Mohammadpur organization and the rest (31 sample) collection was done from Children Out Patient Department (COPD) of the then Institute of Post Graduate Medicine and Research (IPGMR).

The method of systematic random sampling (every 5th child) was used for data collection from all the three organizations. For follow-up round all of the food refusal group children from Mohammadpur organization was selected for counseling. Out of 65 food refusal group children, 50 mothers agreed to participate in counseling rounds. This subset for followed up, of which 43 attended in the pre counseling and in the 1st, 2nd and final round of counseling 45, 37 and 44 children were followed. Counseling was repeated at the interval of one month for the first two months and after a gap of 3 months a final round of follow up was observed.

The procedure of data collection:

- a) In depth interview method.
- b) Food intake pattern by 24 hours food recall method for obtaining qualitative and quantitative food intake information.
- c) Anthropometric measurements of nutritional status (HA, WH and WA).

Duration of data collection:

Baseline data was collected from June 1992 to June 1994.

Follow-up data was collected from July 1994 to December 1994.

3.2.6 Preparation of food composition tables and data bases for this study

Food composition databases are important resources used by professionals working in areas such as nutrition research, food trade, food control and health promotion (Sevenhuysen, 1994). Food composition tables and computerized databases are available in most countries. The Institute of Nutrition and Food Science (INFS), Bangladesh published food composition tables in 1977 and the fourth edition was published in 1992 (Desio khadder Pustiman). The food tables and database were based mainly on raw foods. These food tables and databases were inadequate as cooked food, confectionery and other prepared foods were missing. After consuming cooked, confectionery and prepared foods, calculation of an individual's nutrient intake from food table and databases from raw food were not possible. Nutrient content of foods is related to food served on the table. Foods reaching the table are mainly prepared food. Cooking practices vary from one area to another within the country, one class of population to another and even from one household to another. Nutrient loss from cooking depends on method of cooking, temperature and duration of cooking.

The loss of protein, fat or carbohydrate in cereals, pulses and meat are little. Some protein may be lost if vegetables are cooked in water containing salt and cooking water is discarded (Gopalan et al, 1991). The discarded cooking water contains considerable amount of minerals mainly Na, K, Ca and water-soluble vitamins. Roots and tubers suffer minimum cooking losses. Repeated washing of rice may remove some of thiamin and niacin. When water of boiling rice (mur) is discarded it causes very small loss of vitamins and minerals, when parboiled rice is used. To calculate the

nutrient values of raw foods the INFS data was used. For the prepared food the same table was used to calculate the nutrient lost during food preparation was subtracted. The average thiamin, riboflavin, carotene and vitamin C losses in cooking vary from 0-80.0, 0-75.0, 0-30 and 0-100.0% respectively (Southgate and Johnson, 1993). The losses of carotene and ascorbic acid were higher when vegetables were cooked as practiced by Bangladeshi homes. Vitamin A loss ranges from 13.5-51.8 % and average cooking loss was 18.9% and ascorbic acid loss was ranges 16-90% (Nahr, 1988). The cooking loss of green leafy vegetable may be 40% (Savage and Burgess, 1992). For the convenient in this study the average thiamin loss for rice cooking was considered as 50% and 20% cooking loss in other food items. In case of riboflavin and vitamin C 50 % loss was considered and for vitamin A 20 % cooking loss was taken as standard. Egg losses little nutrient during cooking. Cooking improves the quality of food, its digestibility and palatability. The nutrient value labeled on the container of the commercially available food was taken for calculation. The nutrient of beverages, jelly and jam was taken as standard (Mahan and Arlin, 1992) for preparation of new database. Food values of cooked Indian (Antia, 1989), Guide book (1990) of Bangladesh Diabetic Society and food preparation book Cooked Food and Nutrition (Siddiqua Kabir, 1993) was also followed.

It was not possible to analyze the nutrient intake pattern of the children by using food tables and database for new foods. To overcome the, new food tables and database for cooked confectionery and prepared food were made available. The refusal and non-refusal group of children consumed a great variety of foods. Food composition tables and databases were prepared on the basis of their food intake pattern. Energy, protein, fat, carbohydrate, calcium, iron, vitamin A, riboflavin, thiamin, niacin and vitamin C content of each eaten food in the study and comparison group were developed.

3.2.7 Determination of energy and nutrient content of food

The nutrient intake pattern of

- ◆ Cooked food
- ◆ Prepared food
- ◆ Confectionery food and
- ◆ Raw food (Fruits salad etc)

were calculated from prepared new food tables and databases. Food amounts expressed as household measures for serving were mainly used for computation and calculation of their nutrient values (Annexure-I).

3.2.8. Data management

Fox pro was used for data entry. A programmer was assigned to develop the software to comply the objectives and need of the study. Another program was developed to enter all the food items and their quantity a child consumed in last 24 hours. The program automatically calculated the macro and micro nutrient values of each food item using the prepared new food composition tables and databases against the quantity consumed (i, e, calorie, protein, fat, carbohydrate, calcium, iron, vitamin A, thiamin, riboflavin, niacin and vitamin C).

At the latter stage accumulation of the macro and micro-nutrient values of 24 hours composition of each child was done.

The anthropometric data were calculated and analyzed as standard deviation scores (z-scores) of NCHS (The US National Center for health Statistics) reference height for age (H/A), weight for height (W/H) and weight for age (W/A) and as percentage of reference median of these indicators.

3.2.9. Data analysis

After completion of the data entry and processing different tables, hypothesis tests, correlation of different factors, tests of significance were done and prepared. Both qualitative and quantitative analysis was done.

Chapter 4: Results

4.1.1 The status of food refusal

Out of 500 children 350 belonged to refusal group and the rest 150 to non-refusal group. In middle and upper socio-economic classes the number of children was 268 and 232 respectively (Table 4.1.1). The rate of food refusal was 69.4 % in middle class and 70.7% in upper class. This difference in food refusal among middle and upper socio-economic classes is not significant ($P > 0.05$).

4.1.2 Food refusal, age group and socioeconomic class

The distribution of children by age group and socioeconomic class is shown in the following table. The food refusal among the children of different age groups irrespective of socioeconomic class shows no significant variation ($p = 0.017$). Chi sq. test was also done to see the association of refusal of children with age group for both middle and upper socioeconomic classes. But no significant association was found ($P = 0.153$ and 0.413 for middle and upper class respectively).

More over after Z test the study also could not show any significant difference in food refusal between middle and upper class children in none of the age groups ($P > 0.05$).

4.1.3 Mean meal frequency

Mean meal frequency in refusal group was 5.21 ± 1.59 and in non-refusal group 5.41 ± 1.51 . The group t-test was performed ($t = -0.35, df = 405$) frequency of food intake was not significantly different ($p = 0.35$) between refusal and non-refusal group. Mean meal frequency in female was 5.34 ± 1.64 in refusal group, 5.92 ± 1.52 in non-refusal group. In male it was 5.13 ± 1.56 in refusal and 5.08 ± 1.42 in non-refusal group. (Table 4.1.3).

4.1.4 Period of food refusal

In this study period of food refusal by the children was recorded according to their mothers' statement. Out of 350 cases, period of 1-4 years was stated by the maximum (93) mothers comprising 26.6% of the total cases. The period of food refusal varied from < 2 weeks to > 7 years with a mean of 2.13 years and SD = 2.66 years (Table 4. 1.4)

4.1.5 Mean period of food refusal

Mean period of food refusal was higher (2.29 ± 2.26 years) in upper class children than that in middle class children (1.99 ± 2.65 years). This difference is not significant ($z=1.136$, $P > 0.05$). The mean duration was also compared between two socioeconomic classes for each age group. It was found that in both socioeconomic classes mean duration of food refusal increased with the increase of age. But there was no significant difference in mean period of food refusal between the classes in none of the age group studied (Table 4.1.5).

4.1.6 Degree of food refusal

The food refusal status was categorized as no refusal, poor food intake, very poor food intake and exceptionally poor food intake. This degree of food refusal showed no significant association with socioeconomic class (Table 4.1.6).

4.2 Food items refusal of the basic food groups

To see the type of food usually refused by the children the mothers were asked to mention the common items from different food groups that are refused by their children. In both classes, food item refusal varies within the food groups. GLV and other vegetable refusal rate were higher (58.5 and 62.0). Milk refusal rate was higher than fish refusal. Fruits refusal rate was lower than other food groups. Class difference was not observed in food refusal (Table 4. 2.1).

Cereal group

In cereal group, rice topped the list with 50.4% refusal rate irrespective of socioeconomic class. It follows by parata (40.2%) and ruti (36.4%). Only 27.5% children refused loaf. Although the refusal rate was higher in children belonging to upper socioeconomic class than that in middle socio-economic class for all of the items.

Protein group

In animal protein group refusal rate of fish was higher than that of meat or egg in both middle and upper socioeconomic classes. In combined class the refusal rate for fish, meat and egg was 47.4%, 29.4% and 26.8% respectively. In case of vegetable protein bean refusal rate was higher (51.4%) than pulses (22.5%). The palatable vegetable protein ground nut showed lowest refusal rate (17.2%) among all protein varieties. It was found that refusal of fish was higher and refusal of groundnut was very lower.

Vegetables & Fruits group

The vegetable intake pattern shows green leafy vegetables (GLV) and other vegetable refusal rates were 58.5 and 62.0 percent respectively. In case of fruit, refusal was higher (23.5 %) in citrus fruits than in other fruits (16.9%).

Over all refusal rate was higher in vegetable group than that in fruit group.

Milk and milk products group

In milk and milk products group refusal status of milk, butter, ghee and cheese was inquired. The response was different among different items. Milk refusal was higher in upper socioeconomic class than middle class. But in case of milk products none of butter, ghee or cheese showed difference in refusal between two socio-economic classes. This group shows higher refusal rate of food items of milk and milk products. Here the refusal was much higher for cheese and lower for butter.

4.3 Food refusal and the demographic characteristics

Mother's education

Majority of the mothers in both refusal (98.3%) and non-refusal (96.7%) group were literate and only 1.7% and 3.3% mothers from refusal and non-refusal group respectively had no schooling (Table 4.3.1). More than 66.8% mothers of refusal group and about 58.1% mothers from non- refusal group had SSC or above level of education. Statistical analysis showed no significant association between mother's education and food refusal.

Mother's occupation

More than 85% of the mother's were housewives in both refusal and non-refusal children belonging to middle and upper class family. The rest of the mothers were service holder. Here also no association was found between food refusal and mother's occupation.

Father's education

In refusal group 55.6% fathers had graduation and above level of education and in non- refusal group 46.0% fathers had such level of education. Only 0.3 % and 1.3% fathers respectively from refusal and non-refusal group were uneducated.

Father's occupation

In refusal group 47.8 fathers were service holders and 52.2% were businessmen. Similarly in non-refusal group 44.9% fathers were service holders and 55.1% were businessmen.

χ^2 test showed no association between food refusal and father's education or occupation.

Per capita monthly income

In food refusal group 71.4% families had <Tk.4000 per capita monthly income and it was 67.85% in non-refusal group. The said income was ≥Tk.4000 in 28.6% families of food refusal group and 32.2% families of non-refusal group. χ^2 has shown no association of food refusal with per capita monthly income of the family.

Number of child in the family

In 89% of the families the number of child was within three and in 68% of the families the number was only one or two. In only 3.4 % of refusal group and 2.0 % of non-refusal group the number of child in the family was more than four. Number of child in the family also showed no association with food refusal.

Birth order

Food refusal is more in 1st birth order child. Although this difference is not significant at 5.0% level of significance ($p=0.0539$), it is significant at 10.0% level. Food refusal was more than expected in 1st birth order group.

Birth weight

In refusal and non-refusal group 12.0% and 13.0% children's birth weight was low (<2.5 kg). Statistical analysis showed no association between food refusal and their birth weight. The mean birth weight in food refusal and non-refusal group was 3.16 and 3.20Kg respectively.

4.4.1 Food refusal and parasitic infestation

In food refusal group 133 suspected children's stool was examined and 67 positive finding was observed from the report. In food refusal group *Ascaris Lumbricoidis* (AL), *Ankylostoma Duodenalis* (AD) was found in 15.9 and 3.8% cases. *Giardia* and *Entamoeba Histolytica* (EH) was found in 5.3% cases.

History of expulsion was recorded for pinworm within past two weeks, 17.3% cases it was positive in food refusal group. Food refusal was found significantly higher in presence of parasitic infestation ($p<0.05$). In non-refusal group parasitic infestation was present in 9.5% cases (Table 4.4.1).

4.4.2 Food refusal and micro-nutrient status

Nutritional anaemia

In total 397 children were examined clinically for anaemia. It was found that 206 (51.89%) were anaemic and the rest of 191 (48.11%) were non-anaemic. Among the anaemic children 190 (92.2%) were from refusal group and 16 (7.8%) were from non-refusal group. Where as out of 191 non-anaemic children 154 (80.6%) were from refusal group and the rest of 19.4% were from non- refusal group. Chi sq. test revealed that clinical anaemia was very significantly higher in food refusal group than that in non-refusal group (Chi sq. = 11.54; $P < 0.05$, Table 4.4.2).

Vitamin A deficiency

From history and clinical examination of 410 children, Xerophthalmia was found in 16 children. Only conjunctival xerosis, Bittot's spot and night-blindness were identified. Conjunctival xerosis was 93.8% in refusal group and 6.2% in non-refusal group. Night-blindness and Bittot's spot was only found in food refusal group and out of 344 children of this group 3 night-blindness and 01 Bittot's spot cases were identified. But statistical analysis failed to reveal any association between food refusal and vitamin A deficiency (Chi sq. = 0.557; $P = 0.455$, Table 4.4.2).

Riboflavin deficiency

For convenience only riboflavin deficiency signs were noted after examining the children clinically. In total 411 children were examined and of them 40 (9.73%) children had one or more of the riboflavin deficiency signs (angular stomatitis-8.18%, chelosis- 2.4%, glossitis- 7.6%, magenta tongue-2.4% and naso-labial rashes- 1.5%). All these 40 children were from refusal group and none was from non-refusal group. Statistical analysis shows that prevalence of riboflavin deficiency is significantly higher in food refusal group children ($\chi^2 = 8.47$; $p < 0.05$, Table 4.4.2)

Vitamin C deficiency

In case of vitamin C deficiency, the spongy gum, peticheal haemorrhage, echymosis and painful limbs were looked for. Only spongy was found in 5 children belonging to food refusal group and in non-refusal group no sign of vitamin C deficiency was found.

4.4.3 Food refusal, mother's patience and force feeding

Mother's patience during food intake is an important caring practice. Father's and other elderly family member stated that 33.2% and 60.6% mother from refusal and non-refusal groups have good or excellent patience during feeding their children. In refusal group 26.9% mother's patience was poor but in non-refusal group it was 8.8%. Mother's patience was significantly lower in food refusal group than non-refusal group ($p < 0.05$, Table 4.4.3).

Forcing during feeding time was a common attitude found in this study population. Forcing during feeding was 73.9 and 32.3 percent in food refusal and non-refusal group. Statistical analysis shows strong association between force feeding and food refusal (Chi sq.=37.25; $P < 0.05$.) when tested combindly as well as separately for middle and upper socioeconomic classes. But, force-feeding showed no significant difference between middle and upper class (Table 4.4.3).

In food refusal group while mother's patience was not satisfactory 72.4% mother forcing and 27.6% was not forcing their children to take food, forcing was more marked in food refusal group than non-refusal group. In not satisfactory patience group food refusal was significantly higher ($p < 0.05$) (Table 4.4.4).

4.5 Food refusal and energy and nutrient intake

Energy intake

In food refusal group 88.4% and in non-refusal group 78.8% children were taking energy significantly less ($p < 0.05$) than RDA (UK and WHO reference). Each and every male and female child's intake was compared with the standard.

In all age categories, mean energy intake of energy in food refusal group was lower than RDA. In 1-3,4-6,7-10 and 11-14 years of age category food refusal group children's mean energy intake was 708,985,1199 and 1433 kcal/day respectively. The mean energy intake was also lower in non-refusal group. While comparing the mean energy intake in different age category, it was found that 1-3 years is the most affected group. With the increase of age, energy intake improves but still it is far from the reference mean energy intake (Table 4.5.1).

Protein intake

In refusal group the mean protein intake was normal in all age category. It is also normal in non-refusal group. Each of the child's intake was compared with WHO reference intake and found that they were taking protein less than RDA in 16.2% cases in non-refusal group (Table 4.5.1).

Iron intake

In all age categories, the mean iron intake was normal in food refusal group. While monitoring each and every child (using WHO reference as standard), it was observed that 45.2% in food refusal and 28.8% in non-refusal group children were taking iron less than RDA. Iron intake was significantly lower in food refusal group ($p < 0.05$) (Table 4.6.1).

Calcium intake

In food refusal group 1-3,4-6,7-10 and 11-14 years of age group children's mean calcium intake was 500 ± 292 , 392 ± 308 and 463 ± 284 respectively. Considering WHO reference, only 1-3 years of age group children's mean calcium intake was normal. While each and every child was monitored, in 61.2% cases calcium intake was less than RDA (WHO reference) in food refusal group (Table 4.5.1).

Vitamin A intake

The mean vitamin A intake was normal (using WHO reference) in all age categories. In case of individual monitoring, it was found that 77.7% in food refusal and 80.3% in non-refusal group, children were taking vitamin A ($\mu\text{g/d}$) normally.

Vitamin C intake

In food refusal group 1-3,4-6,7-10 and 11-14 years of age children were taking 18,46,27 and 39 mg of vitamin C per day. Except in 1-3 years of age group, all age category children's mean vitamin C intake was normal. In case of individual monitoring, 60.6% child in food refusal group was taking less than RDA (WHO reference, Table 4.5.1).

Riboflavin, thiamin and niacin intake

While using WHO reference value as standard only 11.3% children in food refusal group was taking riboflavin normally. If we use UKLRNI value 44.9% children was taking riboflavin normally. The mean intake of riboflavin was less than the recommended intake in all age categories in both refusal and non-refusal group. Thiamin and niacin intake was significantly lower in food refusal group ($p < 0.05$). The mean intake of thiamin and niacin was less than RDA in all age categories (Cont'd table 4.5.1).

4.6 Food refusal and nutritional status of the children

In food refusal and non-refusal group 12.6 and 10.4 of children were stunted (H/A z- score) 10.6 and 9.0% were wasted (W/H z- score) and 16.9 and 12.0% were under weight (W/A z-score) respectively (Table 4.6, Figure 4.6.1,4.6.2 and 4.6.3). Using Water Low classification, it was found that malnutrition was mostly mild type. In food refusal group only 4.7% children were stunted and 4.1% were wasted and only 0.6% children were stunted and wasted (Table 4.6,4.7, 4.8 and 4.9).

Only 02 (0.6%) children were severely stunted, 01(0.3%) child severely wasted, and 02 children was wasted and stunted (Table 4.6.1 & fig. 4.6.3). Nutritional status in both refusal and non-refusal groups was not significantly different.

Table 4.1.4 Distribution of children and the period of food refusal by socioeconomic classes.

Period of food refusal	Middle Class n (%)	Upper Class n (%)	Total n (%)
Up to 2 weeks	15 (55.6)	12 (44.4)	27 (7.7)
2 weeks +	22 (55.0)	18 (55.0)	40 (11.4)
1 month +	20 (47.6)	22 (52.4)	42 (12.0)
3 months +	22 (61.1)	14 (38.9)	36 (10.3)
6 months +	11 (73.3)	4 (26.7)	15 (4.3)
1 year +	55 (59.1)	38 (40.9)	93 (26.6)
4 year +	16 (43.2)	21 (56.8)	37 (10.6)
7 year +	14 (58.3)	10 (41.7)	24 (6.8)
Since birth	11 (13.6)	25 (69.4)	36 (10.3)
Total	186 (53.1)	164 (46.9)	350 (100.0)

Mean period (year) 1.99 $\pm$ 2.65 2.29 $\pm$ 2.67 2.13 $\pm$ 2.66

p=ns

Table 4.1.5 Distribution of children and the mean period of food refusal by age groups and socioeconomic classes

Age group in year (n)	Mean period of food refusal in year ($\pm$ SD)			
	Middle class	Upper class	Total	Z test (p value)
1-3 (156)	1.00 (1.55)	1.33 (1.08)	1.06 (1.36)	1.57 (>0.05)
4-6 (95)	2.03 (2.12)	2.51 (2.34)	2.28 (2.24)	1.05 (>0.05)
7-10 (85)	3.25 (3.24)	3.26 (3.33)	3.25 (3.27)	0.01 (>0.05)
11 + (14)	6.27 (4.77)	6.20 (4.90)	6.24 (4.65)	0.03 (>0.05)
Total (350)	1.99 (2.65)	2.29 (2.67)	2.13 (2.66)	1.1 (>0.05)

Table 4.1.6 Distribution of children and the degree of food refusal by the socioeconomic classes

Degree of food refusal	Middle Class n (%)	Upper Class n(%)	Total n(%)
Non-refusal group	82 (54.7)	68 (45.3)	150 (30.0)
Refusal Group			
Poor food intake	102 (54.8)	84 (45.2)	186 (37.2)
Very poor food intake	77 (50.7)	75 (49.3)	152 (30.4)
Exceptionally poor food intake	07 (58.3)	05 (41.7)	12 (2.4)
Total	268 (53.6)	232 (46.4)	500 (100.0)

P=ns

Table 4.2.1 **Distribution of food refusal children and the presence and absence of food refusal by the food items within each food groups.**

FOOD ITEMS	FOOD REFUSAL	
	PRESENT n (%)	ABSENT n (%)
1. Cereal group		
Rice	174 (50.4)	171 (49.6)
Parata	131 (40.2)	195 (59.8)
Ruti	126 (36.4)	220 (63.6)
Loaf	93 (27.5)	245 (72.5)
2. Protein group		
Fish	164 (47.4)	182 (52.6)
Meat	101 (29.4)	243 (70.6)
Egg	93 (26.8)	252 (73.2)
Beans	149 (51.4)	141 (48.6)
Pulses	78 (22.5)	268 (77.5)
Ground nuts	55 (17.2)	265 (82.8)

Table 4.2.1 Distribution of children and the presence and absence of food refusal by the food items within each food groups. (Cont'd)

FOOD ITEMS	FOOD-REFUSAL	
	PRESENT n (%)	ABSENT n (%)
3. Fruit and GLV groups GLV	203 (58.5)	144 (41.5)
Other Vegetables	212 (62.0)	130 (38.0)
Citrus fruits	81 (23.5)	263 (76.5)
Other fruit	58 (16.9)	285 (83.1)
4. Milk and milk products		
Cheese	108 (62.1)	66 (37.9)
Ghee	144 (51.4)	136 (48.6)
Milk	169 (48.8)	177 (51.2)
Butter	108 (39.3)	167 (60.7)

Table 4.3 Distribution of children in food refusal and non-refusal groups by socio-demographic characteristics of the family.

SL No	Variable		Category		p
			Refusal	Non- refusal	
1.	Mother's education		n=349 (%)	n=150 (%)	ns
	i	No schooling	06(1.7)	05(3.3)	
	ii	Up to class x	110(31.5)	58(38.7)	
	iii	SSC & HSC	144(41.3)	46(30.7)	
	iv	Graduate & above	89(25.5)	41(27.3)	
2	Mother's occupation		n=350	n=150	ns
	i	Housewife	299(85.4)	128(85.3)	
	ii	service & others	51(14.6)	2(14.7)	
3	Father's education		n=349	n=150	ns
	i	No schooling	01(0.3)	02(1.3)	
	ii	Up to class x	54(15.5)	24(16.0)	
	iii	SSC & HSC	101(28.9)	55(36.7)	
	iv	Graduate & above	193(55.3)	69(46.03)	
4	Father's occupation		n=316	n=136	ns
	i	Service	151(47.8)	61(44.9)	
	ii	Business	165(52.2)	75(55.1)	

Table 4.3 Distribution of Children by food refusal and non-refusal group and socio-demographic characteristics (Cont'd)

SL No	Variable	Category		p
		Refusal (n)	Non- refusal (n)	
5	Per capita monthly income	n=339	n=149	ns
	< 4,000 Tk.	242(71.4)	101(67.8)	
	≥ 4,000 Tk.	97(28.6)	48(32.2)	
6	No. of children in the family	n=350	150	ns
	01	117(33.4)	38(25.3)	
	02	124(35.4)	59(39.3)	
	03	71(20.3)	39(26.0)	
	04	26(7.4)	11(7.3)	
	>4	12(3.4)	03(2.0)	
7	Birth order	n=350	n=150	ns
	1 st child	186(53.1)	63(42.0)	
	2 nd child	87(24.9)	43(28.7)	
	3 rd child	39(11.1)	28(18.7)	
	4 th child	23(6.6)	13(8.7)	
	5 th or more	15(4.3)	03(2.0)	
8	Birth wt.	n=225	n=80	ns
	<2.5 Kg	27(12.0)	11(13.8)	
	2.5 Kg or more	198(88.0)	69(82.2)	

Table 4.4.1 Distribution of children in food refusal and non-refusal groups by the presence and absence of parasitic infestation.

Parasitic infestation	Refusal (%)	Non-refusal (%)	Total (%)	p
Present	67 (90.5)	07 (9.5)	74 (37.2)	<0.05
Absent	66 (52.8)	59 (47.2)	125 (62.8)	
Total	133	66	199	

Table 4.4.2 Distribution of children in food refusal and non-refusal groups by micro-nutrient status

Micro-nutrient status		Refusal n (%)	Non-refusal n (%)	Total n (%)	p
Anaemia	+ve	190 (55.2)	16 (24.2)	206 (50.2)	<<0.001
	-ve	154 (44.8)	50 (75.8)	204 (49.8)	
	Total	344	66	397	
Vitamin A deficiency	+ve	15 (4.4)	01 (1.5)	16 (3.9)	ns
	-ve	329 (95.6)	65 (98.5)	394 (96.1)	
	Total	344	66	410	
Riboflavin deficiency	+ve	40 (11.6)	00	40 (9.7)	<0.05
	-ve	305 (88.4)	66 (100.0)	371 (90.3)	
	Total	345	66	411	
Vitamin C deficiency	+ve	5 (1.4)	00	5 (1.2)	ns
	-ve	340 (98.6)	66 (100.0)	406 (98.8)	
	Total	345	66	411	

Table 4.4.3 Distribution of Children in food refusal and non-refusal groups by mother's patience and force feeding

Status		Refusal n(%)	Non-refusal n(%)	Total n(%)	p
Mother's patience	Satisfactory	116 (33.2)	37 (56.9)	153 (37.0)	<<0.05
	Not Satisfactory	233 (66.8)	28 (43.1)	261 (63.0)	
	Total	349	65	414	
Force feeding	Absent	91 (26.1)	44 (67.7)	135 (32.6)	<<0.05
	Present	258 (73.9)	21 (32.3)	279 (67.4)	
	Total	349	65	414	

Table 4.4.4 Distribution of children in food refusal and non-refusal groups by the presence and absence of force feeding and patience status of mother

Mother's Patience	Refusal group		Non-refusal group		Total	
	Force feeding		Force feeding		Force feeding	
	Present n(%)	Absent n(%)	Present n(%)	Absent n(%)	Present n(%)	Absent n(%)
Satisfactory	70 (27.1)	46 (50.5)	07 (33.3)	30 (68.2)	77 (27.6)	76 (56.3)
Not Satisfactory	188 (72.9)	45 (49.5)	14 (66.7)	14 (31.8)	202 (72.4)	59 (43.7)
Total	258	91	21	44	279	135

P<<0.05

P=0.01

P<<0.05

Table 4.5 Distribution of children by food refusal and non-refusal group and their energy and nutrient intake.

Energy and nutrient intake		Refusal n=345,(%)	Non- refusal n=66,(%)	P
Energy (Kcal/d)	Normal	40 (11.6)	14 (21.2)	<0.05
	<RDA	305 (88.4)	52 (78.8)	
Protein (gm/d)	Normal	289 (83.8)	58 (87.9)	ns
	<RDA	56 (16.2)	8 (12.1)	
Iron (mg/d)	Normal	189 (54.8)	47 (71.2)	0.01
	<RDA	156 (45.2)	19 (28.8)	
Calcium (mg/d)	Normal	134 (38.8)	22 (33.3)	ns
	<RDA	211 (61.2)	44 (66.7)	
Vitamin A (µg/d)	Normal	268 (77.7)	53 (80.3)	ns
	<RDA	77 (22.3)	13 (19.7)	
Vitamin C (mg/d)	Normal	136 (39.4)	33 (50.0)	ns
	<RDA	209 (60.6)	33 (50.0)	

Table 4.5 Distribution of children by food refusal and non-refusal group and their energy and nutrient intake, (cont'd).

Energy and nutrient intake		Refusal n=345, (%)	Non- refusal n=66, (%)	P
Riboflavin (mg/d) (WHO Ref.)	Normal	39 (11.3)	10 (15.2)	ns
	<RDA	306 (88.7)	56 (84.8)	
(UK RNI Ref.)	Normal	69 (20.0)	13 (19.7)	ns
	<RDA	276 (80.0)	53 (80.3)	
(UK LRNI Ref.)	Normal	155 (44.9)	28 (42.4)	ns
	<RDA	190 (55.1)	38 (57.6)	
Thiamin(mg/d) (WHO Ref.)	Normal	57 (16.5)	13 (19.7)	ns
	<RDA	288 (83.5)	53 (80.3)	
(UK RNI Ref.)	Normal	67 (19.4)	21 (31.8)	<0.05
	<RDA	278 (80.6)	45 (68.2)	
Niacin (mg/d) (WHO Ref.)	Normal	37 (10.7)	13 (19.7)	<0.05
	<RDA	308 (89.3)	53 (80.3)	
(UK RNI Ref.)	Normal	51 (14.8)	20 (30.3)	<<0.05
	<RDA	294 (85.2)	46 (69.7)	

Table 4.5.1 Mean intake of energy and nutrient in food refusal and non-refusal group among 1-3 years aged children

Mean energy and nutrient intake	Refusal (n=153)		Non-refusal (n=20)		RDA
	Mean	±SD	Mean	±SD	
Energy (Kcal/day)	708	364	931	400	1230-M 1165-F
Protein (gm/d)	27.06	16.30	35.14	15.30	14.50
Iron (mg/d)	6.00	6.50	8.49	6.00	5.00
Calcium (mg/d)	500	397	583	432	400
Vitamin A (µg/d)	916	803	1118	821	400
Vitamin C (mg/d)	18	25	29	34	20
Riboflavin (mg/d)	0.55	0.50	0.76	0.60	0.80
Thiamin (mg/d)	0.33	0.20	0.47	0.30	0.50
Niacin (mg/d)	6.90	5.60	7.89	8.60	9.00

Table 4.5.2 Mean intake of energy and nutrient in food refusal and non-refusal group among 4-6 years aged children

Mean energy and nutrient intake	Refusal (n=94)		Non-refusal (n=17)		RDA
	Mean	±SD	Mean	±SD	
Energy (Kcal/day)	985	409	1202	582	1715-M 1545-F
Protein (gm/d)	35.89	20.60	41.40	29.10	19.70
Iron (mg/d)	12.36	10.30	13.03	11.70	5.50
Calcium (mg/d)	380	292	409	327	450
Vitamin A (µg/d)	963	746	1053	828	400
Vitamin C (mg/d)	46	115	34	27	20
Riboflavin (mg/d)	0.40	0.30	0.42	0.30	1.10
Thiamin (mg/d)	0.45	0.30	0.52	0.30	0.70
Niacin (mg/d)	7.39	4.60	8.24	6.70	12.10

Table 4.5.3 Mean intake of energy and nutrient in food refusal and non-refusal group among 7-10 years aged children

Mean energy and nutrient intake	Refusal (n=85)		Non-refusal (n=24)		RDA
	Mean	±SD	Mean	±SD	
Energy (Kcal/day)	1199	529	1106	500	1970-M 1740-F
Protein (gm/d)	41.35	22.00	43.24	16.60	28.30
Iron (mg/d)	12.89	9.60	20.86	23.60	9.50
Calcium (mg/d)	392	308	418	269	500
Vitamin A (µg/d)	1166	1109	1171	1012	400
Vitamin C (mg/d)	27	34	43	45	20
Riboflavin (mg/)	0.41	0.30	0.39	0.20	1.30
Thiamin (mg/d)	0.47	0.30	0.54	0.20	0.90
Niancin (mg/d)	8.72	5.00	9.35	4.00	14.50

Table 4.5.4 Mean intake of energy and nutrient in food refusal and non-refusal group among 11-14 years aged children

Mean energy and nutrient intake	Refusal (n=13)		Non-refusal (n=05)		RDA
	Mean	±SD	Mean	±SD	
Energy (Kcal/d)	1433	630	1405	685	2220-M 1845-F
Protein (gm/d)	42.52	15.80	60.44	34.20	42.1-M 41.2-F
Iron (mg/d)	15.23	7.10	13.17	4.70	15.0-M 16.0-F
Calcium (mg/d)	463	284	297	187	600-700
Vitamin A (µg/d)	1291	1550	1235	1137	500
Vitamin C (mg/d)	39	43	43	54	30
Riboflavin (mg/d)	0.43	0.20	0.31	0.20	1.7-M 1.5-F
Thiamin (mg/d)	0.62	0.30	0.56	0.30	1.2-M 1.0-F
Niacin (mg/d)	9.35	3.40	13.21	4.80	19.1-M 16.4-F

Table 4.5.5 Distribution of children by food refusal and non-refusal group and their percentage of total calorie from protein, fat and carbohydrate and age groups

%of total Kcal from	R	NR	R	NR	R	NR	R	NR	R	NR
	1-3 years		4-6 years		7-10 years		11-14 years		Total	
Protein	14.8	15.5	14.3	14.2	15.0	15.2	12.8	16.4	14.2	15.3
Fat	32.3	34.2	27.8	27.6	28.8	26.8	24.3	22.5	28.3	27.8
Carbo-hydrate	52.9	50.3	57.9	58.2	56.2	58.0	62.9	61.1	57.5	56.9

R =Refusal

NR= Non- Refusal

Table 4.6 **Distribution of children in food refusal and non-refusal groups by nutritional status (z-score)**

Nutritional status		Refusal		Non-refusal		ps
		frequency	%	frequency	%	
H/A SD	Stunted (Short) (<-2 SD)	43	12.6	15	10.4	ns
	Normal (-2 to + 2 SD)	289	84.8	122	84.7	
	Tall (> 2 SD)	09	2.6	0.7	4.9	
	Total	341	100	144	100	
W/H SD	Thin (<-2 SD)	36	10.6	13	9.0	ns
	Normal (-2 to + 2 SD)	305	89.4	131	91.0	
	Total	341	100	144	100	
W/A SD	Under wt <-2 SD	59	16.9	18	12.0	ns
	Normal (-2 to + 2 SD)	289	82.6	124	82.7	
	Over Wt > 2 SD	02	0.6	08	5.3	
	Total	350	100	150	100	

Table 4.7 Distribution of children in food refusal and non-refusal groups by nutritional status (Waterlow Classification, H/A)

Nutritional status (% Ref.)		Refusal		Non-refusal		p
		frequency	%	frequency	%	
Waterlow H/A	Normal (≥ 95)	227	66.6	109	75.7	ns
	Mild malnutrition (90-94)	96	28.2	27	18.8	
	Moderate malnutrition (85-89)	16	4.7	06	4.2	
	Severe malnutrition (< 85)	02	0.6	02	1.4	
	Total	341	100	144	100	

Table 4.8 Distribution of children in food refusal and non refusal groups by nutritional status (Waterlow Classification, W/H)

Nutritional status Waterlow W/H (Wasting) (% Ref.)	Refusal		Non-refusal		p
	frequency	%	frequency	%	
Normal (≥ 90)	223	65.4	109	75.7	ns
Mild malnutrition (80-89)	102	29.9	31	21.5	
Moderate malnutrition (70-79)	15	4.4	04	2.8	
Severe malnutrition (< 70)	01	0.3	-	0	
Total	341	100	144	100	

Table 4.9 Distribution of children in food refusal and non-refusal groups by nutritional status (Waterlow, Wasting and Stunting)

Nutritional status Waterlow Classification (Wasting and Stunting) (% Ref.)	Refusal		Non-refusal		p
	frequency	%	frequency	%	
Normal (>90 H/A & >80 W/H)	309	90.6	132	91.7	ns
Wasted (>90 H/A & >80 W/H)	14	4.1	04	2.8	
Stunting (<90 H/A & >80 W/H)	16	4.7	08	5.6	
Wasted and Stunting (<90 H/A& <80 W/H)	02	0.6	-	0	
Total	341	100	144	100	

Chapter 5: Counseling

5.1 Counseling

Counseling on food intake among food refusal children was studied. 50 children were taken from food refusal group. Out of them 43 Children were attended in pre-counseling session. In pre-counseling session weight and height were recorded and their food intake during previous 24 hours period was recorded. After observation, 1st counseling was done. After one month, their nutritional status was measured and food intake was recorded and 2nd round of counseling was done. Then after one month the same process was performed and after a gap of 3 months final round of follow up was observed. Number of children were attended in 1st, 2nd and final round of follow-up were 45, 37 and 44 respectively (Table 5.1).

5.2 Effect of counseling on energy and nutrient intake

Energy intake in pre-counseling was 1358 ± 549.6 kcal/day and it increases to 1415 ± 546.7 , 1586 ± 447.8 in 1st and 2nd round of counseling and 1558 ± 430.1 kcal/day in final round of counseling (Table 5.1).

While comparing pre-counseling with 1st, 2nd and final round of counseling, results has shown improved energy intake and the t-test (pair) shows significant improvement in 2nd round ($p=0.002$, Table 5.2). The mean energy intake falls from 1572 ± 453 Kcal/d in 2nd round to 1554 ± 456 in final round of counseling, t-test (pair) between pre-counseling and final round of counseling shows the significant improvement ($p<0.05$). The same table has shown the significant improvement of protein intake ($p<0.05$).

Iron, calcium, vitamin A and other micronutrient intake were also improved in majority cases but the difference is not significant.

5.3 Effects of counseling on force feeding and energy and nutrient intake nutritional status.

In pre counseling 28 (65%) forces their child to take food. The energy intake (mean) was 1120 k cal/day in pre counseling and improved to 1380 k cal/day in final round of follow up. Mean energy intake (1358 kcal/d) in pre-counseling in food refusal children is higher than mean energy intake (1120 kcal/d) in force feeding refusal group children. Improvement occurs in all rounds of counseling in both groups. In final round of counseling mean energy intake in refusal group and force feeding refusal group were 1558 and 1380 kcal/d respectively.

Counseling failed to bring significant change in force feeding behaviour but it improved both the intake and nutritional status. It was more marked in 1-6 years of age than 7 years + group and using H/A z-score, the improvement was more in male and in upper class. Using W/H z-score, progress was in all age category, sex and class in all rounds of follow up and improvement was more in female than male and more in 7 years + group.

In case of following W/A z-score, mean score improved in all rounds of follow up. In male child and in middle class the improvement of nutritional status was significant.

Nutritional status of the forced fed children in different rounds of follow up have shown improvement, in pre-counseling 02 (7.1%) and 01 (3.4%) child in 1st round of follow up was wasted and wasting was not present in following rounds (Table 5.3).

Table 5.1 Change in energy intake in children in the pre-counseling and different rounds of counseling.

Energy intake and nutritional status	Pre-counseling (n=43)	Counseling		
		1 st round (n=45)	2 nd round (n=37)	Final round (n=44)
Energy (Kcal/d)	1358 ±549.6	1415 ±546.7	1586 ±477.8	1558 ±430.1

Table 5.2 t-test (pair) showing the effect of counseling on energy and nutrient intake

Energy and Nutrient intake	Pre counseling (n=43)	1 st round (n=39)	2 ⁿ round (n=31)	Final round (n=39)	
	Mean±SD				t-test (pair)
Energy (kcal/d)	1345 ±562	1446 ±578	1572 ±453	1554 ±456	Pc-C1=0.302 Pc-C2=0.002 Pc-C3=0.049
Protein (gm/d)	47 ±20	48 ±24	46 ±19	55 ±22	Pc-C1=ns Pc-C2=0.035 Pc-C3=0.045
Iron (mg/d)	14.6 ±12.8	16.6 ±11.0	16.6 ±9.8	16.3 ±9.7	Pc-C1=ns Pc-C2=ns Pc-C3=ns
Calcium (mg/d)	609 ±445	628 ±279	708 ±362	736 ±384	Pc-C1=ns Pc-C2=ns Pc-C3=ns
Vitamin A (μ g RE/d)	1584 ±1085	1383 ±874	1540 ±1083	1650 ±797	Pc-C1=ns Pc-C2=ns Pc-C3=ns
Thiamin (mg/d)	0.59 ±0.28	0.63 ±0.29	0.70 ±0.43	0.59 ±0.19	Pc-C1=ns Pc-C2=ns Pc-C3=ns
Riboflavin (mg/d)	0.74 ±0.70	0.64 ±0.40	0.76 ±0.74	0.69 ±0.44	Pc-C1=ns Pc-C2=ns Pc-C3=ns
Niacin (mg/d)	7.6 ±5.5	8.74 ±5.59	9.12 ±4.23	10.40 ±5.38	Pc-C1=ns Pc-C2=ns Pc-C3=ns
Vitamin C (mg/d)	47 ±57	56 ±67	60 ±53	35 ±30	Pc-C1=ns Pc-C2=ns Pc-C3=ns

Pc= Pre-counseling

C1= Counseling Round 01

C2= Counseling Round 02

C3= Counseling Round 03

Table 5.3 Change in energy intake and nutritional status of the forced fed children in the different rounds.

Energy intake and nutritional status	Pre- counseling (n=43)	Counseling		
		1 st round (n=45)	2 nd round (n=37)	Final round (n=44)
Energy (Kcal/d)	1120	1119	1246	1380
(n)	(28)	(26)	(21)	(26)
W/H <-2SD	02	01	00	00
W/H - 2SDto+2SD	26	25	21	19

Figure 4.1 Distribution of children and the degree of food refusal by the socioeconomic classes

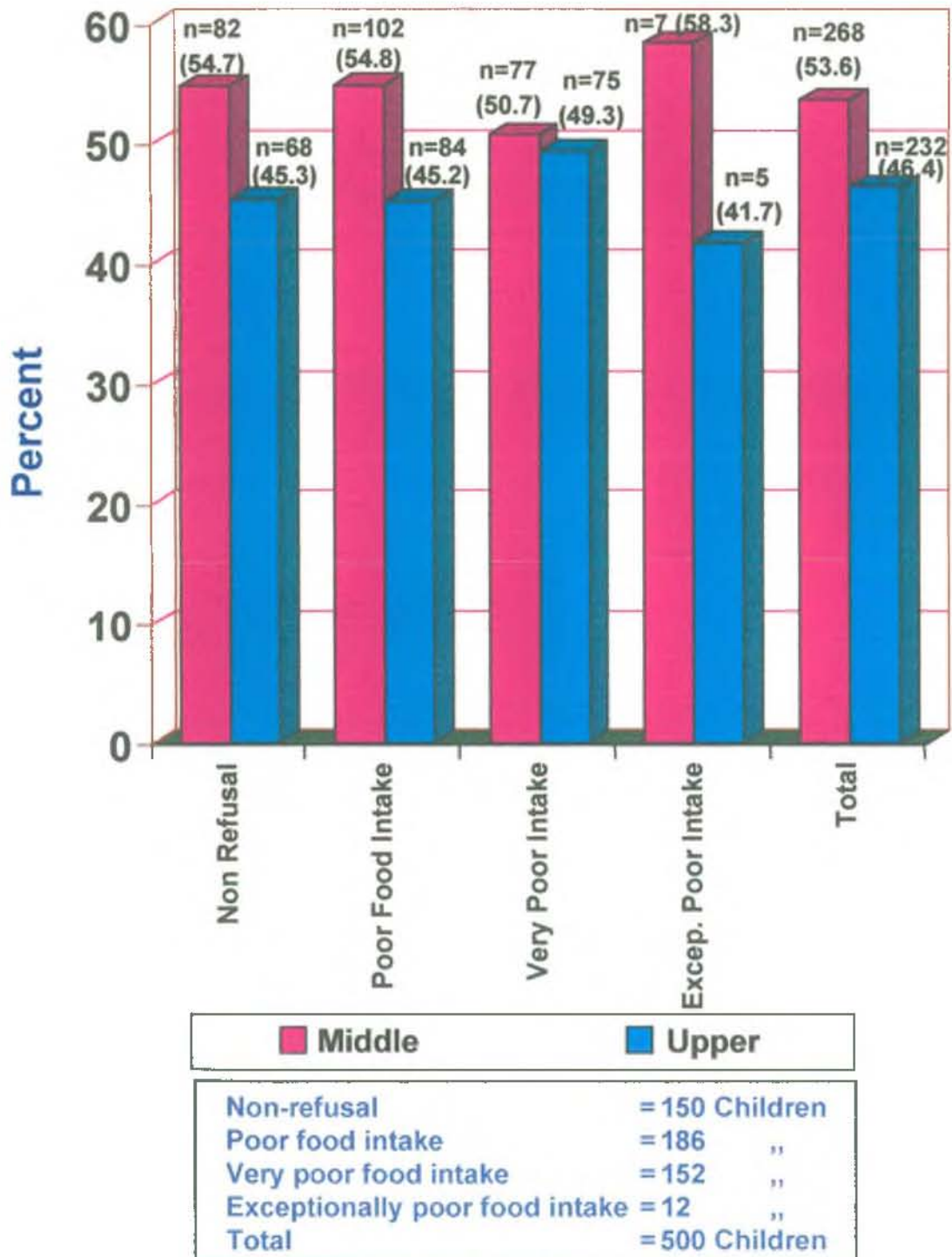
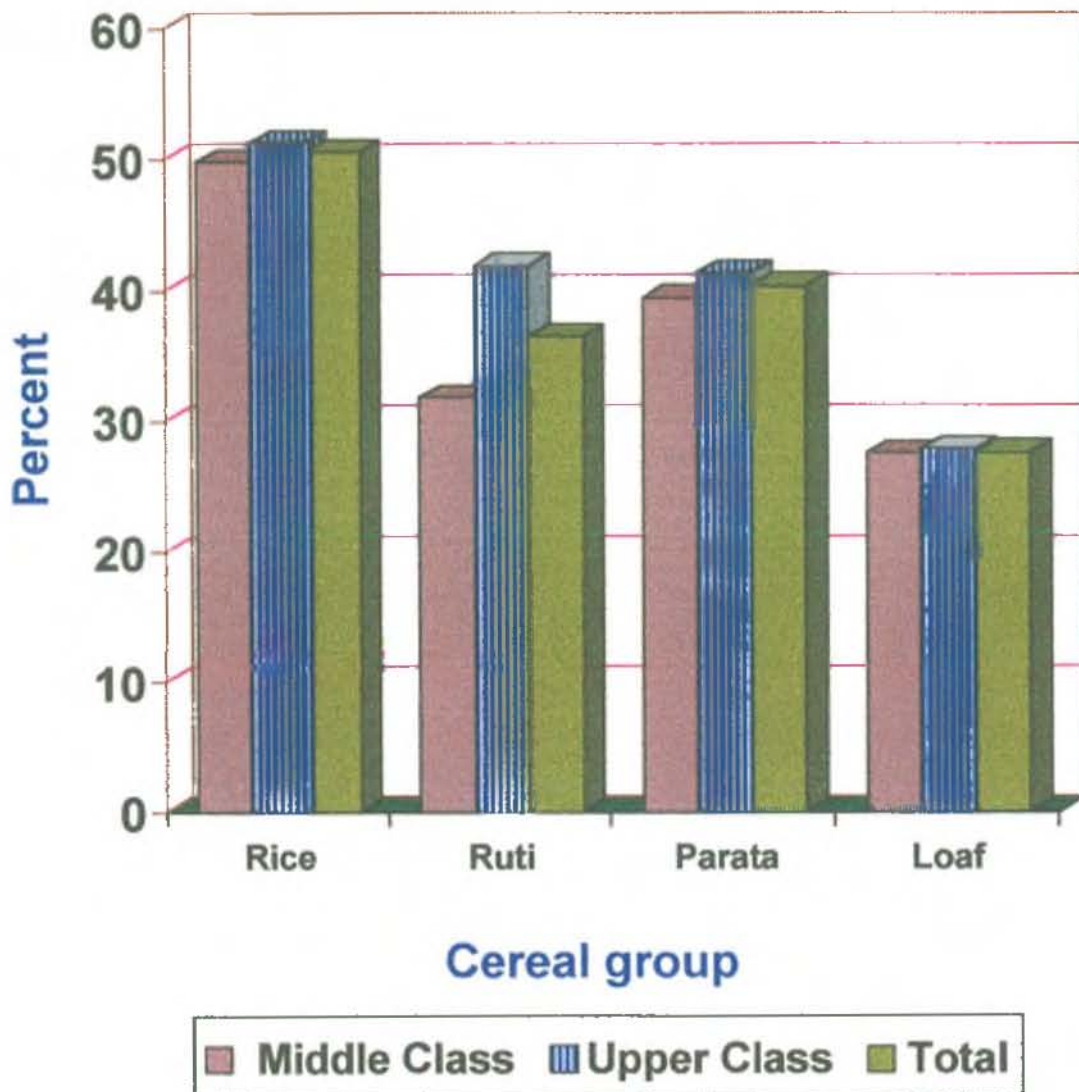


Figure 4.2.1 Distribution of children and the present of food refusal by the food items of cereal group and socio-economic class children.



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Figure 4.2.1 Distribution of children and the present of food refusal by the food items of protein group and socio-economic class children.

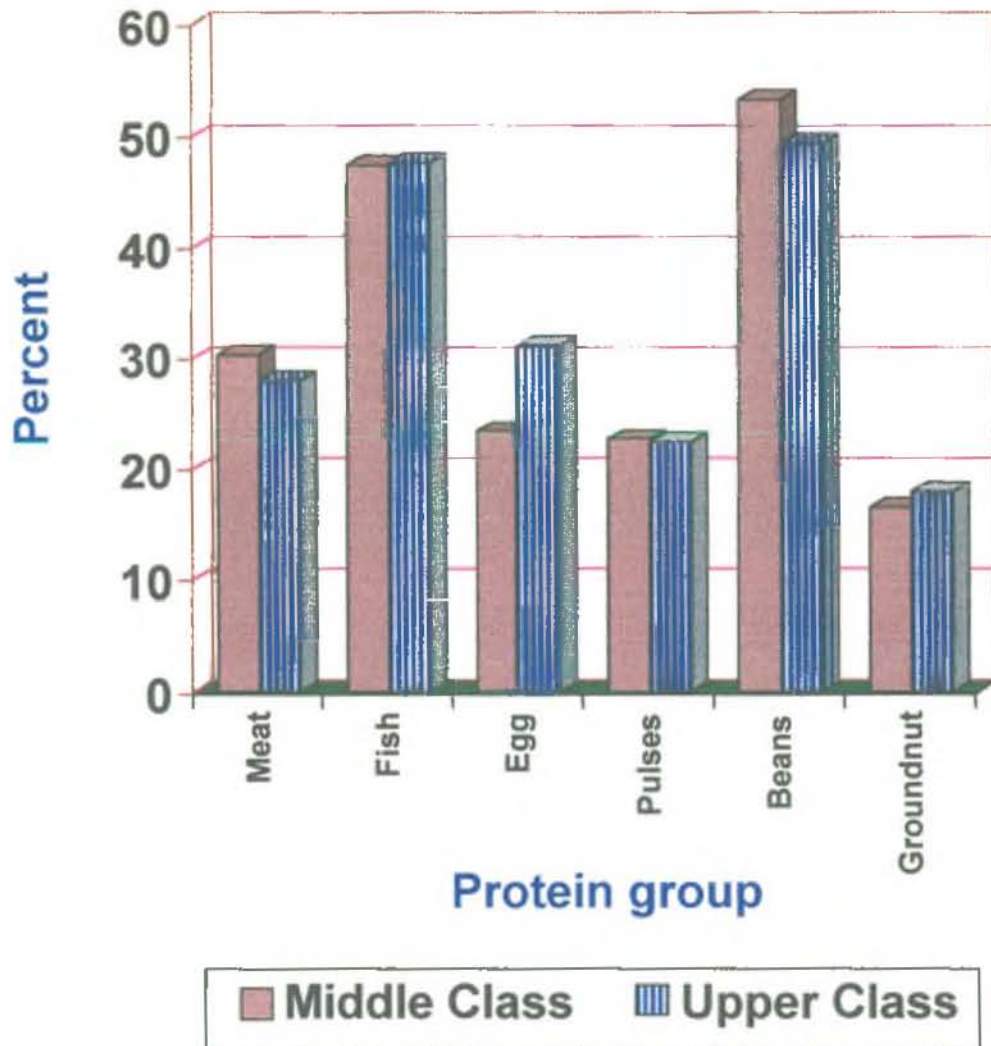


Figure 4.2.3 Distribution of children and the present of food refusal by the food items of vegetables and fruits group and socio-economic class children.

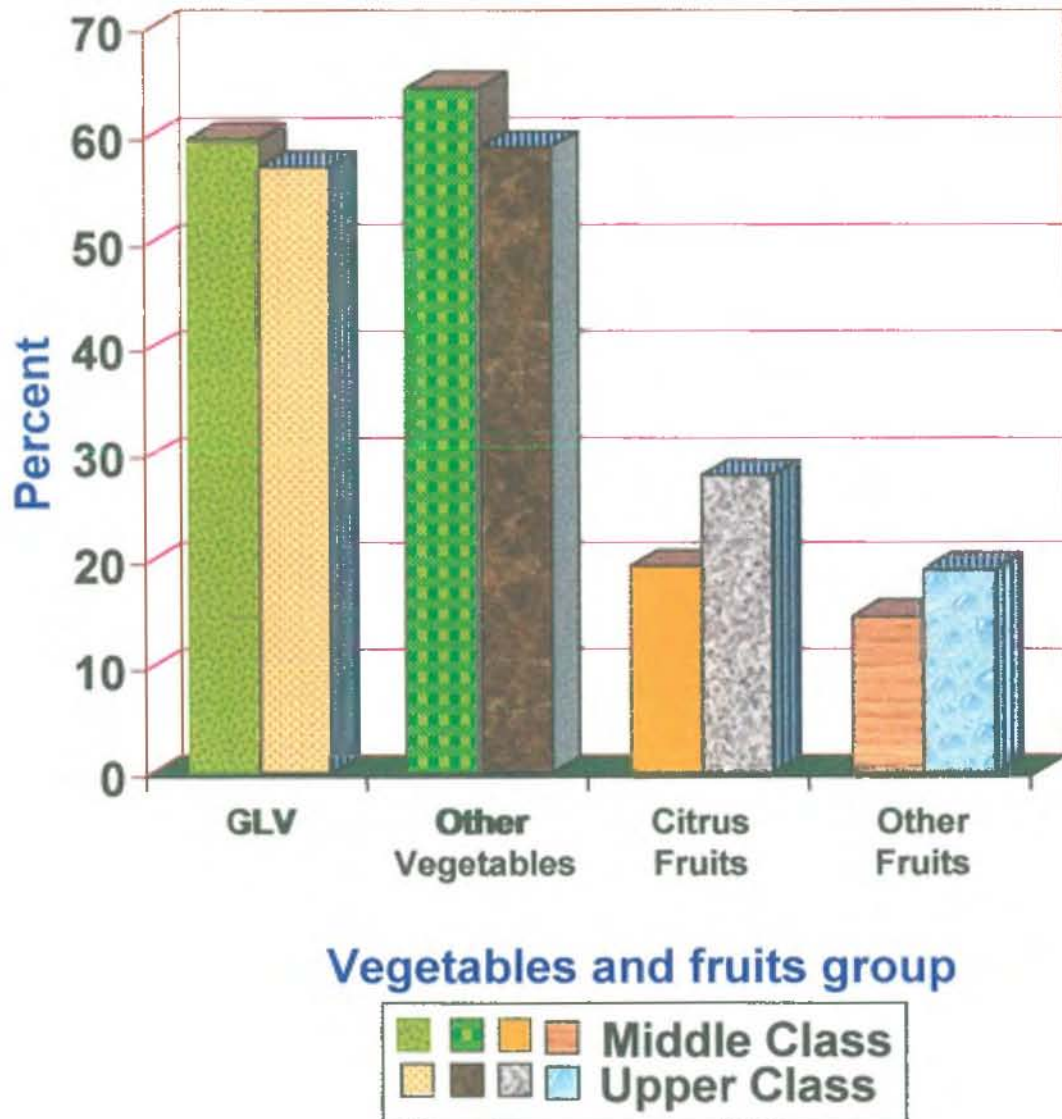


Figure 4.2.4 Distribution of children and the present of food refusal by the food items of milk and milk products group and socio-economic class children.

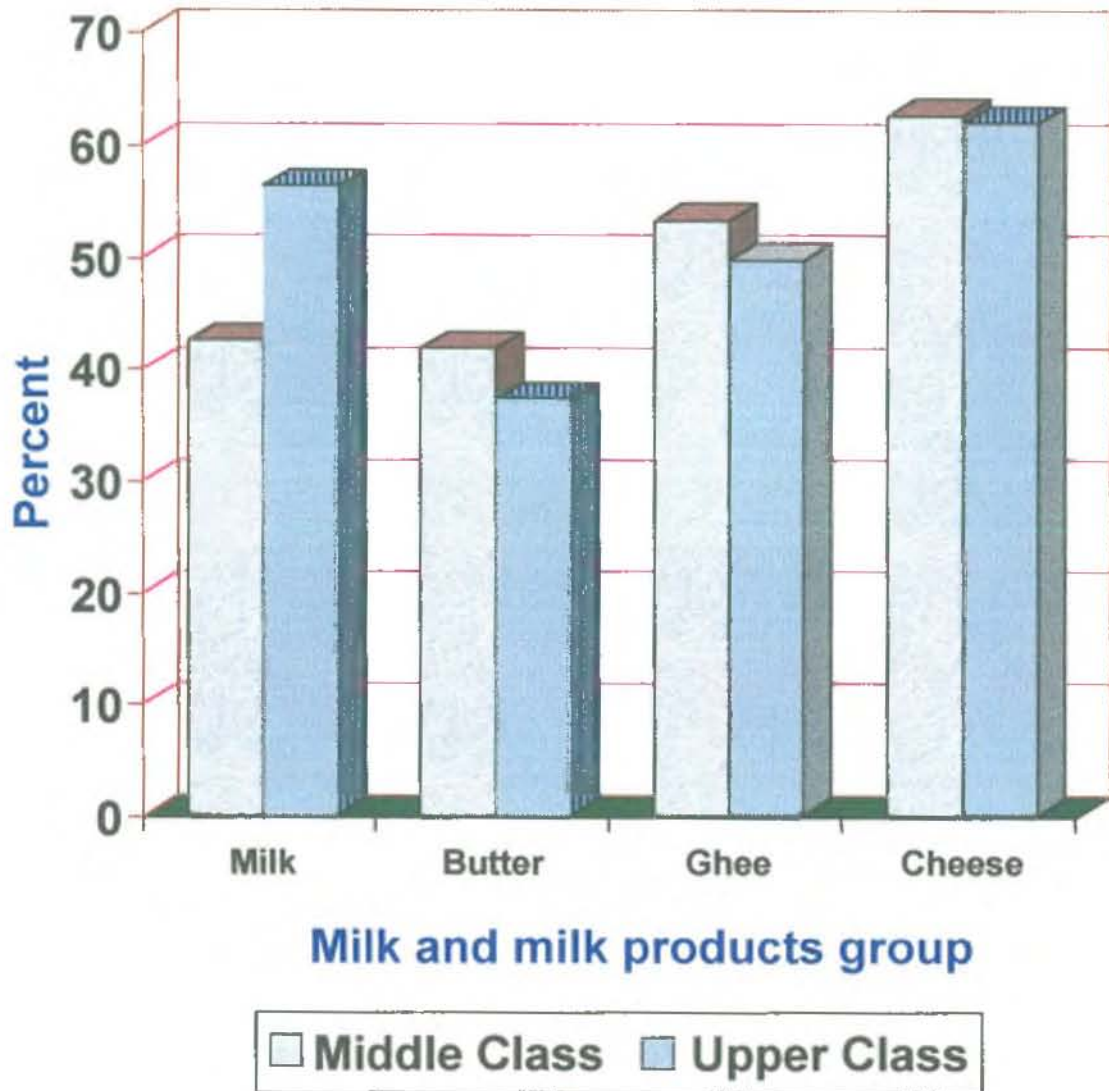


Figure 4.6.1 Distribution of children in food refusal and non-refusal groups by the nutritional status (H/A SD).

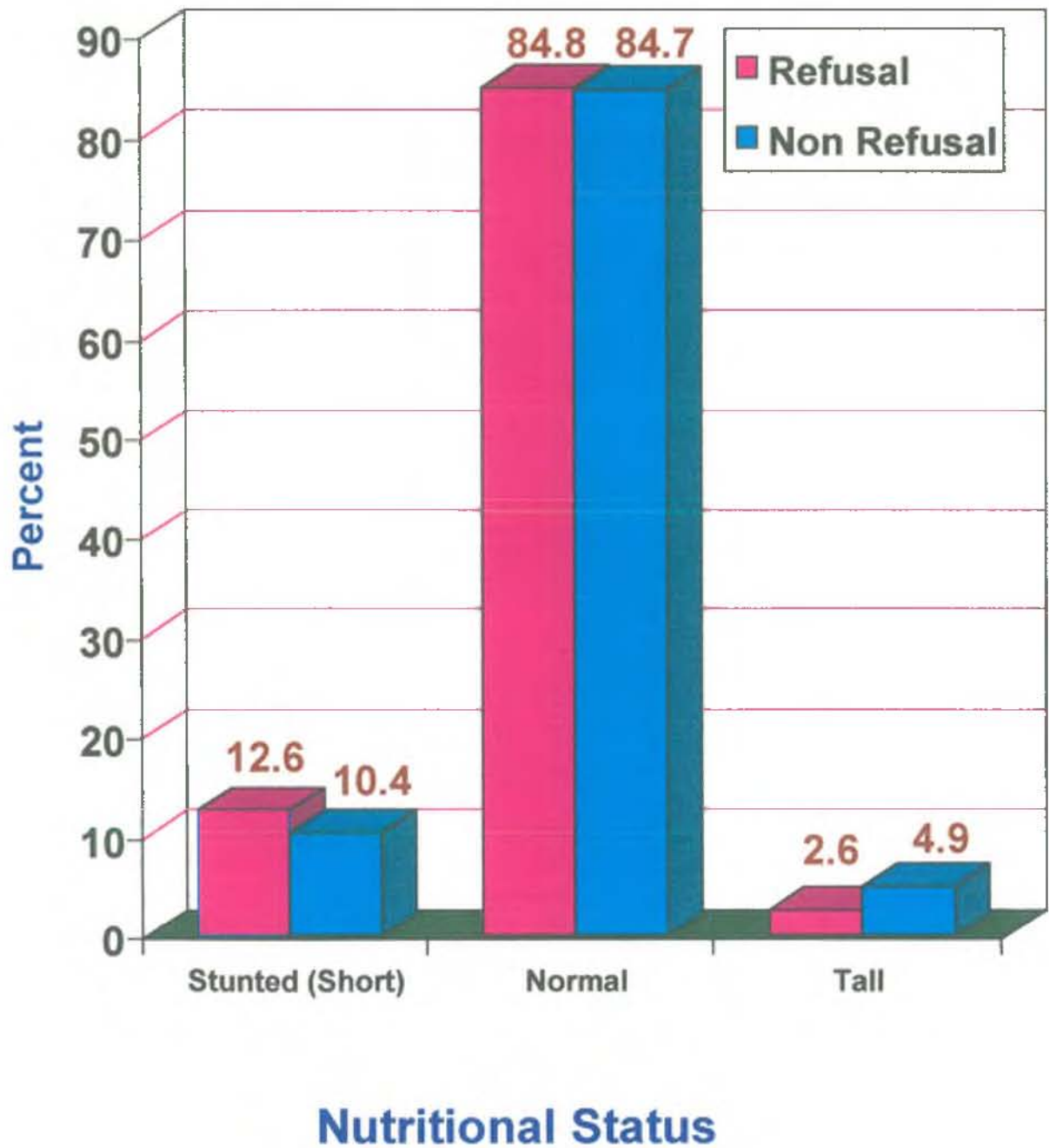


Figure 4.6.2 Distribution of children in food refusal and non-refusal groups by the nutritional status (W/H SD).

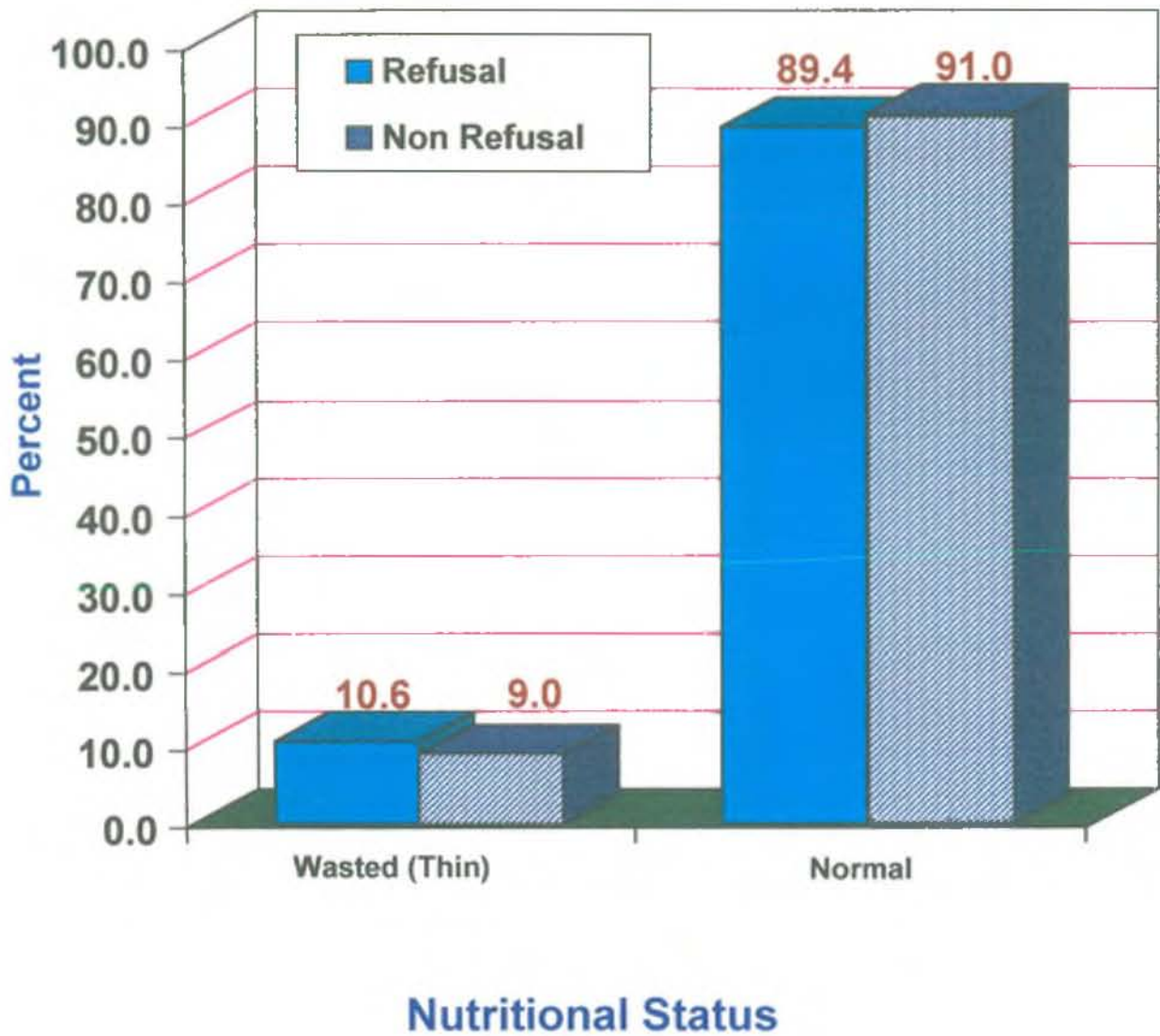
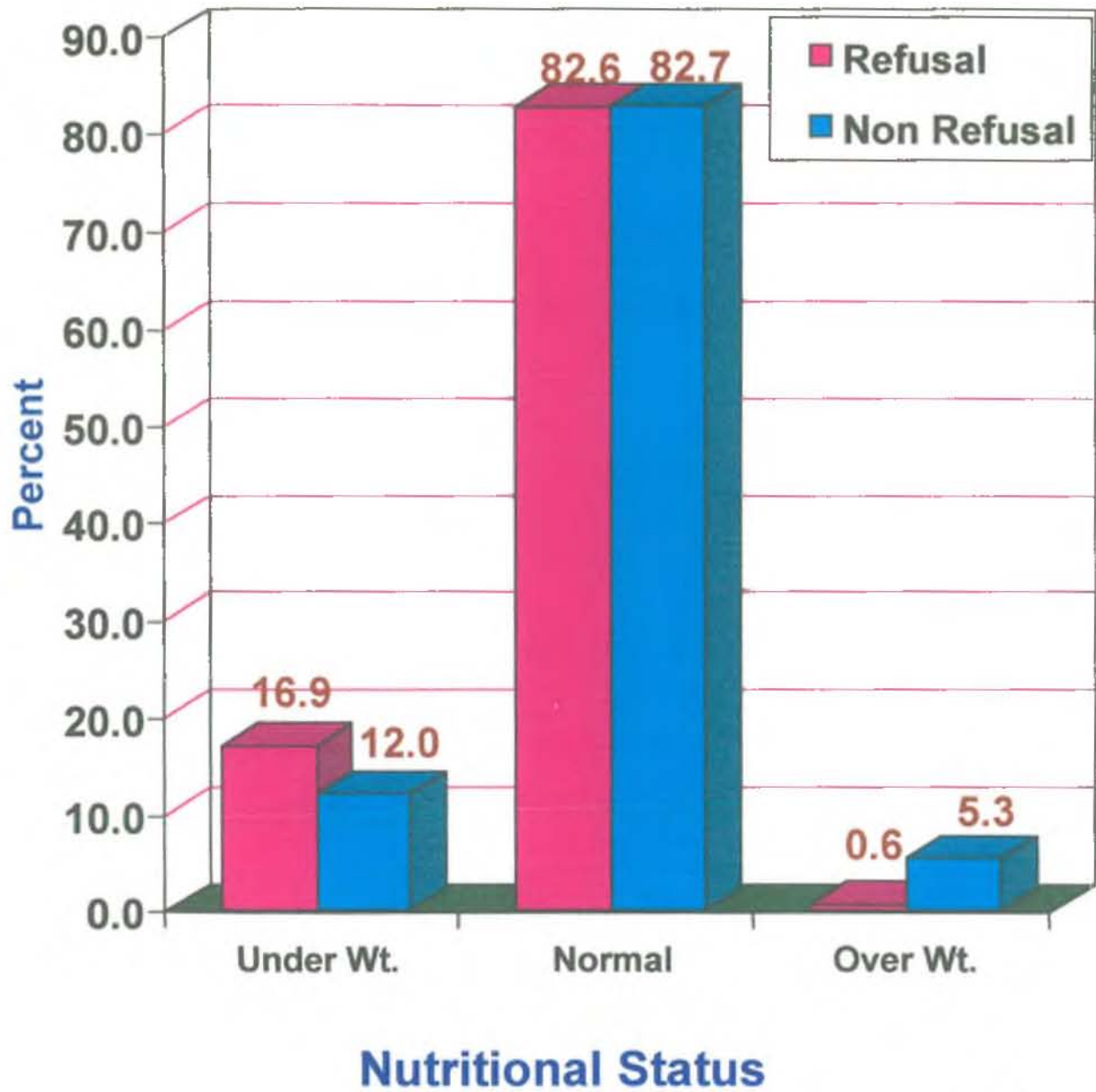


Figure 4.6.3 Distribution of children in food refusal and non-refusal groups by the nutritional status (W/A SD).



Chapter 6: Discussion

6.1 The status of food refusal

This research is an attempt to understand the status of food refusal, its determinants and the effects of counseling on food refusal. No previous data is available in Bangladesh other than the present study.

Meal frequency is the most important determinant related to food intake. In this study, in food refusal group the meal frequency was 5.27. In female and male child the meal frequency was 5.34 and 5.22. For children this meal frequency is within universally accepted normal range. This meal frequency has shown no association with food refusal. Urban affluent society has shown no discrepancy in male and female child. It reflects the awareness of the mother regarding their child's intake. Leonard (1991) in his study has also found male children did not shown any preferential treatment in terms of diet. Engle (1995) has shown the prediction of food intake sharpened by considering feeding time and frequency, food quality and caloric density, child appetite and refusal, the active feeding behavior of caregivers, and beliefs about child feeding.

In this study, the period of food refusal by the children is recorded according to the statement of the caregiver the mother of the child. Food refusal period ranges from less than two weeks to more than seven years. The mean period of food refusal is 2.13 ± 2.66 . Food refusal period was higher in upper class (2.29 ± 2.67) than middle class (1.99 ± 2.65). The result shows food refusal complained by the mother is a common problem in well to do family of the urban Dhaka. Although it was observed that the mean duration of refusal increases with the increase of age but in comparison to the age group, the younger children suffers more. It reflects that mother is gradually becoming more aware leading to more conscious about child caring. In affluent society parents are taking less number of children and they are more conscious about their child (BBS, 1996) on the other hand it may be a real problem of the children due to changed environmental conditions. The mean duration of food refusal increases with the increase of age.

The degree of food refusal was graded as non-refusal group, poor food refusal group, very poor food refusal group and exceptional poor food refusal group. In the non-refusal group no complaint was raised by mothers regarding their child's food intake. In poor food refusal category, the mother of the children was stated that their food intake was less than the required amount in quality and quantity. This poor intake was assumed from experience and or comparing with other children. Within food refusal group 53.1 and 42.4% children belong to the poor and very poor food intake group. When child refuses to take food regularly in quantity and quality are categorized as very poor food intake group. Only in 12 cases out of 350 food refusal children, mother was anxious regarding their child's food intake. In exceptional poor food intake group, child was taking food exceptionally poor in amount and variety and the meal frequency was less than other known children's food intake.

6.2 Food refusal and food items of the basic food groups

This section deals with discussion on food refusal associated with certain food items within each basic food groups. Rice and wheat are the staple food, which are eaten in Bangladesh in large amount and they give us most of the needed energy. Rice is the main food in Bangladesh, Sri Lanka, Burma, China, Japan and in India-mainly in west Bengal, Assam and South India. Wheat is the most widely used cereal in the world. In the Punjab, Uttar Pradesh and Pakistan over 70 percent of the total calorie intake has come from wheat (Antia,1989). In a span of 27 years since 1971, a trend of change in wheat consumption was observed in Bangladesh, mainly in urban society. No data is available in Bangladesh, other than the present study where food items often refused by the urban children were observed.

In this study, it is observed that refusal of food item varies within the food groups. In all of the food items, the refusal rate is higher in children belonging to upper socio-economic class than that in middle socio-economic class.

In cereal group, irrespective of the socioeconomic class, rice refusal rate topped the list and loaf refusal rate was the lowest, parata and ruti lie within the refusal rate of these two food items. The major staple food the rice refusal was markedly higher may

be due to its maximum use rate. In practice loaf intake pattern was less than rice, parata and ruti in this community, its acceptance is high may be due to its less frequent offer to the children. Monotony of food intake may be the cause of food refusal.

In protein group, fish refusal was higher than that of meat or egg. Pulses refusal rate was lower and groundnut showed the lowest refusal rate among all protein varieties. The fish refusal may be due to fish bone and their test. All fish are not equally refused by the children but the refusal was higher than meat and egg. The ground nut refusal was the lowest probably because of its palatability.

The average vegetable consumption in Bangladesh has been estimated at 32 grams, below than the estimated minimum intake set by FAO of 200 grams per capita per day (Zaman, 1998). Among all food items, green leafy vegetables and other vegetables refusal rate were higher. This higher refusal rate was probably due to the low palatability or less attractive during serving. In affluent Dhaka society the use of leafy and other vegetables was less in the family practice.

Fruits refusal rate was lower than other food items, except groundnut. Within fruits group citrus fruits refusal was higher. Less availability of fruits in amount and or variety is also a factor in the well-off families. This higher acceptability of fruits may be due to the colour, order and tests. Sattar (1991) conducted a study in urban Dhaka on food intake of 2-5 years old children. In his study mothers were categorized into satisfied group and dissatisfied group on the basis of their child's food intake. It was found that ruti, aloobhazi, egg, milk, rice, suji, semi, porata, bread, khichuri and banana were used as breakfast. In majority cases of dissatisfied mother it was observed that milk and egg were given in addition to ruti and aloo bhazi in breakfast. At mid-day meal, majority of the dissatisfied mother has given fish, meat, and pulses, milk and vegetables. Protein and vegetables were given to large number of children. The majority of the dissatisfied mother gave milk at bedtime. Banana, milk, and noodles were used as snacks in midmorning and mid afternoon by a large number of dissatisfied mothers.

Khan (1991) found another picture in a study in rural Manikgonj and Joypurhat that before 15 months of age, none of these village children was given vegetables. Fruit consumption was not frequent in these children. In that study, it was seen that from second year of life, meat, fish, poultry items were given to children on a regular basis. Elizabeth (1992) has shown that leafy vegetable spinach and pumpkin were avoided in diarrhoea. They also avoided cooking oil during diarrhoea, because it was thought that the item is hot and indigestible. FAO has shown (1991), the urban trend of consumption of meat, vegetables and fruits are linked with purchasing power. In another study, Lucas (1992) has shown that taste has an important part in the acceptance of food. The study found that temperature has a relation with the acceptance or refusal. Extreme temperature is generally avoided and Luke warm is actually preferred. Some foods may be rejected because of the order than taste. Mixed dishes were not popular in many children, except for spaghetti, macaroni and cheese, and pizza. It is found that broken crackers and wrong way cut of sandwich is refused by many children. In that study it was found that children's rejection was related to palatability of food and off flavour. Children rejected overlooked vegetables. Bakery products and soft drinks are the most frequently chosen snacks. After schooling and in evening snacks are commonly consumed by the children. It was found that children do not eat well if they are tired, So it needs to be considered children's meet and play times.

Dwyer (1993) found that temporary refusal to eat, dawdling, and the use of food and eating to attempt to exert control over the parent are inevitable. The generalized poor appetite may be due to small size of stomach for the age, small appetite compared to other children in the family. It was also found that after exhausting play and numerous snacks in the late afternoon appetite becomes poor at supper. Poor appetite also is related to illness and recovering from illness.

In recent observation, Engle (Unicef, 1997) has reported, most of the investigators showed that children were not eating all of the foods offered to them. Poor-quality, low nutrient density food, poor testing food, illness, loss of appetite, inappropriate timing of food, failure to assist the child in taking food or caregiver offering too much food initially was related to food leaving.

6.3 Summary: Food refusal is a common problem. In cereal group, rice refusal was higher than ruti, parata and loaf. In protein group, fish refusal rate was higher than meat or egg. Vegetable protein the groundnut refusal rate was lowest. In vegetable group, green leafy vegetable and other vegetable refusal rates were higher. Fruits refusal rate was lower than other food items. This refusal varies from food to food within and among the basic food groups. Preference given to liking and disliking of food within and among the basic food groups will decrease the rate of food refusal and can play an important role in the prevention of malnutrition.

6.4 Food refusal socio-demographic characteristics

In this section, socio-demographic indicators, like parent's education, occupation, income, and number of children in the family, birth weight and birth order will be considered. No data is available for urban area of Bangladesh, other than the present study where association of food refusal with the mentioned socio-demographic characteristics was observed. The study result has shown no association with food refusal.

Chawdhury (1984) found that mother's education has a significant and positive effect on calorie intake of children in the first year of life. Mother's education is negatively associated with calorie intake and calorie adequacy after one year of age. He found that fathers education have very little effects on dietary intake of preschool rural Bangladeshi children. Bangladesh Bureau of Statistics (BBS) has conducted studies in 1987, 1991, 1994 and shown the strong positive impact of mother's education on nutrition education of the children. Even two-three years of schooling tend to improve the child's nutritional status. Secondary education has additional positive effect. According to BBS 1997 report, mothers/caretakers who never attended school, their children were stunted in 61.2% cases. In educated categories I to V; VI-IX, SSC/HSC, passed the Degree or above groups have shown 54.3, 46.3, 28.5 and 9.9% respectively. In our study, it was found that 1.7% mothers and 0.3% fathers of refusal group have no schooling and majority of the parents was literate. The stunting wasting and underweight rates were 12.6, 10.6 and 16.9% in food refusal groups in overall cases.

Sattar (1992) in his study in urban Dhaka has shown nutritional status of the children was directly related to mother's education levels. Another study conducted by Rahim (1993) has shown the similar result. Victor et al., (1992) has found that maternal education has effects on child health.

Vella V et al. (1994) has conducted a study in Northern Uganda has shown that recovering from stunting is more associated with mother's education than income. Deepti Chirmulay (ACC/SCN, 1997) presented that education in an adult family member, either man or women is associated with better child nutrition.

Amine and Awad (1991) studied in Kuwait have shown educated and employed mothers were more liable to have smaller babies compared to illiterate or unemployed mothers. Christian et al. (1988) found that significant nutritional knowledge of the mother is effective in improving the nutritional status of the children.

Choudhury (1993) has shown that educated women when worked outside the home resulting drop in time spent for breast feeding and weaning.

Fourth National Nutrition Survey (NNS) of Philippines (1993) has shown higher educational attainment make better choice on the quantity and quality of foods for their households given the same constraints faced by all households. The same survey has shown professional, technical and related occupation group were taking energy and nutrient higher than the others.

BBC (1997) has shown, when household head's occupation was business their sibs are 56.8% stunted and 56.5% underweight while in case of service (officer) and service (staff) the stunting 30.6% and 38.9% and underweight rates were 32.5 and 44.0%.

6.4.1 Parents' income

Parents' income is one of the most common socio-demographic indicators. In this study, less than Taka 5000.00 monthly family income category of children were not taken in this study. Income is directly related to availability of food. But food intake is not always related to food availability. In developing countries like Bangladesh, availability of food for children is a problem for low-income group and it is not so far the middle and upper socio-economic class children.

Lack of adequate food for the children is closely related to malnutrition. It is a common problem in poor socioeconomic class. But in affluent family, malnutrition is not due to food availability. Engle (1995) in his studies indicate that food availability in the household is a poor measure of daily food intake. In this study among the affluent, food refusal was not related to per capita monthly income, this type of study was not found in recent years.

In a recent report presented by Deepti Chirmulay (ACC/SCN,1997) it has been discussed families not reported any food shortage also have 40 to 81% severely underweight in India. She also reported that health care in early illness was common in high socioeconomic class. Nutrition is more than food. From her presentation it was found that poverty may not be the most important constrain for growth and development of children. In the same report, majority of the finding has shown that higher rate of obesity among children of developed countries in high-income group. NNS (1993) of Philippines has shown mean one day per capita energy and nutrient intake was higher in higher income group. Similar findings are also reported in other studies.

BBS (1997) has reported, household expenditure increases 3.14 times, the nutritional status of children (HAZ) increases by 0.13 and WAZ increases by 0.18 points. The report mentioned, importance of household income or expenditure should not be overstated in reducing child malnutrition, and emphasis on promotion of income alone will not be an effective choice for improving child nutrition in the country.

In this study it is found that number of children in middle and upper socioeconomic class was limited from one to three in 89% family. Family size greater than seven children in Nigerian family results in a higher incidence of kwashiorkor (Allenye, 1988). Choudhury (1993), in his study, has shown that increased family size adversely affects the nutritional status. It was observed that lower the dependency ratio causes higher the nutrient intake.

The similar finding was reported by FAO (1984), higher birth rates cause increased malnutrition in the individual families. In another report (FAO, 1992, Nutrition and development - a global assessment) it was found that the large families are exposed to greater risk of energy deficiency.

The World Bank Survey (FAO/WHO, 1989) in Sub Saharan Africa has shown the similar findings where food availability and intake falls in large families.

Pelto et al. (1991) has conducted a study in Mexico and found the similar result, in larger families children consume poor quality of protein and they are significantly shorter.

Sattar (1992) and Rahim (1994) have shown the similar report, as family size increases the rates of malnutrition also increases. BBS (1992, 1994) has shown the stunting and wasting increase with the increase of family size. Most recent report of BBS (1997), it was observed that if the number of alive children is less than three, their stunting and underweight rates were 49.0 and 55.7%, when number of children range from 3-4, 53.5 and 60.2% children were stunted and underweight. But if the number of children in the family was 5 or more has not further deteriorates the nutritional status.

6.4.2. Birth Order

The Care Initiative Report (Unicef, 1997) has shown, birth order has a significant effect on caring practices. First born to young mother was usually cared by grand mother but later born is not so cared. High birth order children (5th or higher) receive less adult attention.

Gopalan (1969) in his analysis of 872 cases of kwashiorkor has shown that majority of them are from higher birth order. In another field study of 1400 pre school children by same author it was found that 30% children were malnourished in case of birth order 4 or above and 17% children were malnourished in case of earlier birth order. Gopalan found that majority of nutritional deficiency in preschool belongs to 4th birth order or above. Rahim (1993) conducted a study at army colonies of Dhaka cantonment and has shown, with the increase of number of birth order after 2nd, malnutrition also increases.

BBS (1992) has shown lower birth order has fewer stunted and wasted children. In this study it is found that in food refusal group 78% children's birth order was 1st or 2nd and only 10% children's birth order was 4th or above. Almost similar information was found in non-refusal group. In the present study it is found that food refusal is higher in case of birth order 1st and 2nd, refusal is the lowest for the 3rd birth order than in birth order 4th or above cases. This study does not provide adequate answer to the question why refusal is low in case of 3rd birth order, needs further research.

Regional Office for South Asia (ROSA), Unicef report (1997) has shown average age (year) of marriage of female observed by Unicef in 1996 was < 15 in Bangladesh, 15-17.5 in India and > 20 in Sri Lanka. Maternal age is important cause of low birth weight. The average age of marriage in the region has steadily increased in past few decades. The mean age of marriage of female in 1980, 1990, 1995 and 1996 was 16.4, 18.0, 19.9 and 20.1 % respectively (BBS, 1996). It is more marked in urban area.

6.4.3 Low Birth Weight (LBW)

WHO on the basis of world data had recommended that new born with birth weights less than 2.5kg are considered as low birth weight (LBW).

Recent UNICEF report (ROSA no 5, 1997) has shown more than half of the world's low birth weight (LBW) babies are born in South Asia. Low birth weight is a prospective marker of future growth and development and mother's nutritional and health status is the retrospective marker. Their risk of dying before their first birthday is four times than that of other infants. The same report concluded that LBW is the best single predictor of malnutrition and which is closely associated with poor growth, not just in infancy but throughout childhood.

Sachdev (ROSA, 1997) presented LBW caring relatively greater risk of perinatal and neonatal morbidity and mortality and substandard growth and development in later life. Longitudinal studies from this region reveal that LBW infants demonstrate retardation in motor, adaptive, personal, social and language development in the first five years of life.

In Bangladesh, approximately half of the babies are born with low birth weight. In India the proportion is one-third, in Nepal and Pakistan it is one-fourth and in Sub-Saharan Africa the proportion is about one-sixth. In developing countries 6.5% of newborn babies has LBW (WHO, 1992).

The poor care that is afforded to girls and women by their husbands and by elders is the first major reason for levels of child malnutrition. The report also presented that birth weight is an indication that the infant was malnourished in the womb and/or that the mother was malnourished during her own infancy, childhood, adolescence and pregnancy.

Nargis Rowshan et al. (1977) has shown, a significant relationship exists between birth weight and socioeconomic status of mothers.

In recent report (ACC/SCN, 1997) it has concluded that, the prevalence of low birth weight is very high in countries with prevalent of stunting.

The same report also mentioned, most children who are born with low birth weight become increasingly malnourished upto the age of two years. The causes of low birth weight are complex but it is likely that poor nutrition of mothers both before and during pregnancy, plays an important role (Elizabeth, 1992).

LBW is considered to be indicative of nutrition deprivation of mother during her pregnancy and this deprivation mostly arises from the poor socioeconomic and living condition of mother (RAPA report, 1990).

The birth weights of infants of well-fed mothers in the upper socioeconomic classes are higher on average than those of poorer mothers. Birth weights are related to energy intakes of mothers during pregnancy. Maternal energy deficit limits fetal growth (Davidson and Passmore, 1986)

In the present study it is found that birth weight was 12.0 and 13.8% in food refusal and non-refusal group. The statistical analysis shows no association between food refusal and the birth weight. These results are probably because of the socio-demographic status of the children,

In food refusal and non-refusal group the mean birth weight was 3.16 and 3.21kg respectively. Hassan et al (1990) in their study has found that mean birth weight of uncomplicated mother was 2.9kg. Amine and Award (1991) have shown in their study in Kuwait that the mean birth weight was 3.5kg.

Delay in marriage, pregnancy, improved nutritional status, access to health care and educational level of the affluent female help to reduce LBW in urban Dhaka.

6.4.4 Summary

In this study food refusal and non-refusal group children were selected from same socio-demographic class. Relationship of food refusal with some of the socio-demographic determinants like parents education, occupation, income, number of children in the family, birth order and birth weight was discussed in this section. The results showed 98 % mother was literate in refusal group, 85% mother was housewife in both refusal and non-refusal group. Per capita monthly income was <Tk.4000 in 71.4% refusal and 67.8% non- refusal group. In about 90% family number of children was 1-3 in both groups. LBW was 12.0% in refusal and 13.8% in non-refusal group. These socio-demographic determinants showed no significant association between food refusal and non-refusal group.

6.5.1 Parasitic Infestation

Food refusal is a common problem in parasitic infestation. In this study, 133 children from food refusal group and 66 from non-refusal group were investigated. In food refusal group ascariasis was found in 15.9%, ankylostoma duodenalis in 3.8% cases and trichuriasis, Giardiasis and aemebiasis were found in 5.3% cases. History of expulsion was recorded for pinworm within past two weeks, 17.3% cases it was positive in food refusal group. Food refusal was found significantly higher in presence of parasitic infestation ($p < 0.005$). Malnutrition is related to parasitic infestation. In ascariasis, it occupies gut surface area and limits the absorption sites, it takes food from gut and causes food refusal. Major factors contributing to intestinal blood are due to parasites especially hookworm and trichuris trichiura infection. Anorexia and food refusal are very common in anaemia. Giardia and entamoeba histolytica drains nutrient. Giardiasis causes chronic dysentery, this chronic illness is also related to food intake.

Parasitic infestation is related to intake, absorption and nutritional status of the children.

Brown et al.(1980) conducted a study in urban Dhaka and has shown that protein absorption decreased in worm infection and after deworming there was a significant improvement of protein absorption. The total energy absorption improved slightly.

Vitamin A absorption may also be less in presence of ascariasis. It has been shown in the study of Mahalanebish (1976).

Taren and others has been shown in a study conducted in Urban area of Republic of Panama (1992) that the prevalence of parasitic infestations and factors associated with malnutrition in Guaymi Indian children. Their findings have shown significant association among ascariasis, age, food diversity score and vitamin A concentrations.

In hookworm infection, the amount of blood loss is related to feeding and bleeding from intestinal mucosa. This blood loss directly is proportional to number of worms infecting the host. Hookworm infection is likely to be an important cause of anaemia.

A moderate infection approximately doubles the iron losses of a child. The prevalence and intensity of hookworm infection increase with age, so that its effects is greatest on the iron status of school-age children, adolescents, and adults, including pregnant women (Rebecca and Michele, INACG, WHO, UNICEF, 1998).

Stolzfus et al. (1997) has shown, in hookworm prevalent area anaemia in school was reduced by effective treatment. Hookworm is responsible for considerable red cell, protein loss from gutwall (Alleyne, Protein energy malnutrition, 1st ed, 1988).

FA/WHO expert consultation report (1988) has shown the major contributing factors of poor iron nutrition include: diet low in bioavailability of iron, low iron intake and intestinal blood loss due to parasites especially hookworm and trichuris trichura.

In this study about five percent children in food refusal group are infected with trichuris trichiura. Trichuriasis is one of the important causes of anaemia. Trichuris trichura is not found in non-refusal group where anaemia rate was also significantly lower.

Simeon et al. (1995) in their study in 407 Jamican children of 6-12 years of age have shown the effects of treatment. Heavy infection group has shown significant improvement, but not so in lower intensities group. Stunted children suffering from trichuriasis improved significantly with treatment ($P<0.04$), and no difference was observed in the non stunted children. Treatment of this parasites was more likely to benefit school performance in children of poor nutritional status.

In developing countries trichuriasis is a common infestation frequently responsible for chronic diarrhoea. Amoebae is also a common problem in Bangladesh, results chronic diarrhoea. In this study, it was found that 5.3% children of refusal group were affected with amoebae infestation. Loss of weight and anaemia is associated with parasitic infestation.

Pinworm or enterobius vermicularis infection occurs worldwide, mainly in temperate zone. Pinworm infection has no preference for socioeconomic class. Children are more commonly infected than adults.

6.5.2 Food refusal, mother's patience and forcing feeding

This section of the discussion deals with the patience of the mother and their forcing attitude during feeding their children. Laugh, language and love-these three variables (L.L.L) are related to cognitive development of the children. These are called mental food. Mothers' patience is related to her workload, number of children, gap between childbirth, and her nutritional status especially anaemic status and riboflavin status and with other environmental factors. In this study, patience of the mother of the study children was categorized into excellent, good, fair, poor and very poor. Father of the children or elderly family member's opinion regarding mother's patience during feeding their child was recorded. Here excellent and good patience was denoted as satisfactory patience of the mother. In case of fair patience, they were not up to level of satisfaction, so together with poor and very poor patience of the mother was denoted as not satisfactory patience group. Out of 349 respondent in food refusal group, 233(66.8%) children were belongs to not satisfactory group. Out of 65 respondent in non-refusal group, 28(48.1%) belongs to not satisfactory group.

Food refusal was significantly higher in not satisfactory patience of the mother. No such study was conducted other than the present study in Bangladesh. In Bangladesh, Zeitlin in et al., (1990) has shown less educated mothers tended to leave much of the impetus for development up to the nature patterns of the child, but in case of educated mother they observed that mothers were much active in controlling and feeding their children. Regarding child care and feeding, a recent report on assessment, analysis and action to improve care for nutrition (The Care Initiative, Unicef,1997) have come out with some useful information:

- # Active spooning of food are appropriate for a 7 months old but inappropriate for a normal 2 years old child.
- # The amount of food that children consume may depend on the caregiver's active encouragement of eating.
- # Children should be encouraged to ask for more.
- # A relaxed and comfortable atmosphere without conflict will increase intake with gentle encouragement and responsive feeding.
- # Caregivers attitude varies widely, at one extreme the caregiver has all of the control, and children should be forced and in other extreme, control is given entirely to the child. Neither extreme is good for children.
- # Passive feeding may be due to lack of time and energy, or to beliefs that children should not be pressured to eat.

According to Patric L. Engle (1995) caring of child is a complex problem and will require patience. Economic development and urbanization changes rapidly the content and contest of childcare activities.

Roy presented (Dialogue on Diarrhoea, 1988) that feeding is a matter of using good sense, like adults; babies may like a particular food more than another, and may be hungrier on some days than others. No two babies are the same in which foods they like more than others. Some babies prefer sweet things while others prefer salty things. Mealtime should be pleasant and 'force' must not be used in feeding. Learning to swallow semisolid food may be difficult for a baby who only knows how to suck the breast. If a particular food is refused, researcher suggested not offer it again for a few days rather try something different. Patience during feeding is most important.

Werle, Murphy and Hudd (1993) in their study found that giving training to mothers to initiate regular offering of previously rejected foods to provide contingent attention to increase the acceptance of the non preferred foods.

6.5.3 Summary

Food refusal was a common problem in parasitic infestation. In this study stool examination report has shown that food refusal was found significantly higher in presence of parasitic infestation ($p < 0.005$). Ascariasis was topped the list and history of expulsion of pinworm was positive in 17.3% cases. Control of parasitic infestation may however, can improve food refusal status.

Mother's patience during food intake is an important caring practice. Mother's patience was significantly lower in food refusal group than non-refusal group. Forcing during feeding was 73.9 and 32.3% in refusal and non-refusal group. Statistical analysis shows strong association between force feeding and food refusal ($p < 0.0001$). In not satisfactory patience 72.9% mother forcing their child to take food and found that food refusal was significantly higher ($p < 0.0001$). Patience of the mother is most important during feeding their child, avoiding forcing during feeding and counseling can play an important role in the prevention of food refusal.

6.6.1 Food refusal, energy and nutrient intake pattern of the children

This section deals with the energy and nutrient intake pattern of the children. Energy is essential for activity, growth and rest. Requirement of energy also varies in different age, sex, height, weight and state of nutrition of the individual (FAO/WHO/UNO, 1985). UK, WHO EAR (Estimated Average Requirement) has also grouped the children in same pattern. Canada has grouped (1983) the children as 1-2-3, 4-6, 7-9 and 10-12 years of age. Schofield (1990) for the population of Asian country has classified the age group as 1+, 2+, 3+, 4+, 5+, 6+, 7+, 8+, 9+. Japanese RDA has revised in 1984 and grouped the children as 1+, 2+, 3+, 4+, 5+, 6+, 7+, 8+, 9+, 10+, 11+, 12+ and 13+. In this study, UK and WHO recommended age grouping was followed.

Age group 1-3 years :

In this age group, 153 and 20 children's energy intake from food refusal and non-refusal group is studied. The mean energy intake is 708 ($\pm$ 364) kcal/day in food refusal group and 931($\pm$ 400) kcal/day in non-refusal group. National survey of rural Bangladesh (NSRB) in 1975-76 and 1981-81 has shown that the energy intake of this age group was 630 and 659 kcal/d respectively. The RDA of Bangladeshi children of this age group is 1360 Kcal/d. The observed energy intake was less than UK, WHO, USA, Canada, Schofield and Japanese recommended allowance.

The RDA of UK and WHO for the mentioned age group for male and female is 1230 and 1165 kcal/day. According to USA AER for male and female the RDA is 1300 kcal/day. On the other hand, the RDA for Canada (revised, 1983) has shown for the age 1 and 2-3 years in both sexes are 1100 and 1300 kcal per day respectively. Schofield (1990) has suggested for 1y+2y+3y+ of age group are as 1004, 1134 and 1228 kcal/day. Japanese RDA (revised, 1984) for male and female are 970 and 920 kcal/day for the age (year) 1+, 1250 and 1150 kcal/day for 2+ and 1400 and 1350 kcal/day for the age 3+ group.

Age group 4-6 years:

In this age group, 94 children from food refusal group and 17 children from non-refusal group were observed. The mean energy intake in food refusal group was 985 ($\pm$ 409) kcal/day and in non-refusal group the intake was 1202 ($\pm$ 582) kcal/day. National survey of rural Bangladesh (NSRB) in 1975-76 and 1981-81 has shown that the energy intake of this age group was 1172 and 1245 kcal/d respectively. The RDA of Bangladeshi children of this age group is 1820 Kcal/d. This energy intake, both in refusal and non-refusal group was less than the RDA of UK and WHO, 1715 kcal/d for male and 1545 kcal for female. Using Canadian RDA for the age group the needed kcal per day is 1800. According to Schofield (1990) for the age (year) 4+, 5+ and 6+ the recommended energy intake is 1321, 1426 and 1505 kcal per day. While following Japanese RDA for male and female the recommendation is 1550 and 1450 kcal/d for the age (year) 4+, 1600 and 1500 kcal/d for 5+ and 1700 and 1550 kcal/day for 6 years +.

Age group 7-10 years :

In food refusal group 85 children and in non-refusal group 24 children were studied. Their mean energy intake with SD were 1199 (± 529) and 1106 (± 500) kcal per day. In this study, it was found that as the age increases RDA for the children increases too, but their intake was not increasing proportionately. The 1975-76 and 1981-82 NSRB has shown that in 7-9 age category children take 1497 and 1575 kcal/d. The RDA of Bangladeshi children of 7-9 years of age group is 2190 Kcal/d. UK and WHO RDA for male and female for the age group of 7-10 years is 1970 and 1740 kcal/day. USA and Canadian RDA for the age group of 7-10 years of age is higher than RDA of UK and WHO recommendations. Japanese RDA for male and female children 1800 and 1650 kcal/day for the age 7(y) +, 1850 and 1700 kcal/d for the 8(y)+, 1850 and 1800 kcal/d for 9+ and 2000 and 1950 kcal/day for 10 years + age group. According to Schofield for the age (year) 7+,8+,9+ and the RDA is 1552,1555 and 1570 kcal per day.

Age group 11-14 years:

In refusal group 13 and in non-refusal group 5 children were observed. Their mean energy intake was 1433 (± 630) and 1405(± 685) respectively in both groups. The 1975-76 and 1981-82 NSRB have shown that in 11-12 years age category male children take 1989 and 1912 kcal/d. For female children the intake was 1780 and 1745 kcal/d respectively. The RDA of Bangladeshi children of 10-12 years of age is 2600 Kcal/d for male and 2350 Kcal/d for female.

The UK and WHO RDA for 11-14 years is 2220 kcal/d for male and 1845 kcal/d for female. While comparing with USA, Canada, Japanese and Schofield's recommendation it was found that mean energy intake of our studied children for both refusal and non-refusal, 11-14 years of age group had taken less than the recommended allowance. In this study, it was found that energy intake declines with the increase of age, similar findings were also observed by choudhury (1993).

Each and every children from both sex was compared with UN and WHO RDA and found that in food refusal group 88.4% and in non-refusal group 78.8% children were taking energy less than RDA. Energy intake rate was significantly lower in food refusal group and non-refusal group of children.

During 1962-64, National Survey of East Pakistan has shown urban food intake was 13% lower than rural food intake and 1981-82 urban intake was 11% higher than rural food intake (Karim and Hasan, 1989).

FAO report has shown (1991) urban food consumption pattern changes rapidly, particularly with regard to consumption outside home.

FAO/WHO RDA for energy was higher in 1974 than the present recommendation, in 1-3,4-6,7-9 years age group recommendation was 1360,1830,2190 kcal/d respectively in both male and female. In case of adolescent 10-12 years boy and girl the RDA for energy are 2600 and 2350 kcal/d.

Table 6.1 Energy requirements of children in different age group in year 1974, 1985 and 1993

Age group (year)	1974	1985	1993
1-3	1360 (Both sex)	1200(M), 1140(F) (1-2 years)	1230M,1165F
4-6	1830	1400(M), 1310(F) (2+ years)	1715M,1545F
7-10	2190 (7-9 years)	1560(M), 1440(F) (3+ years)	1970M,1740F
10-12	2600 (M) 2350 (F)		2220M,1845F (10-14 years)

Current energy requirement shows declining from 1974 and 1985.

6.6.2 Protein intake

The requirement of a particular nutrient or energy is the amount necessary to ensure normal physiological functions, and to prevent symptoms of deficiency occurring (FAO/WHO/UNU, 1985). In this study, it was found that mean protein intake was normal in both food refusal and non-refusal group.

Age group 1-3 years:

In refusal group protein (mean) intake was 27.1 ± 16.3 gm per day. In 1975-76 and 1981-82 NSRB, children of this age group have taken 18.1 and 16 protein g/d. The RDA of Bangladeshi children of this age group is 25gm/d. WHO and UK RNI (Reference Nutrient Intake) recommended 14.5 gm/day. USA RDA for this age is 16 gm per day. European Population Reference Intake (PRI) recommended 14.7 gm/day. RDA for Canada is slightly higher, for the age 1 and 2-3 years and their protein requirements are 18 and 20 gm per day. According to European Population Reference Intake (PRI) for 1-3 years RDA for protein is 14.7 gm per day. FAO and WHO (1992) report shows, in urban affluent society, people often consume higher protein, fat and refined carbohydrates and lower complex carbohydrate and fibre. In that report, in urban areas animal protein intake increases and energy intakes are almost invariably lower. Animal Protein intake per capita per day in urban Brazil, and Trinidad are 30.7 and 43.3 gm respectively. In another study, it was found that the healthy children of urban (Dhaka) middle class was consuming 51.58 gm protein/capita/day (Alam et al., 1991).

Age group 4-6 years:

Mean protein intake in this study was 35.9 ± 20.6 gm per day. In 1975-76 and 1981-82 NSRB, children of the same age group has taken 33.3 and 31gm protein per day. The RDA of Bangladeshi children of this age group is 31 gm/d. WHO RDA for this age group is 19.7. Comparing other reference value the mean intake of urban affluent class children are higher than recommendation for the age.

Age group 7-10

WHO RDA for protein is 28.3 gm/d for this age group. In our observation, children have taken 41.4 ± 22.0 gm per day in food refusal group. In 7-9 years of age, NSRB in 1975-76 and 1981-82 has shown that the intake was 42 and 40 g/d. The RDA of Bangladeshi children of 7-9 years of age group is 38 gm/d. The intake of protein in this study children is higher than USA RDA, European PRI, Canadian RDA.

The amount of protein taken in this study is less than Japanese RDA for the age. Japanese RDA for male and female children are 60 and 55 gm/day for 7 year + and for 8+,9+ and 10+ of both sexes the recommendation is 65,70 and 75 gm/d respectively.

Age group 11-14 years:

In this thesis work, it was found that children of 11-14 years of age belongs to food refusal group were consuming 42.5 gm per day. In 1975-76 the NSRB has shown that the protein intake was 56.6 and 52.7 g/d in male and female children of 10-12 years of age and in 1981-82 survey the intake was 47.7 and 42.5 gm/d respectively. The RDA of Bangladeshi children of 10-12 years is 46gm/d for male and 45 gm/d for female. The WHO RDA for male and female of 11-14 years of age group is 42.1 and 41.29 gm/day.

The US RDA for male and female of this age are 45.0 and 46.0 gm/d which is higher than the amount taken by our study children. In majority cases, both in food refusal and non-refusal group. Children are taking protein normally, in all age group. Each of the children's intake was compared with their won RDA (WHO Ref. value) and found that 83.8% children in food refusal group was taking protein. Normal protein intake in non-refusal group was 87.9%. This difference is not statistically significant.

In this study, it is seen that like developed country children from urban affluent class are taking their percentage of energy from protein, fat and carbohydrate. In food refusal group, 14.2, 28.3 and 57.5% of the total energy are taken from protein, fat and carbohydrate.

National development changes percentage of protein and fat intake in Malaysia, Rep. Korea and Japan. RAPA report in 1978-81 and 1986-88 shows the change of fat consumption (% of kcal) from 18.5 to 25.6 in Malaysia, 12.1 to 17.17 in Republic of Korea and in Japan in 1986-88 shows 25.6%.

NNS of Philippine (1993) shows in Philippine % of calorie from fat intake was 15.2%, in all urban area it was 18.0% and in Metro Manila it was 21.0%.

Table 6.2 Percentage of energy from protein, fat and carbohydrate intake in this study and it's pattern found in Malaysia, Republic of Korea, Japan and Philippine.

% energy	Study Population		Bangladesh		Malaysia		Republic of Korea		Japan	Phili- pine
	R	N	'79- 81	'86- 88	'79- 81	'86- 88	'79- 81	'86- 88	'86- 88	'93
Protein	14.2	15.3	8.7	8.5	8.9	8.6	11.1	10.9	12.7	12.8
Fat	28.3	27.8	6.6	9.3	18.5	25.6	12.1	17.2	25.6	21.1
Carbo- hydrate	57.5	56.9	84.7	82.2	72.6	65.8	76.8	72.0	61.7	66.2

R= Refusal

N= Non-refusal

Protein (% of kcal) intake was 11.8, 12.3 and 12.8% respectively in Philippine, All Urban of Philippine and in Metro Manila. This figure was for all age group.

In western diet 50% of the calories are derived from carbohydrate, 37 energy (en)% from dietary fat and the rest from protein en% (Present Knowledge in Nutrition, 6th ed, 1990).

In this study, the carbohydrate, protein and fat en% are observed in children may not be the consumption pattern of urban adult. This shifting simulates with the urbanization of the developed countries. Protein, fat and carbohydrate en% intakes in food refusal group are not so different with non-refusal group.

6.6.3 Anaemia, food refusal and iron intake

Nutritional anaemia is a common problem in developing countries. Due to lack of necessary nutrient body cannot make enough haemoglobin and healthy red blood cells (Savage King and Burgess A, 1992). In 6m to 60 months, haemoglobin (Hb) level below 11g/dl and in 6-14 years below 12gm/dl is called anaemia. Anaemia is graded as mild, moderate and severe. Haemoglobin level 10-11g/dl in 6-60months and 10-12g/dl in 6-14 years are called mild anaemia. Hb level 7-10g/dl is called moderate and below 7gm/dl is termed as severe anaemia (ACC/ACN 1991). The reduced Hb level makes paleness in lower conjunctival mucous membrane, buccal mucus membrane, palmer creases and nail beds (Gill D. and Obrien N, 1988). We have diagnosed anaemia by clinical observation and found that in food refusal group 55.2% children are anaemic and 24.2% are anaemic in non-refusal group. The major clinical sign-symptoms of anaemia are paleness, tiredness, loss of appetite and feeling of breathlessness.

Epidemiological criteria can be used to define severe (>40%), moderate (10-39.9%) or mild (<10%) prevalence within populations (WHO, 1996). In area with high anaemia prevalence (75%), it can be assumed that almost all the populations are iron deficient (WHO/UNICEF/UNU, in preparation, 1998).

Nutritional anaemia is the most prevalent nutritional deficiency problem and it is a major public health problem in developing countries. It is estimated that 90% of all anaemic individuals are to be found in developing countries (Subadra, ROSA no5, 1997). In Bangladesh 73% preschool and 40-74% older children are anaemic (National Nutrition Survey of Bangladesh, 1981-82). It is reported that no improvement of anaemia has occurred in last two decades (WHO, 1996). Present study findings are in agreement simulates with this findings. In anaemic children food refusal was significantly higher than non-anaemic children ($P < 0.0001$).

Prevalence of anaemia in preschool children in India, Nepal, Pakistan and Sri Lanka are 68.0, 78, 65-78 and 45% (Malnutrition in South Asia, ROSA, 1997). It shows that prevalence was not much varied in South Asia region. From present finding, it was observed that more than fifty percent children from affluent class are also suffering from anaemia. In non-refusal affluent urban children 24.2% are anaemic. In Latin America and East Asia 26 and 20% children and in developed countries 8-18% children were anaemic (FAO Food and Nutrition Service, 1988).

WHO (Regional Publication, SEARO, 1994) has shown, 18% under five children in 1990 and 15% in 1991 in Thailand were anaemic. The same report shows in 1980, 25 to 35% preschool Indonesian children were anaemic.

The poor bioavailability of iron in cereal based diet appears to be the major factor contributing to development of anaemia in Bangladesh. Cereal and cereal products, legumes and other non-haem iron need vitamin C in enhancing iron absorption. Feeding and eating practice in urban affluent children have shown in this study that the mean intake of protein was normal. While monitoring individually, it was observed that 16.2% children have taken protein less than RDA. Carbohydrate intake in the study children simulates the intake of developed world. In our study, 60.6% children from food refusal group were taking vitamin C less RDA. Parasitic infection may also be the most contributing factor in developing anaemia. The major cause of the nutritional anaemia is related to iron intake.

In this study the mean iron intake is normal in all age categories of food refusal group of children using WHO reference. In 1-3, 4-6, 7-10 and 11-14 years of age groups mean iron intake is 6.0, 12.4, 12.9 and 15.2 mg/d respectively. National nutrition survey in 1975-76 and 1981-82, the iron intake are 7.6 and 8.0 mg/d respectively. In 4-6 and 7-9 years of age group, iron intake are 13.5 and 17.3 mg/d in 1975-76 survey and 16 and 20 mg/d in 1981-82 survey. The RDA of Bangladeshi children of 1-3, 4-6, 7-9 and 10-12 years of age is 10 mg/d respectively. But while monitoring each and every child it was observed that 45.2 and 28.8% children from food refusal and non-refusal group have taken iron less than RDA, using the same reference value.

Peter R. Dallman (1990) reported that decreased energy intake is likely to curtail iron intake to a degree that result in anaemia in some children and young women. Peter's information is consistent with the study where food refusal group has taken energy less than RDA in 88.4% children.

Prevalence of anaemia was studied in Greater Buenos Aires (Calvo and Sosa, 1991) in middle and upper socioeconomic class adults population. Anaemia has observed 34.2% middle and 5.3% upper class subjects.

In the study, 59% middle class and 51.6% upper class children from food refusal group are anaemic. In non-refusal group, 34.6% middle class and 30.6% upper class children are anaemic.

In this study, anaemia is also a problem in affluent class, which is closely related to reluctance to take food. Though they are anaemic, their nutritional status is normal in majority of cases.

Zhao-XH(1992) has conducted his study in Urban Beijing city and found that the nutritional status of the people is good in general, but there is still iron deficiency anaemia in infants and children, supported our observation.

Nutrition Canada Survey (1993) has shown that their iron intake was low.

Iron deficiency is the most common of all deficiency disease in human in both developing and developed countries (Dorice M. Czajka-Narins,1992). They have found that iron requirements are highest during infancy and adolescence. Similar finding was observed in case of adolescent children.

Iron deficiency anaemia not only related to food refusal, but also it is related to physical and mental performance, immunity and learning capacity of the children (FAO Food nutrition series 23,1988).

Rebecca and Michele (1998) reported that anaemia control program in children causes improvement of behavioural and cognitive development, improved child survival, improve fitness and child survival.

Brown et al.(1996) reported that the most frequent deficiencies in young children's diet are iron and vitamin A and additionally some diet is low in zinc and calcium.

6.6.4 Food refusal and calcium deficiency and calcium intake

Calcium is the most abounded mineral in the body, it constitutes 39% of the body minerals (Dorice M. Czai ka-Narians, 1992). More than 99% of the body calcium is present in bone and teeth (Arnaud and Sanchez, 1990) Calcium is primarily stored in the ends of long bones and mobilized according to needs for growth in children. Milk and milk products are the major source of calcium in diet, and other sources are certain leaves, nuts, shellfish and small bony fish. In food refusal group, in this study it was found that milk, butter, ghee and cheese refusal rate were 48.8, 39.3, 51.4 and 62.2% respectively. GLV and other vegetables refusal rate were 58.5 and 62.0% respectively. Bone of small fish is the important source of calcium, 47.4% children refuse fish. Calcium rich food refusal was a common problem in affluent urban children. In 1-3 year's age group, mean calcium intake was 500 ± 397 mg/day. In 1975-76 and 1981-82 NSRB has shown that the intake was 127 and 122 mg/d respectively. In 1-3 years of age group Bangladeshi RDA is 500-600 mg/d. WHO and European Union recommended calcium for 1-3 years is 400 mg/day. USA and Canadian RDA is 500 mg/d. Reference Nutrient Intake (RNI) is 350mg/d for this age group, the Estimated Average Requirement is 275mg/day and Lower Reference Nutrient Intake (LRNI) of calcium for 1-3 years is 200 mg per day. The mentioned disparities in recommended allowance largely reflect the fact that there is no consensus on dietary intake to ensure the requirements of calcium. These wide variation in RDA has shown no nutritional deficiency syndrome of calcium (Food and Nutrition Board, USA/Canada, 1997).

In food refusal group, 4-6, 7-10 and 11-14 years of age categories mean intake of calcium were 380 ± 292 , 392 ± 308 and 463 ± 284 mg/day. The National survey in 1975-76 and 1981-82 the 4-6 year age category children have taken 185 and 184 mg/d in 7-9 years 228 and 233mg/d. In the age category of 10-12 years, 302 mg/d for the male and 251mg/d for the female and in 1981-82 survey 291.5 mg/d and 245.6 mg/d were taken by male and female children respectively. In 4-6 and 7-9 years of age groups it is 450 mg/d and for 10-12 years the Bangladeshi RDA is 650 mg/d respectively.

Table 6.3 Calcium requirements (various RDAs) by age groups in food refusal children.

Age (year)	Food refusal children	WHO	USA (1989)	EAR	RNI	LRNI
1-3	500 ± 397	400	800	275	350	200
4-6	380 ± 292	450	800	350	450	275
7-10	392 ± 308	500	800	425	550	325
11-14	463 ± 284	600-700	1200	750-625	1000-800	450-480

The table shows, considering all RDA for calcium 1-3 year age group children were taking calcium normally. Following LRNI, the mean intake of calcium in our study was normal in all age group. Considering EAR children from 1-6 years were taking normally and from 7-14 years were taking less than recommended allowance. According to RNI and WHO RDA children of 4-14 years of age group were taking

less than the recommendation. In our study, calcium intake falls proportionately with the increase of age. Considering WHO reference value, individual child was monitored, in food refusal group 61.2% child were taking calcium less than RDA.

Calcium intake in Sub-Saharan region, comes from variety of foods and condiments and the overall calcium intake range from 300-400 mg/day and only 7% comes from milk (Prentice et al., 1993; Jorjou et al., 1993).

The National Canada Survey (Moffatt, 1995) has shown that calcium intake was low. The possible deficiency of calcium may be the cause of stunting (Chasilpk et al., 1992).

Zhao-XH (1992) conducted his study in Beijing has shown food availability in quality and quantity is well. The nutritional status of the people of Beijing was good, but calcium intake is inadequate in lot of cases, supported our study findings.

Another similar finding which was observed in National Nutrition Survey of Philippines (1993), has shown calcium intake remained grossly inadequate in diet, maintaining 67.2% adequacy.

6.6.5 Food refusal, vitamin A deficiency and vitamin A intake

Vitamin A deficiency is a common nutritional problem in Bangladesh. The prevalence rate of clinical vitamin A deficiency decreased in all region during the period 1985 to 1995 (WHO, 1996).

In this study, in food refusal group 344 children are clinically observed and night blindness was found in 03(0.87%) and Bitot's spot was in 01(0.29%) cases.

In India XIB is 0.7%(1988-90), 0.50% in Nepal (1996), 0.33% in Sri Lanka (1987), 0.30% in Indonesia(1992) and 0.50% in Philippines(1993) respectively (ACC/SCN, 1997).

According to WHO criteria, presence of Vitamin A deficiency is not a public health problem. The minimum prevalence criteria for classification of xerophthalmia (The 3rd report, ACC/SCN, 1997) is not considering conjunctival xerosis and xerophthalmic fundus for the assessment. In this criteria, 1% night blindness, 0.5% Bittot's spot,

0.5% corneal scar, 01% corneal xerosis or 0'1% keratomalasia are considered as public health problems. No deficiency sign of vitamin A was observed in non-refusal group. According to Olsen JA (1990), the best defined function of Vitamin A is in vision and second major function is cellular differentiation, which is directly or indirectly related to appetite.

Green leafy vegetables and other vegetables refusal rate were the highest among all varieties of food. Force-feeding is a common problem in feeding vegetables. No data is available in food refusal children other than the present data.

In this study, the mean intake of vitamin A is normal in all age groups. In 1-3, 4-6, 7-10 and 11-14 years of age groups in food refusal group mean vitamin A intakes are 869, 853, 1098 and 1393 µg per day respectively. In 1975-76 and 1981-82 NSRB has shown, the 1-3 years age group children have taken 253 and 314 IU per day of vitamin A was taken. In 4-6 year, 503 IU and 780 IU per day children have taken in 1975-76 and 1981-82 national survey. The same survey has shown that 585 IU and 910 IU is the intake in 7-9 years of age. In 1975-76 NSRB the male and female children have taken 850 and 425 IU per day. In 1981-82 for male and female children the intake is 1084.5 and 454.6 IU per day. Bangladeshi RDA for 1-3 years is 250, for 4-6 years 300, for 7-9 years 400 and for 10-12 years 575 µg per day. While monitoring the study children individually, it is found that 77.7% in food refusal group and 80.7% in non-refusal group are taking vitamin A normally, using WHO reference value.

Zeitein et al.(1992) has studied 183 children of 3-27 months of age in rural Bangladesh in January to July 1986 and found that the average intake for children comes close to 100% of RDA.

Nutrition Canada Survey (1993) has shown vitamin A intake is low and clinical vitamin A deficiency is not seen in urban area.

Fourth National Nutrition Survey in Philippines (1993) has shown urban house hold met more than adequate intake of vitamin A.

Ahmed F et al.(1992) revealed that Urban Dhaka school children of 5-12 years of age have normal serum level of vitamin A, 10-12 years of male children have higher serum vitamin A level than those younger boys of 5-9 years of age.

In this study, it is seen that the mean intake of vitamin A is normal in 4-6 years of age and is lower than normal in 7-14 years of age group.

Nandi and Tontisirin (1995) have reported, most sustainable and long term solution of vitamin A deficiency is a food based one that looks at improving the overall diet as well as increasing consumption of vitamin A rich foods.

Protein energy malnutrition is usually associated with micronutrient deficiency mainly due to inadequate dietary intake of vitamin A. The low socioeconomic status was the high risk determinants of vitamin A deficiency (Cohen, 1989).

Taluker (1981) has shown retinol deficiency is almost invariably accompanied by protein energy malnutrition. Harrera et al.(1992) found that children living in poor and unsanitary environments, younger children, and those sick, stunted, wasted on consuming diet low in vitamin A were at a significantly higher risk of dying.

Fuchs GJ and et al.(1994) has shown plasma retinol measurement was significantly associated with stunting ($p<0.001$).

In this study, 12.6% children are stunted. This is quite different from national figure where 54.4% is stunted (BBS, 1997).

In this observation, it is found that malnutrition is not a major problem in affluent class and they are aware of the problem of vitamin A deficiency, majority of them consumes vitamin A normal by and vitamin A deficiency is not a public health problem.

But the prevalence of night blindness at the rate of 0.87% is still higher and needs care for prevention.

6.6.6 Food refusal, riboflavin, thiamin and niacin deficiency and intake pattern

Angular stomatitis, glossitis magenta, tongue rash around nose, fatigue, burning and itching of eyes, weakness in legs, skin rash mental changes, loss of appetite and anorexia are the common presentation in B-Vitamin deficiency. This loss of appetite and anorexia causes food refusal.

In this study, vitamin B₂ deficiency signs angular stomatitis, cheilosis, glossitis, megenta tongue and nasolabial rash are inquired. In food refusal group, 40(11.6%) children are diagnosed clinically as deficient. Majority of the deficient children 22(55%) are from 1-3 years, 8 (20%) and 10 (25%) was from 4-6 and 7-10 years of age groups. Riboflavin deficiency sign was not found in 11-14 years of age category in food refusal group. Riboflavin deficiency sign was absent in non-refusal group. Children having riboflavin deficiency, the food refusal was significantly higher ($P<0.05$). Thiamin and niacin deficiency signs are not commonly present in affluent children. Thiamin deficiency occurs because of inadequate intake, poor absorption and increased metabolic demand. Thiamin deficiency is seen in poor malnourished children. Niacin deficiency sign the peeling rash is not common in Bangladesh. Niacin deficiency disease pellagra occurs commonly in populations who almost depends on maize or sorghum and is still occasionally seen among populations in remote area in Asia or Africa or among refugees (FAO and WHO, 1992). The skin signs to deficiency diseases must believed to be associated with pellagra (Alleyne et al., 1988).

In this study, it was found that food sources rich in B-vitamin refusal was significantly higher in food refusal group.

Table 6.4 Riboflavin intake in food refusal group by different age categories compared with various RDA standards (mg/day)

Age	Food refusal group		WHO RNI	UK RNI	UK LRNI	USA RDA	UK EAR	European PRI
	R	N						
1-3	0.55	0.76	0.80	0.6	0.3	0.80	0.5	0.7
4-6	0.40	0.42	1.1	0.8	0.4	1.1	0.6	1.0
7-10	0.41	0.39	1.3	1.0	0.5	1.3	0.8	1.1
11-14	0.43	0.31	1.7 M	1.2 M	0.8	1.5 M	1.0 M	1.3 M
			1.5 F	1.1 F		1.3 F	0.9 F	1.0 F

R= Refusal;

N= Non-refusal

The mean riboflavin intake in all age categories are less than the standard of WHO RDA, USA RDA, UK RNI and European PRI. In 1-3 year age group children were taking 0.55 mg mean riboflavin which was normal while comparing with UK EAR or UKLRNI as standard. The LRNI RDA for 1-3 and 4-6 has shown that the food refusal group children were taking normally. In 7-14 years of age, according to all standard values children are taking riboflavin less than RDA. In 1975-76 NSRB has shown that in 1-3, 4-6, 7-9 years of age groups riboflavin intake were 0.31, 0.50 and 0.65 mg/d respectively. The children of 10-12 years of age 0.84 and 0.74 mg/d were taken. In 1981-82 NSRB for the same age group, the riboflavin intake was 0.28, 0.46, 0.58 mg/d respectively. The 10-12 years of age 0.71 and 0.58 mg/d was taken. Bangladeshi RDAs at 1-3, 4-6 and 7-9 years of age for riboflavin are 0.4, 1.0 and 1.2 mg/d respectively. In 10-12 years of age group RDA for male and female are 1.4 and 1.3 mg/d. Zhao-XH (1992) studied in Beijing city and found that food availability was well in quality and quantity and the nutritional status was good in general but riboflavin intake was inadequate in lot of cases.

Table 6.5 Thiamin intake in food refusal groups by different age categories compared with various RDA standards (mg/day)

Age (year)	Food refusal group mg/d		WHO RNI mg/d	UK RNI mg/d	UK LRNI mg/d	USA RDA mg/d	UK EAR mg/d
	R	N					
1-3	0.33	0.47	0.50	0.5	0.23mg/ 1000kcal	0.8	0.3mg/ 1000kcal
4-6	0.45	0.52	0.70	0.7	do	1.1	do
7-10	0.47	0.54	0.9	0.7	do	1.2	do
11-14	0.62	0.56	1.2 M 1.0 F	0.9 M 0.7 F	do	1.5 M 1.3 F	do

The mean thiamin intake was less than RDA of WHO, UK RNI and USA standard. While considering UK LRNI the recommendation is based on 0.23 mg thiamin per 1000 kcal energy intake and 0.3 mg/1000kcal using UK EAR as standard. In our study, the intake of thiamin is normal using UK LRNI reference. In 1975-76 NSRB has shown that the thiamin intake were 0.50, 0.93 mg in 1-3 and 4-6 years. In 1981-82 NSRB has shown that the thiamin intake were 0.46, 0.90 mg and 1.34 mg/d in 1-3, 4-6 and 7-9 years of age respectively. In 10-12 years of age male child was 1.56 and 1.37 mg/d for the female. For Bangladeshi RDAs at 1-3, 4-6 and 7-9 years of age for thiamin are 0.7, 0.9 and 1.1 mg/d respectively. In 10-12 years of age group RDA for male and female are 1.3 and 1.2 mg/d. The study children have taken the thiamin less than the Bangladeshi RDA.

Table 6.6 Niacin intake in food refusal group by different age categories compared with various RDA standards (mg/day)

Age (year)	Food refusal group mg/d		WHO RNI mg/d	UK RNI mg/d	UK RNI mg/d	USA RDA mg/d	UK EAR mg/d	Euro PRI mg/d
	R	N						
1-3	6.9	7.9	9.0	8.0	4.4 mg/1000kcal	9.0	5.5 mg/1000kcal	8.0
4-6	7.4	8.2	12.1	11.0	do	12.0	do	11.0
7-10	8.7	9.4	14.5	12.0	do	13.0	do	12.0
11-14	9.4	13.2	19.1 M 16.4 F	15 M 12 F	do	17 M 15 F	do	18 M 14 F

Euro = European

R= Refusal; N= Non-refusal

Bangladeshi RDAs at 1-3, 4-6 and 7-9 years of age for niacin are 9.0, 12.1 and 14.5 mg/d respectively. In 10-12 years of age group RDA for male and female are 17.2 and 15.5 mg/d respectively. In all age group, niacin intake was low comparing with various standard RDA for niacin. In 1981-82 survey 4.0, 8.86 and 11.15 mg per day were taken in 1-3, 4-6 and 7-10 years of age group. Zive et al. (1993) in their study in Mexican American preschool children and found that niacin intake was likely to be inadequate. In this study, when each of the children's riboflavin intake was assessed and compared with WHO, UK RNI and UK LRNI reference and found that 88.7, 80.0 and 55.1% children were taking less than RDA.

Using WHO and UK RNI as reference, 89.3 and 85.2% children of food refusal group were taking niacin less than RDA. Bangladesh NNS (1975- 76 and 1981-82) and NNS of Philippines show (1993) that riboflavin intake declines from the past finding.

6.6.7 Food refusal, vitamin C deficiency and vitamin C intake

In food refusal group, 23.5 and 16.9% children are refusing citrus and other fruits. Among all foods, fruits refusal is lower. In this study, 1-3 years age category children from food refusal group have taken 18mg vitamin C per day, but in 4-14 years of age group, the mean vitamin C intake was normal according to WHO reference value. In 1975-76 survey 1-3, 4-6 and 7-9 years of age vitamin C intake was 2.53, 6.15 and 6.87 mg/d. The male and female children in 1975-76 have taken 10.56 and 5.79mg per day in 10-12 years of age category. In 1981-82 survey 1-3, 4-6 and 7-9 years of age vitamin C intake was 2.53, 6.15 and 6.87 mg/d. This intake was 15.43 mg/d for male and 10.9mg/d for female respectively in the same age. Bangladeshi RDA for the children from 1-12 years is 20 mg/d. When all children of food refusal group was observed separately, it was found that 60.6% of them was taking vitamin C less than RDA.

Clinical sign of vitamin C was observed. The spongy gum, petichial haemorrhage, ecchymosis, painful limbs, fresh wound fail to heal these signs were looked for. Only spongy gum was detected in 05 children, of them 03 from 1-3 years age group and 02 children was from 4-6 years category. Depending only on spongy gum finding it is difficult to conclude vitamin C deficiency problem.

According to FAO/WHO (A global assessment, 1992) vitamin C deficiency survey may occur among refugees, person's dependent upon food rations and others who lack access to fresh fruits or vegetables.

Zive et al. (1993) has conducted their study among Mexican-American preschool children and found that vitamin C intake was inadequate.

NNS Philippines (1993) has shown 28.3, 23.9 and 31.0% of the consumed vitamin C was derived from other vegetables, GLV and fruits. This survey report shows that ascorbic acid, iron, calcium and energy intake decreases significantly in 1993 from 1987 intake level.

Table 6.7 Vitamin C intake in food refusal group by different age categories compared with various RDA standards (mg/day)

Age (year)	Refusal group of study population mg/d		WHO RDA mg/d	UK RNI mg/d	UK EAR mg/d	UK LRNI mg/d	European PRI mg/d	USA RDA mg/d
1-3	18	29	20	30	20	08	25	40
4-6	46	34	20	30	20	08	25	45
7-10	27	43	20	30	20	08	30	45
11-14	39	43	30	35	22	09	35	50

Vitamin C intake in food refusal group was lower than non-refusal group. Using WHO, UK EAR, UK LRNI reference values children are taking vitamin C normally. Considering USA RDA as standard except 4-6 years food refusal group, children from all age group were taking vitamin C normally. Fruits are the major source of vitamin C. Regular dietary fruits eating habit is poor even in affluent middle and upper socioeconomic class.

6.6.8 Summary

In this study it was observed that in all age categories mean energy intake was lower than RDA in food refusal and also in non-refusal group. All possible attempts were done to know the exact intake pattern of the children. The most possible cause may be the illness of the study children, which temporarily affects the intake of food without affecting the nutritional status. The low intake of energy may also due to under reporting by the mothers. In refusal group the mean protein intake was normal and iron intake was also normal. Culturally protein foods are prestigious and in affluent class its availability is common. Palatability may be a factor in taking protein food

adequately. In affluent urban Dhaka parents are aware about the protein energy malnutrition situation of Bangladesh and their continuous emphasis in providing protein food may be the result of these level of intake. Iron intake was normal probably it is related to protein food intake. Vitamin A deficiency was a major problem in Bangladesh, lot of emphasis was given in this regard and urban well-off families are aware about the sources of vitamin A. Mean vitamin A intake was normal, which may be due to the results of this awareness. Calcium intake was normal in 1-3 years of age group. Culturally more emphases are given to young children to take milk and milk products but as age increases emphases proportionately reduced in this regard. Milk and milk products are the major source of calcium. In this study low calcium intake was observed in 4-14 years of age category children. This may be due to lack of awareness of the problem. Availability of milk and milk products may also be the cause of this low calcium intake. Nuts, beans and legumes intake rates are poor in Bangladesh it was reflected in riboflavin, thiamin and niacin intake pattern in this study which are significantly lower than RDA.

6.6.9 Nutritional status

In this study it was found that food refusal and non-refusal group 12.6 and 10.4 of children were stunted (H/A z- score) and 10.6 and 9.0% were wasted (W/H z- score) and 16.9 and 12.0% were under weight (W/A z-score) respectively (Table 4.6, Figure 4.6.1, 4.6.2 and 4.6.3). Water Low classification shows malnutrition was mostly mild in nature. Only 4.1% were wasted, 4.7% children were stunted and 0.6% were wasted and stunted. Zareen et al (1997) studied 385 children of 10-16 years of age from high school of Dhaka City was studied and shows, 14.8% children were undernourished (W/A), 2.6% were short (H/A<90%) and 31% were thin W/H<90%) and about 10% were overweight (W/H>120%).

Bangladesh national nutrition survey, 1995-96(1998) shows, in 6-71 months age group urban children, 30.3% were stunted, 9.7% were wasted and 4.6% children were stunted and wasted. In 6-9 years of age group, 62% urban children were physically retarded. The same report shows majority of the adolescents were also physically

retarded. In 1996-97, stunting rate was 39.4%, 1995-96 stunting was 42.9% and in 1992 it was 52.8% (BBS, 1997).

In 1995 the prevalence of stunting was 53.5% in South Asia, 39.4% in Sub-Saharan Africa and in South America it was 12.9%. In 1995 national prevalence of stunting in Near East affluent countries like Iran, Libya, Kuwait and Qatar were 18.9%, 15.1%, 12.2% and 8.10% respectively. In affluent class majority of the children were normal probably because of mother's awareness.

6.7.1 Effects of counseling on food intake and nutritional status among food refusal children.

For follow up all the children (65) of food refusal group from Mohammadpur organization were selected primarily. These children need regular follow-up for six months for the study. Mothers were asked to render their co-operation during follow-up of the children. Out of them 50 mothers were agreed to attend regularly for follow-up of their children for providing necessary information. Out of these 50 children 43 were attended for pre-counseling.

In pre-counseling round, anthropometric assessment was done and the past 24 hours food intake was recorded. Afterwards counseling was stated and effects were observed after one month, it is called 1st round of counseling. In a same way 2nd round was observed after one month and at the interval of three months final round was observed. In 1st round of follow-up 45 were attended of which 39 were from 43 group. In 2nd round of counseling 37 children were attended of which 29 belong to 39 group. In final round out of 44 children were attended of which 26 children belong to 29 group. In all round of observation 26 children were present.

While counseling of children following points were considered:

1. Balance diet, correct nutrient deficiencies as per individual deficiency.
2. Meal frequency and
3. Force-feeding.

6.7.2 Counseling and balanced diet

A diet that meets all the nutritional requirements is called a balanced diet. For normal growth and development of the children, quantity and quality of the diet should be adequate and balanced. Food refusal problem is a barrier for the successful feeding. During our observation of food items refusal, we have gathered some important information regarding this issue, these are:

- a. Within each basic group, food refusal varies.
- b. Not all food items of a basic food group was refused.
- c. Liking and disliking is closely related to food refusal.
- d. Scope of giving preference to alternative food is available.

The most recent report has shown (The care initiative, 1997), the person who is doing feeding may influence the child's willingness to eat.

In this study we have seen, micronutrient malnutrition is common in affluent class with or without protein energy malnutrition. Among all micronutrient problems, iron and vitamin B (s) deficiency problems are deleterious problems. During follow-up observation, scope of counseling regarding belief and or food taboo of the mothers or caregivers were present. Nutrition education plays a strong role in developing awareness in solving iron, vitamin A, riboflavin, vitamin C and calcium deficiency problems. Rich food sources of iron, vitamin A, vitamin C, riboflavin and calcium in the form of leaflet plays strong role in selection of right items to combat selective micronutrient deficiency problem. For counseling of mother and to build their awareness growth chart, of Bangladesh National Nutrition Council (BNNC) was used as an educational tool. Majority of the children from food refusal group was refusing vegetables and fruits. Hand out on vegetables and fruits were given to parents to know its importance and role in prevention of micronutrient malnutrition.

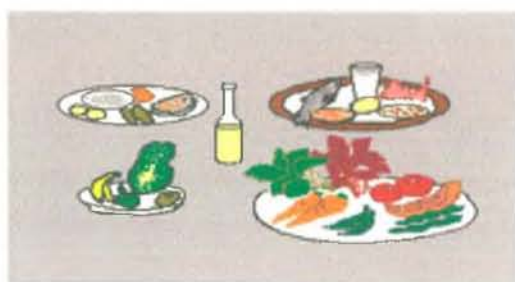
Nutritional anaemia affects 55% children in food refusal group. Leaflet was provided on nutritional anaemia reflection on causes of nutritional anaemia, iron sources, and public health problems due to anaemia, sign symptoms of anaemia and how it can be prevented. In order to improve intake of green leafy vegetable and colored fruits

leaflet was provided on vitamin A deficiency problem. Mean vitamin C intake was less than RDA in 1-3 years of age group and 60.6% children were taking vitamin C less than RDA. So, leaflet on vitamin C was provided to mother to build the awareness, reducing its cooking loss and now to increase its intake.

Riboflavin and other B-vitamin deficiency are a major problem. Only 11.3% children were taking riboflavin normally. Advocacy on riboflavin intake was conducted in each session to let them know about the sources of riboflavin. The animal source food intake was encouraged according to the liking of the children, ground nut, pulses intake were encouraged because refusal was less in the mentioned items, intake of other vegetable food item was also encouraged.

During awareness creating session, mothers were encouraged to give preference to the liking and disliking of the child. In selecting food items from a food group this part of the growth chart was used to motivate in selecting alternate food items in order to prevent food refusal.

Figure 5.1 Balanced diet



Meal frequency is the most important tool for the improvement of food intake and correction of food refusal. Meal frequency are of 4 (four) types:

- i) Too short interval: Meal frequency more than 06 (six) per day is termed as too short interval.
- ii) Irregular interval: If not maintaining any feeding time is called irregular interval.
- iii) Too long interval: If meal frequency is 03 or less per day, is called too long interval.
- iv) Normal: 5-6 meal per day for children with a regular interval is called normal meal frequency.

In pre counseling out of 43 children, too short interval was present in 19 children and meal was irregular in 19 children and others were normal. In 1st, 2nd and final round of counseling the number of children in too short interval group were 04, 04 and 03 respectively.

In order to improve energy and nutrient intake the following chart was used for feeding the children:

Figure 5.2 Time schedule in planning diet



In the morning, midday and at dinner children should take their food from family pot, like their parents. In between breakfast and lunch one extra meal should be given at/around 10-11 a.m and in the afternoon (in between lunch and dinner) another extra meal should be provided. If intake of food in quantity and quality was poor due to food refusal, another extra meal was suggested 2-3 hrs after dinner (where dinner was suggested at 8 PM.)

Due to small stomach size of the children, frequent feeding is essential. If frequency increases, between meal snacks are recommended. Non breast fed child need food more often and greater amounts with special attention to the protein, micro-nutrient and energy qualities of the diet (Brown, et al., 1996).

During feeding the children of 1-3 years, following points were suggested to mother/caregiver for proper feeding the children, through which food refusal can be improved:

1. All family food should be given to the children.
2. For 1-2 year age group, breast feeding and family food plays equivalent role in feeding the children.
3. Food should be soft and mashed with spoon or finger.
4. Food should not be blend or blended food should not be fed, using bottle.

2. For 1-2 year age group, breast feeding and family food plays equivalent role in feeding the children.
3. Food should be soft and mashed with spoon or finger.
4. Food should not be blend or blended food should not be fed, using bottle.
Food should be from family pot, and food prepared for the adult should be given to the children gradually.
6. Use of safe water for drinking, food preparation and washing plate, glass and utensil etc.

6.7.3 Feeding during illness

- Mothers were encouraged to give two extra meal during illness and up to two weeks after illness.
- Normal diet should not be restricted during illness.
- During diarrhoea body can absorb 60% and drain 40%, so insisted to give extra two meals to compensate.
- During ARI or fever anorexia is a problem, preference to liking the alternate food was suggested.

6.7.4 Mothers attitude during feeding their child

Mother patience was not satisfactory during feeding their child in majority cases. Force-feeding was common in three cases out of four. Among not satisfactory patience group 72.9% mothers were forcing their child to take food.

In order to reduce forcing during feeding following points were frequently hammering to change the attitude of the mother in each counseling session:

- Force – is dangerous.
- Counseling – is helpful.
- Patience – is the most important for successful feeding.
- Laugh, language, love (L.L.L) and play are called mental food.
- Two children are not always same.

Patience and understanding plus recognizing the child's need will increase the chance of successful feeding. If a child has anorexia or poor appetite, extra encouragement may be necessary for adequate nutrient intake (The care initiative, Unicef, 1997). The

same report shows, caregiver is the child's first teacher, children learn from games, play and guided imitation. Caregiver who allow children to play and who interact with them frequently can stimulate their cognitive, language, social and motor development.

Experience has taught that even when there is adequate food in the house and a family lives in a safe and healthful environment and has access to health services, children can still become malnourished (UNICEF, The state of world children, 1998).

6.7.5 Effects of counseling, energy and nutrient intake and nutritional status.

In this observation it is found that energy intake and the intake of majority of the nutrients was improved in counseling rounds. Among all, iron intake was improved significantly from 12.4mg/day in pre counseling to 15.7mg/day in final round of counseling. While observing the children in 1-3, 4-6 and 7+ years category, the number of child were 19,16 and 14 respectively. Energy intake was improved in 1-3 and 7+ years of age category, but not so improved in 4-6 years of age category. The improvement of energy intake was more marked in male child than female child. Energy intake was also improved more in upper class. Though their energy and nutrient intake was less than RDA but the positive change of nutritional status was satisfactory. Similar finding was observed in Mahmood's thesis (M.Phil, PSM, 1998) where adult population was studied.

Using H/A Z-score, the effects of counseling were more marked in 1-6 years of age group than 7+ group which is consistent with the normal rate of development. Male and female were both improved but progress was more in case of male child and also upper class than middle class.

In our observation, intake of energy is more in male child, which relates the change of nutritional status. The reasons are same for the improvement of the upper class category.

Using W/H 2-score, progress was observed in all age categories, sex and class. Improvement was more in female than male child, more in upper class than middle class and more in 7 years + category.

While measuring W/A 2-score, it was found that one child was underweight in counseling rounds. Others were normal, and their improvement was statistically significant from pre counseling to final round observation. In male child and also in middle class the improvement of status was significant.

6.7.6 Force feeding, energy intake and nutritional status:

In pre counseling mothers were forcing their children and energy intake was 1120 kcal/day and mean intake improved to 1380 kcal/day in final round.

The form of force changes but force remains in the following rounds of follow up. In pre counseling two wasted children was found and in final round all children were normal.

Recent report has shown (Unicef, 1997, The care initiative) that first three years of life of the children are the most important period for growth and development. Caregiver's affection, attention and involvement and encouragement of autonomy, exploration and learning are correlated with better nutritional status. Caring practice also differs very much according to the age of the child, or the child's development period. Care that is appropriate at one age may not be appropriate at another age. Healthy children are happy, bright and active as well as free from diseases.

6.7.7 Summary:

Counseling improves energy and protein intake significantly but also improves other nutrient intake. Each and every child was monitored and counseling was done for mothers and focus was given regarding the intake and result was observed. Vitamin A deficiency was a common public health problem and in affluent family its intake was normal in majority of cases. The mean vitamin A, vitamin C, iron, and calcium intakes were normal in all rounds of counseling. Counseling was done specially on refusal problem and major focus was given regarding liking of alternative food from same group but not nutrient specific. Minor efforts were given regarding other

micronutrient intake and it was observed that intake of B-vitamins were not so improved. Pre-counseling in 1st and 2nd rounds was at the interval of one month and final round was observed at the interval of 03 month. Energy intake was significantly higher in final round of observation (pair t-test, <0.05), though it was less than 2nd round of counseling, it could be due to the 03 months gap of observation. Force-feeding was a common behaviour of the affluent mother of urban Dhaka. Counseling failed to bring significant changes in the form of forcing but it also improves the nutrient intake and nutritional status.

Chapter: 7 Conclusion and Recommendation

Conclusion

1. The majority of the study children was found to take energy and nutrients less than RDA (WHO Ref.) and their nutritional status was found normal (Z-Score) in majority cases.
2. Refusal of food item varies within the food group.
3. Refusal to take food was markedly higher in children suffering from anaemia, riboflavin deficiency and parasitic infestation.
4. Forcing during feeding aggravates food refusal.
5. Counseling played a positive role to improve the qualitative and quantitative intake of food.

Recommendations:

1. RDA for energy and nutrient may be revised for different populations.
2. Alternative food item within food group may be advocated to ensure balanced diet.
3. Nutrition-education program on food intake is to be introduced among mothers; adolescent girls, paediatrician, obstetrician and general physician may also incorporate in school education.
4. Anaemia, riboflavin deficiency and parasitic infestation need early identification and correction accordingly when there is food refusal.
5. Force-feeding is to be avoided by mothers and they may be advised not to lose patience during feeding their child.
6. Counseling on food intake is to be practiced by the physician as apart of treatment.
7. Counseling of mothers on food intake is to be practiced routinely by the concerned physician.
8. Counseling regarding food intake should be nutrient specific.

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LIST OF FOOD ITEMS

1. Cereals and Cereal Products

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
1	Bakharkhani	1 PC/22.5g	123.95	1.57	8.4	10.52	3.27	0.36	0	2.85	0.01366	0.00498	0.3415	0
2	Barley power (jaab)	1 TSP/4g	15.6	0.52	0.2	2.92	4.88	0.16	0	0.00	0.0112	0.007	0.0192	0
3	Birani	1 CUP/80g	157.74	7.82	11.26	6.26	4.88	1.13	200	0.00	0.0419	0.03638	4.8073	0
4	Bread	1 SLICE/23g	56.35	1.79	0.16	11.94	2.53	0.25	0	0.00	0.01288	0	0.161	0
5	Bread Roll	1 PC/60g	147	4.68	0.42	31.14	6.6	0.66	0	0.00	0.0336	0	0.42	0
6	Butter Boan Ruti	1 PC/102g	295.75	7.41	7.67	49.31	10.45	1.05	87.5	0.00	0.0532	0	0.665	0
7	Cerealuc rice	1TSP/5gm	20.95	0.78	0.45	3.46	23.5	0.38	15.46	0.00	0.04	0.015	0.2	1.75
8	Cerealuc Wheat	1TSP/5gm	20.65	0.78	0.46	3.35	25	0.38	15.46	0.00	0.04	0.015	0.2	1.75
9	Chira (Flated Rice)	1 CUP/40g	138.4	2.64	0.48	30.92	8	8	0	0.00	0.0672	0.01	1.6	0
10	Flated rice (chira) Fried	1 CUP/20g	107.98	0.86	7.16	10.05	2.6	2.6	0	0.00	0.02184	0.00325	0.52	0
11	Fuljuri, fried	1 CUP/30g	62.17	2.05	2.95	6.85	22.64	0.33	97.06	30.93	0.01747	0.0282	0.1872	0.14
12	Jarda	1 CUP/100g	237.12	1.75	4.96	46.27	7.95	0.88	190.4	1.10	0.01482	0.01113	0.5352	1.64
13	Jarda	1 TBSP/20g	47.4	0.35	0.99	9.25	1.59	0.18	38.08	0.22	0.00297	0.00223	0.107	0.33

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
14	Jau	1 CUP/100g	51.9	0.96	0.06	11.85	1.35	0.6	0	0.00	0.01575	0.00375	0.57	0
15	Khoi	1 CUP/12g	29.25	0.68	0.01	6.62	2.07	0.59	0	0.00	0.01512	0.00045	0.369	0
16	Luchi	1 PC/40g	156.08	2.66	8.22	17.85	5.56	0.6	0	4.83	0.02319	0.00846	0.5798	0
17	Moa	1 PC/17g	58.15	0.92	0.02	13.58	6.76	1.36	0	0.68	0.02096	0.0016	0.517	0
18	Muri	1 CUP/6g	19.5	0.45	0.01	4.42	1.38	0.4	0	0.00	0.01008	0.0003	0.246	0
19	Nan roti	1 PC/60g	165.68	4.4	2.86	30.55	9.32	1	0	8.00	0.0384	0.014	0.96	0
20	Panta bhat	1 CUP/120g	84.22	1.56	0.1	19.23	2.19	0.97	0	0.00	0.02556	0.00609	0.9249	0
21	Parota	1 PC/58g	247.2	4.4	12.36	29.56	9.2	1	300	8.00	0.0384	0.014	0.96	0
22	Polao	1 CUP/80g	145.3	1.09	10.08	12.51	1.6	0.5	200	0.00	0.00768	0.0048	0.304	0
23	Rice	1 CUP/80g	81	1.5	0.09	18.49	2.11	0.94	0	0.00	0.02458	0.00586	0.8896	0
24	Rice bhazi	1 CUP/80g	92.97	1.48	1.59	18.14	2.98	0.92	0	0.22	0.03938	0.00577	0.8698	0.11
25	Ruti (medium size)	1 PC/ 45g	102.3	3.63	0.51	20.82	14.4	3.45	0	6.96	0.1176	0.0435	1.29	0
26	Ruti (small size)	1 PC/31g	68.2	2.42	0.34	13.88	9.6	2.3	0	4.64	0.0784	0.029	0.86	0

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
27	Sago (Shabu)	1TSP/4g	14.04	0	0	3.48	0.4	0.05	0	0.00	0.00032	0	0	0
28	Semolina (suzi),rice	1 TSP/5g	17.28	0.34	0.3	3.91	0.5	0.16	0	0.00	0.0024	0.0015	0.095	0
29	Semolina(suzi), wheat	1TSP/5g	17.4	0.52	0.04	3.74	0.8	0.08	0	0.00	0.0048	0.00075	0.08	0
30	Suji without milk	1 CUP/140g	285.12	1.87	10.91	44.83	6.66	0.29	215.4	0.00	0.01723	0.0027	0.2872	0
31	Suzi without milk	1 TBSP/28g	57	0.37	2.18	8.97	1.33	0.06	43	0.00	0.00345	0.00054	0.0574	0
32	Vermicelli without milk	1TBSP/22g	54.95	0.52	1.1	10.72	2.05	0.12	27	0.00	0.00917	0.00151	0.1085	0

2. Roots and Tubers

33	Beet, Cooked	1 CUP / 80g	88.68	1.65	5.08	9.07	12.36	0.82	0	0.00	0.01978	0.02473	0.2473	6.18
34	Carrot , Bhazi	1 CUP/75g	88.84	0.92	5.15	9.77	20.77	1.69	0	1163.03	0.02462	0.01923	0.4384	5.77
35	Kachu, Cooked	1CUP / 100g	157.45	2.91	5.78	23.65	29.08	1.65	0	18.62	0.12408	0.05332	0.3102	2.91
36	Kachumukhi, Cooked	1 CUP / 100g	308.23	1.78	5	32.06	21.77	0	0	0.00	0.03166	0	0	0
37	Olekopi, Bhazi	1 CUP / 60g	66.96	0.54	5.05	4.88	13.39	0.21	0	6.86	0.00429	0.00804	0.2143	14.2
38	Onion	1PC / 6g	3	0.07	0.01	0.67	2.82	0.04	0	0.67	0.0048	0.0006	0.024	0.66

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
39	Onion, fried	1 TSP / 4g	18.15	0.03	1.9	0.23	0.99	0.01	0	0.23	0.00134	0.00011	0.0084	0
40	Potato Bhazi (small size)	1 CUP / 85g	127.56	1.36	5.85	19.23	8.51	0.6	0	16.34	0.06809	0.00426	1.0213	7.23
41	Potato, fried	1 TSP / 14g	33.11	0.25	2.16	3.52	1.56	0.11	0	2.99	0.01246	0.00078	0.187	1.32
42	Potato, Cooked	1 CUP / 100g	20.04	0.18	1.11	2.57	1.14	0.08	0	2.18	0.00911	0.00057	0.1367	0.97
43	Potato, Mashed	1 CUP / 90g	97.37	1.31	2.82	18.49	8.18	0.57	0	15.71	0.06546	0.00409	0.9818	6.95
44	Radish, Cooked	1 CUP / 90g	71.44	1.23	5.09	5.1	9.44	0.47	0	2.26	0.32487	0.00945	0.4722	16.05
45	Sweet Potato, Boiled	1 CUP / 80g	107.87	1.08	0.27	25.35	41.35	0.72	0	4.31	0.05753	0.01798	0.6292	10.79
46	Sweet Potato, Cooked	1 CUP / 80g	165	1.2	5.3	28.2	46	0.8	0	4.80	0.064	0.02	0.7	12
47	Turnip, Cooked	1 CUP / 80g	62.31	1.15	5	3.13	19.78	0.33	0	0.00	0.01978	0.00824	0	6.18
48	Yam Elephant (Olkachu)	1 CUP / 90g	113.52	1.04	5.09	15.96	43.37	0.52	0	180.40	0.04163	0.03036	0.6071	0

3. Sugars, Sweets and Beverages

49	Amlitee	1PC/45 g	178.07	5.46	5.21	27.35	23.66	2.27	0	19.73	0.09192	0.0304	0.5664	0.08
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Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
50	Balusai	1 PC/45 g	249.39	1.67	15.29	26.26	5.3	0.38	303.03	3.03	0.01454	0.0053	0.3636	0
51	Bundia	1 TBSP/20 G	86.52	2.5	2.67	13.14	7.44	1.09	0	12.38	0.04608	0.0108	0.288	0.06
52	Chamcham (big)	1 PC/ 60 g	283.77	2.91	3.13	60.93	38.75	0.04	54.9	0.30	0.00984	0.002	0.036	0.23
53	Chamcham (medium)	1 PC/50 g	236.48	2.43	2.61	50.77	32.29	0.03	45.75	0.25	0.00816	0.00165	0.03	0.19
54	Chocolate, Hard	1 PC / 5 g	19.64	0	0	5	0	0.02	0	0.00	0.0178	0	0	0
55	Chocolate Soft	1 PC / 5.8g	23.82	0.21	0.62	4.56	8.7	0.08	0	0.00	0.0021	0.0103	0.0207	0
56	Coffee	1 CUP/100 g	69.5	2.58	2.67	8.77	98.27	0.06	140	0.00	0.0248	0.07465	0.0346	0.45
57	Date juice (khejur rosh)	1Glass /240	93.6	0.24	0.48	21.84	24	2.64	0	11.52	0	0.096	0	0
58	Glucose	1TSP/ 5g	20	0	0	5	0	0	0	0.00	0	0	0	0
59	Honey	1 TSP / 5g	15.95	0.02	0	3.98	0.25	0.05	0	0.00	0	0.002	0.01	0.2
60	Horlicks	1TSP/5g	19.2	0.55	1.75	3.75	21.25	0	23.15	0.00	0.0425	0.053	0.565	0
61	Jam	1 TSP/10g	27.5	0	0	7	2	0.1	0	0.00	0	0	0.005	0
62	Jelly	1TSP/ 9g	25	0	0	6.5	1	0.05	0	0.00	0	0.005	0	0.5

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
63	Jilapi	1PC /18g	70.49	1.93	1.23	12.92	5.02	0.63	0	6.45	0.02592	0.0072	0.324	0.02

Sugars, Sweets and Beverages

64	Kacha golla	1TSP/20g	58.32	2.93	3.33	4.17	33.76	0	58.56	0.00	0.00896	0.0016	0	0.24
65	Kalojam Sweet	1PC medium/ 50g	212.23	2.2	3.77	42.34	26.37	0.08	69.8	0.66	0.0088	0.00217	0.0799	0.15
66	Laddu	1PC / 45g	226.7	2.08	10.56	30.83	8.6	0.91	200	10.32	0.0384	0.009	0.24	0.05
67	Laddu (Coconut)	1PC / 20g	116.95	1.1	9.36	7.07	24.15	0.41	0	0.00	0.0096	0.00075	0.45	0.53
68	Lalmohon Sweet	1PC medium / 50g	205.5	7.78	11.8	17.13	173.5	0.2	265.5	4.80	0.054	0.0975	0.1	1.38
69	Lemon Shorbot	1CUP / 120g	42.15	0.02	0.04	10.44	3.2	0.12	0	0.56	0	0.0015	0.004	2.35
70	Milk Chocolate Bar	1PC/ 30g	155.36	2.14	9.64	17.14	53.57	0.43	35.66	0.00	0.0214	0.1071	0.1071	0
71	Mimi Chocolate	1PC / 40g	164.29	1.43	4.29	4.29	31.43	0.57	0	0.00	0.0143	0.0714	0.1428	0
72	Molasses	1TSP / 5g	19.15	0.02	0.01	4.75	4	0.57	0	0.68	0.001	0.002	0.025	0
73	Molasses / Date	1TSP/5g	17.65	0.08	0.02	4.31	18.15	0	0	0.00	0	0	0	0

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
74	Monda	1PC / 60g	287.17	3.66	4.16	32.85	21.67	0	244	0.04	0.01066	0	0	1
75	Multova	1TSP/5g	20	0	0	0	0	0	56.31	0.00	0.1	0.1085	1.33	4.15
76	Mylo	1TSP/ 5g	21	0.67	0.5	3.47	28.75	0.75	23.45	0.00	0.1	0.095	1.065	3.1
77	Ovaltine	1TSP/5g	19.68	0.5	0.16	4.07	9	0.9	0.06	0.00	0.095	0.105	1.19	0
78	Rosagolla (big)	1Pc/60g	216.9	4.7	5.02	38.21	54.8	0.06	87.84	0.29	0.01624	0.0031	0.0576	0.36

Sugars, Sweets and Beverages

79	Rosagolla (medium)	1 Pc/50g	180.75	3.92	4.18	31.84	45.67	0.05	73.2	0.24	0.0135	0.0026	0.048	0.3
80	Sandesh	1 PC/ 60 g	276.17	3.66	4.16	32.85	21.67	0	244	0.04	0.01066	0	0	1
81	Soft Drinks	1 Bottle /250	362.5	0	0	90.63	0	0	0	0.00	0	0	0	0
82	Soft Drinks	1 CUP/ 120 g	174	0	0	43.5	0	0	0	0.00	0	0	0	0
83	Soft Drinks	1 Glass/240 g	348	0	0	87	0	0	0	0.00	0	0	0	0
84	Squash	1 TBSP/ 8 g	1.55	0.89	0.44	0.36	2.18	0.03	7.7	0.00	0.0035	0.0031	0.04	0.44

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
85	Sugar	1TSP/ 5 g	19.9	0	0	4.97	0.6	0	0	0.00	0	0	0	0
86	Sugar Candy (Misri)	1 TSP/ 5 g	18.33	0.07	0.03	4.67	18.15	0	0	0.00	0	0	0	0
87	Sugar Cane Juice	1 Glass/240 g	84	0.48	0	20.64	86.4	2.64	0	0.00	0	0	0	0
88	Tea	1 CUP/ 100 g	44.7	1.29	1.34	6.87	48.1	0.03	70	0.00	0.0124	0.0415	0.04	0.1
89	Tea (without milk)	1 CUP/ 100 g	19.9	0	0	4.97	0.6	0	0	0.00	0	0.0075	0	0

4. Fishes , Meat, Egg and Poultry

90	Brain (Mogoj)	30 g	62.5	5.2	4.3	0	8	1.8	0	0.00	0.092	0.065	0	0
91	Chicken (big)	1 PC/40 g	70.46	11.4	2.76	0	11	0.66	357.28	0.00	0.02816	0.0308	2.728	0
92	Chicken (small)	1 PC/ 30 g	53.91	8.53	2.2	0	8.24	0.49	267.47	0.00	0.02108	0.02306	2.0423	0
93	Chicken Korma	1 PC/40 g	73.28	8.41	4.35	0.12	13.96	0.49	343.92	0.00	0.02208	0.0256	1.988	0.02
94	Chicken Ran	1PC / 40g	70.46	11.4	2.76	0	11	0.66	357.28	0.00	0.02816	0.0308	2.728	0
95	Chicken Roast	1PC / 100g	189	29.6	7.3	0	11	0.66	375.28	0.00	0.64	0.9	2.728	0

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
96	Chop, Mutton	1PC / 50g	89.53	1.74	4.77	10.84	8.99	0.61	79.32	44.88	0.04472	0.0176	0.5676	3.53
97	Dried fish (Sutki) cooked	1PC / 30g	135.46	2.41	3.61	0	36.04	0.97	0	0.00	0.03862	0.04827	2.3813	0
98	Egg (Local Hen) Bhazi	1PC/ 35g	103.57	4.15	9	1.48	24.27	0.72	360	145.50	0.03253	0.06067	0.0533	0.73
99	Egg (Local Hen) Poch	1 PC/33 g	78.9	3.99	6.99	0	18	0.63	360	144.00	0.024	0.06	0	0
100	Egg (Local Hen) Boiled	1 PC/30 g	51.9	3.99	3.99	0	18	0.63	360	144.00	0.024	0.06	0	0
101	Egg (Local Hen) Curry	1 PC/30.5 g	56.4	3.99	4.49	0	18	0.63	360	144.00	0.024	0.06	0	0
102	Egg Hilsha fish, Cooked	1 PC/15 g	37.08	3.35	2.63	0	4.3	0.14	178.9	0.00	0	0	0	0
103	Egg Pungas, Cooked	1PC/30g	60.15	7.77	3.23	0	14.79	0	0	0.00	0	0	0	0
104	Egg White, Duck	1 PC/33 g	15	3	0	0	4	0	0	0.00	0	0.045	0	0

Fishes , Meat, Egg and Poultry

105	Egg White, (Hen) Farm	1 PC/33 g	15	3	0	0	4	0	0	0.00	0	0.045	0	0
106	Egg White, (Hen) Local	1 PC/19 g	8.64	1.73	0	0	2.3	0	0	0.00	0	0.026	0	0

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
107	Egg Yolk, Duck	1 PC/10 g	65	3	6	0	26	0.9	94	0.00	0.032	0.035	0	0
108	Egg Yolk, (Hen) Farm	1 PC/17 g	65	3	6	0	26	0.9	94	0.00	0.032	0.035	0	0
109	Egg Yolk, (Hen) Local	1 PC/11 g	42.06	1.94	3.88	0	16.82	0.58	60.82	0.00	0.02064	0.0225	0	0
110	Egg duck vhaaji	1 PC/57.5 g	164.67	6.91	14.36	1.88	41.27	1.59	600	217.50	0.05653	0.06567	0.1533	0.73
111	Egg duck boiled	1PC/50 g	90.5	6.75	6.85	0.4	35	1.5	600	216.00	0.048	0.065	0.1	0
112	Egg duck curry	1 PC/50.5 g	95	6.75	7.35	0.4	35	1.5	600	216.00	0.048	0.065	0.1	0
113	Egg duck poch	1 PC/55g	135.5	6.75	11.85	0.4	35	1.5	600	216.00	0.048	0.065	0.1	0
114	Egg (Hen: farm) bhazi	1 PC/57.5 g	160.67	6.81	14.16	1.48	36.27	1.14	600	241.50	0.04853	0.10067	0.0533	0.73
115	Egg (Hen: farm) boiled	1 PC/50 g	86.5	6.65	6.65	0	30	1.05	600	240.00	0.04	0.1	0	0
116	Egg (Hen: farm) curry	1 PC/50.5 g	91	6.65	7.15	0	30	1.05	600	240.00	0.04	0.1	0	0
117	Egg, Koel	1 PC/7.5 g	13.7	0.98	1.08	0	4.44	0.16	88.8	35.52	0.00592	0.0148	0	0
118	Egg (Hen: farm) poch	1Pc / 55g	131.5	6.65	11.65	0	30	1.05	600	240.00	0.04	0.1	0	0

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
119	Gila, Hen	1 PC/30 g	54.23	5.6	3.32	0	3.95	0.3	0	0.00	0	0	0	0
120	Gut Fried	1 CUP/60 g	83.35	9.14	4.64	0.44	8.3	0.51	0	0.45	0.0032	0.0004	0.016	0.44

Fishes , Meat, Egg and Poultry

121	Kabab, Large	1 PC/34 g	99.38	4.97	4.96	8.72	9.4	1.48	4.22	13.56	0.03248	0.0014	0.6456	0.07
122	Kima (Beef)	1 TBSP/10 g	22.45	3.27	1.03	0	0.51	0	0.35	0.00	0.00616	0.0128	0.3846	0
123	Liver Beef, Vhaji	1 PC/5 g	11.72	1.7	0.28	0	0.6	0.57	536.47	0.00	0.0224	0.287	0.0123	0.4
124	Liver Mutton, Vhaji	1 PC/5 g	9.22	1.72	0.26	0	1.46	1.08	536.47	0.00	0.0344	0.2827	0.5516	0.43
125	Liver, Hen	1 PC/20g	30	5	1	0	3	1.7	983	0.00	0.024	0.175	0.9	1.5
126	Meat / fish (high fat)	1 PC/30g	64.07	4.71	4.79	0.54	46.71	0.43	0	0.00	0.0076	0.0068	1.1644	1.89
127	Meat/ fish (low fat)	1PC/30g	41.74	4.6	2.24	0.59	74.36	0.49	53.49	0.00	0.00664	0.0089	0.7185	0.87
128	Meat/ fish (medium feat)	1 Pc/30 g	44.77	3.74	2.88	0.95	40.4	0.26	12.34	0.00	0.01056	0.00755	0.4296	0.27
129	Pigeon Meal	1Pc / 10g	21.33	2.1	1.44	0	1.08	0.16	0	0.00	0.0072	0.01035	1.62	0

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
130	Prawn (Big)	1Pc / 20g	43.41	1.08	3.69	1.49	40.68	0.07	58.99	1.62	0.01356	0.03221	0.0339	0.34
131	Prawn (Medium)	1Pc / 8g	17.46	0.43	1.49	0.6	16.27	0.03	23.59	0.65	0.00542	0.01288	0.0136	0.14
132	Prawn (Small)	1Pc / 3g	5.2	0.16	0.41	0.22	6.1	0.01	8.84	0.24	0.00203	0.00483	0.0051	0.05
133	Pya juice	1Cup / 110g	127.44	10.77	9.14	0.52	5.32	1.63	0	0.52	0.072	0.0582	0.2358	0
134	Small fish	1Pc / 30g	35.71	2.68	2.6	0.38	81.6	0.14	0	0.00	0	0	0.0718	0.11
135	Tikia	1Pc / 23g	69.25	3.31	3.64	5.81	6.27	0.99	2.81	9.04	0.02163	0.00094	0.4302	0.05

5. Pulses, Legumes, Nuts and Seeds

136	Bean seed , Cooked	1 TBSP/ 11 g	16.37	0.77	0.64	1.87	1.87	0.08	0	0.00	0.01294	0.00249	0.056	0
137	Chola Bhuna	1TBSP / 13 g	32.02	1.18	1.13	4.27	14.26	0.7	0	10.45	0.01702	0.00518	0.2021	0.15
138	Chola Bhaza	1TBSP/ 6.5 g	23.99	1.46	0.34	3.78	3.77	0.62	0	5.88	0.0104	0	0.0845	0
139	Chola Conc.	1CUP / 115 g	117.12	5.14	4.18	14.78	13.84	2.25	0	25.50	0.09489	0.02224	0.593	0.12
140	Chola Dilute	1CUP / 100 g	62.4	2.08	3.36	5.98	5.6	0.91	0	10.32	0.0384	0.009	0.24	0.05

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
141	Chola Medium Conc.	1CUP / 105 g	111.21	4.81	4.09	13.83	12.95	2.1	0	23.86	0.08878	0.02081	0.5549	0.12
142	Coconut Dry	1PC/ 30 g	133.2	1.35	12.48	3.9	3	0.51	0	0.00	0.015	0.03	0.24	0.3
143	Ground Nut, Vhaza (50g)	35g (edible)	199.5	9.17	13.93	9.35	26.95	1.09	0	0.00	0.1365	0.0455	7.735	0
144	Jack Fruit Seed	1PC/ 2.5g	3.46	0.17	0.01	0.67	1.3	0.04	0	0.21	0.0052	0.00143	0	0.14
145	Lentil Conc.	1CUP / 110g	125.8	7.36	3.01	17.3	20.24	1.41	0	63.35	0.10559	0.02933	0.7626	0
146	Lentil Dilute	1CUP / 100g	59.5	2.51	2.87	5.9	6.9	0.48	0	21.60	0.036	0.01	0.26	0
147	Lentil medium conc	1 CUP/105 g	100.66	5.52	2.95	12.98	15.18	1.06	0	47.52	0.0792	0.022	0.572	0
148	Mashkalai Conc.	1CUP / 125g	118.68	6.47	3.18	16.06	41.49	2.45	0	8.19	0.09052	0.04984	0.5388	0
149	Mashkalai Dilute	1CUP / 100g	59.9	2.4	2.94	5.96	15.4	0.91	0	3.04	0.0336	0.0185	0.2	0
150	Mashkalai Medium Conc.	1CUP / 115g	111.71	5.98	3.15	14.86	38.39	2.27	0	7.58	0.08377	0.04612	0.4986	0

Pulses, Legumes, Nuts and Seeds

151	Mug (Green gram) Conc.	1CUP / 125g	119.68	6.65	3.13	16.26	20.36	2.31	0	10.64	0.15638	0.02037	0.6516	0
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Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
152	Mug (Green gram) Dilute,	1CUP / 100g	60	2.45	2.92	5.99	7.5	0.85	0	3.92	0.0576	0.0075	0.24	0
153	Mug (Green gram) Medium Conc.	1CUP / 115g	111.19	6.05	3.1	14.8	18.53	2.1	0	9.69	0.14233	0.01854	0.593	0
154	Peas Green, Cooked	1CUP / 75g	125.05	4.66	5.19	14.94	16.39	0.95	0	0.00	0.00504	0.03782	0	1.58
155	Peas Dal	1CUP Medium/100g	92.93	4.24	3.04	12.15	16.13	1.1	0	6.70	0.0808	0.0204	0.731	0
156	Soyabean Seed, Cooked	1PC / 0.15g	0.65	0.06	0.03	0.03	0.36	0.02	0	0.51	0.00088	0.0003	0.0048	0

6. Green Leafy Vegetable

157	Bathua Leaves Vhazi	1 CUP/85g	65	2.47	5.27	1.93	99.99	2.8	0	927.92	0.00534	0.04666	0.2666	11.67
158	Bottle Ground Leaves, vhazi	1 CUP/65g	81	2.12	5.65	5.63	73.85	2.12	0	5314.10	0.0517	0.06924	0.5539	4.15
159	Data Leaves, vhazi	1 CUP/90g	59.84	1.21	5.13	2.23	53.97	17.2	0	3237.00	0.14032	0.06072	0.4048	2.63
160	Drum Stick, vhazi	1 CUP/ 90g	153.62	7.91	7.01	14.76	519.46	8.26	0	6403.58	0.05667	0.02952	0.9445	129.87
161	GLV	1 CUP / 100g	87.18	3.23	5.22	6.81	179.2	12.67	0	9120.46	0.0767	0.10932	0.4839	3.16

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
162	Indian Spinach (Pui Shak)	1 CUP / 105g	87.86	3.49	5.32	6.67	260.32	15.87	0	9447.61	0.0254	0.28572	0.5714	5.08
163	Jute Plant Tops, Vhazi	1 CUP / 60g	114.48	2.91	5.11	14.12	126.64	0.9	0	6679.46	0.08966	0.05043	0.3362	0

Green Leafy Vegetable

164	Kalmi Shak, Vhazi	1 CUP / 90g	80.23	1.38	5.08	7.2	81.94	2.99	0	1284.30	0.08577	0.15316	0.3293	1.61
165	Mustard Leaves, Vhazi	1 CUP / 70g	88.33	5.1	5.76	4.08	197.55	20.77	0	2673.39	0.03059	0	0	21.03
166	Radish Leaves, Vhazi	1 CUP / 90g	76.38	2.22	6.18	3.01	36.62	4.71	0	5539.42	0.04185	0.05885	0	9.68
167	Red Leaves, Vhazi	1 CUP / 100g	107.84	7.75	5.15	7.31	546.6	37.27	0	13960.25	0.11692	0.095	0.7308	3.14
168	Spinach (Palong), Cooked	1 CUP / 90g	79	3.74	5.11	4.53	111.06	12.35	0	5059.05	0.0272	0.051	0.4987	5.5
169	Sweet Potato Leaves, Cooked	1 CUP / 85g	85.65	2.71	5.52	6.26	232.27	6.45	0	387.12	0.03613	0.07743	1.0968	8.71
170	Sweet Pumpkin Leaves, Vhazi	1 CUP / 90g	79.36	1.9	5.18	6.33	36.17	0	0	1403.47	0.08682	0.10852	0	2.76
171	Taro Leaves, Cooked	1 CUP / 120g	106.49	5.43	6.6	6.47	367.36	30.91	0	7666.56	0.03834	0.17969	1.5173	25.16

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
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7. Other Vegetable

172	Bean, Cooked	1 CUP / 80g	70.91	2.66	5.07	3.68	19.09	1.71	0	1385.62	0.02728	0.00341	0	0.68
173	Bitter Gourd, Vhazi	1 CUP / 65g	73.47	2.54	5.1	4.37	14.24	1.83	0	1179.61	0.03254	0.01017	0.4983	34.57
174	Black Kachu Data	1 TBSP / 15g	11.52	0.04	1.04	0.5	8.4	0.07	0	11.65	0.00784	0.0049	0.014	0.21
175	Bottle Gourd, Cooked	1 CUP / 100g	89.29	0.74	5.07	10.13	17.45	0.47	0	0.00	0.00537	0.00671	0.1141	1.34
176	Brinjal, Fried	1 PC / 22g	29.66	0.5	2.81	0.61	7.78	0.25	0	188.84	0.02666	0.01111	0.2277	0.69

Other Vegetables

177	Brinjal, Cooked	1 CUP / 90g	66.38	0.92	6.48	1.12	14.25	0.46	0	346.12	0.04886	0.02036	0.4174	1.27
178	Cabbage, Vhazi	1 CUP / 75g	75.85	1.54	5.24	5.58	36.78	0.95	0	1138.94	0.05694	0.02966	0.4152	1.78
179	Cowlfiflower, Cooked	1 CUP / 60g	65.14	1.28	5.05	3.68	20.14	0.74	0	11.78	0.01061	0.00737	0.3438	22.35
180	Cowpae, Cooked	1 CUP / 65g	80.3	2.12	5.14	6.35	23.29	4.16	0	318.50	0.07906	0.01059	0.5718	0
181	Data Stem, Cooked	1 CUP / 85g	60.2	0.72	5.08	2.8	208	1.44	0	163.20	0.0064	0.072	0	4

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
182	Drum Stick, Cooked	1 CUP / 60g	74.03	1.55	5.05	5.52	10.16	2.56	0	290.34	0.01549	0.00484	0.0823	10.89
183	Gourd Ash (Chal Kumra), Cooked	1 CUP / 85g	51.67	0.27	5.07	1.27	20	0.53	0	0.00	0.032	0.00334	0.2667	0.33
184	Indian Spinach Stem (Pui Data)	1 CUP / 70g	41.07	1.34	3.13	1.94	50.92	5.96	0	1409.68	0.02144	0.05025	0.2412	3.35
185	Jack Fruits Green, Cooked	1 CUP / 65g	69.68	1.26	5.15	4.55	14.52	0.82	0	0.00	0.01936	0.00968	0.0968	3.39
186	Kachur Lati, Cooked	1 CUP / 70g	55.49	0.17	5.17	2.1	34.95	0.29	0	48.46	0.03262	0.02039	0.0583	0.87
187	Kakrol, Vhazi	1 CUP / 60g	118.34	1.93	5.28	15.95	33	0	0	300.68	0.05867	0.0275	0	0
188	Ladies Finger, Cooked	1 CUP / 80g	72.8	1.16	5.06	5.63	75.01	0.97	0	863.86	0.02069	0.05173	0.0323	3.23
189	Mango, Green (Medium)	1 PC / 110g	48.4	0.77	0.11	11.11	11	5.94	0	79.20	0.044	0.011	0.22	3.3
190	Mango, Cooked	1 CUP/ 80g	79.37	0.55	5.08	7.89	7.81	4.22	0	56.25	0.025	0.00391	0.1562	1.17

Other Vegetable

191	Marrow (Dhundal) Cooked	1 CUP / 110g	61.77	0.66	5.15	4.3	13.85	0.44	0	0.00	0.0175	0.00365	0	1.82
192	Other Vegetable	1 CUP / 72g	71.94	1.26	5.25	4.94	30.7	1.07	0	833.57	0.05347	0.01799	0.2436	4.26
193	Papaya Green, Vhazi	1 CUP / 80g	64.84	0.5	5.44	3.53	7.17	0.5	0	246.94	0.17638	0.00551	0.0386	1.65
194	Plaintain Mocha, Vhazi	1 CUP / 70g	71.37	1.32	5.54	3.95	24.76	1.24	0	16.71	0.03095	0.00774	0.3095	6.19

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
195	Plaintain, Cooked	1 CUP/85g	107.06	1.94	5.3	12.94	8.22	0.45	0	29.91	0.05383	0.02243	0.2243	1.5
196	Plaintain, Mocha	1 TBSP/17.5g	29.58	0.35	2.65	1.06	6.67	0.33	0	4.50	0.00834	0.00209	0.0833	1.67
197	Potoi, Cooked	1 CUP/80g	73.01	2.17	5.54	3.7	18.07	1.54	0	571.07	0.21686	0.01356	0.4518	0.9
198	Potoi, Mashed	1 TBSP/15g	13.03	0.31	1.08	0.53	2.6	0.22	0	82.16	0.0312	0.00195	0.065	0.13
199	Red Bean, Cooked	1 CUP/80g	77	2.25	5.29	5.09	39.27	1.09	0	263.58	0.03491	0.00728	0.4364	4.36
200	Small Bitter Gourd Vhazi	1 CUP/65g	105	2.1	6	10.6	23	2	0	100.80	0.056	0.03	0.4	48
201	SnakeGourd (Chichinga) (Cooked)	1 CUP/70g	56.94	0.33	5.2	2.19	17.25	0.2	0	50.94	0.02122	0.0199	0.199	0
202	Snake Gourd,Vhazi	CUP/110g	60.71	0.94	5.31	2.25	8.38	0.26	0	280.65	0.04608	0.00786	0.0838	0.79
203	SweetPumpkin,Cooked	1 Cup/100g	68.95	1.12	5.4	3.59	38.32	0.56	0	4598.21	0.0447	0.02395	0.3992	10.38
204	Tomato (115) Green, Cooked	1CUP/100g	75.26	2.5	5.13	4.47	26.32	2.37	0	202.10	0.09211	0.01316	0.5263	40.79
205	Tomato ,Cooked	1 CUP/100g	73.75	2.38	5.13	4.5	25	2.25	0	192.00	0.07	0.00625	0.5	19.38

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
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8. Mixed Vegetables (MV)

206	Peas, Potato, Cauliflower	1 CUP	105.91	2.43	5.36	12.62	15.01	0.76	0	9.38	0.02791	0.01648	0.455	10.39
207	Bean, Potato, Cauliflower		87.87	1.77	5.32	8.87	15.91	1.04	0	471.25	0.03532	0.00501	0.455	10.09
208	Cabbage, Tomato, Potato, Peas		100.55	2.49	5.35	11.06	21.67	1.19	0	336.82	0.05002	0.0195	0.4841	7.49
209	Potato, Brinjal, Bottle Gourd, Tomato		89.24	1.35	5.63	8.75	16.3	0.94	0	138.62	0.04808	0.0094	0.5132	7.31
210	Plantain, Ladiesfinger, Potato		102.47	1.49	5.4	12.6	30.58	0.67	0	303.37	0.04754	0.02614	0.426	3.99
211	Potato, Brinjal, Sweet Pumpkin, Bottle Gourd leaves, Bottle Gourd		86.64	1.25	5.69	7.94	30.48	0.84	0	1690.74	0.04374	0.0249	0.5012	4.88
212	Bean, Brinjal, Sweet Pumpkin, Bottle Gourd		73.88	1.36	5.5	4.63	22.28	0.81	0	1582.49	0.03155	0.01361	0.2327	3.42
213	Potato, Kachu, Sweet Pumpkin		117.99	1.8	5.68	15.49	25.3	0.93	0	1544.38	0.07896	0.02718	0.5769	6.84
214	Indian Spinach, Radish, Papaya green, Potato		87.93	1.64	5.43	8.63	71.36	4.36	0	4114.00	0.14869	0.07623	0.5259	7.51
215	Brinjal, Potato, Potol		88.98	1.48	5.96	8.02	13.61	0.86	0	311.18	0.11127	0.01273	0.6302	3.14

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
216	Potato, Data, Sweet Pumpkin leaves		89.04	1.33	5.37	9.46	84.23	0.68	0	2953.61	0.05377	0.06159	0.3404	4.66
217	Sweet Pumpkin, Red leaves, Cowpea		91.53	2.9	5.42	8.04	126.96	8.82	0	3892.87	0.10513	0.02947	0.635	4.33
218	Cowpea, Sweet Pumpkin, Green Papaya, Potato		85.41	1.27	5.46	8.18	19.32	1.45	0	1295.00	0.09206	0.01108	0.5077	4.82
219	Cowpea, Potoi, Sweet Pumpkin		74.09	1.8	5.36	4.55	26.56	2.09	0	1829.26	0.11354	0.01603	0.4742	3.76

Mixed Vegetables (MV)

220	Cowpea, Sweet Pumpkin, Green Papaya, Potato	1 CUP	82.93	1.45	5.47	7.28	19.07	1.47	0	1150.22	0.11702	0.01157	0.4965	4.03
221	Cauliflower, Bean, Green Tomato, Potato, Red leaf		89.04	3.08	5.25	7.68	123.87	8.52	0	3113.20	0.05858	0.02326	0.5192	10.56
222	Potato, Cowpea, Sweet Pumpkin, Bean		86.93	1.81	5.36	8.22	22.3	1.77	0	1579.67	0.05478	0.01055	0.4981	4.57
223	Bean, Potato, Green Peas, Cauliflower		97.16	2.49	5.29	10.38	16.03	1.01	0	353.44	0.02775	0.01321	0.3413	7.96
224	Brinjal, Cabbage, Bean, Potato		85.17	1.62	5.66	7.4	19.66	0.94	0	721.76	0.0503	0.01442	0.4635	2.74
225	Potato, Bean, Carrot, Cauliflower		88.11	1.56	5.28	9.09	17.13	1.2	0	1971.83	0.03265	0.00857	0.4509	9.01
226	Plantain, Green Papaya, Potato, Brinjal		91.46	1.18	5.77	9.2	9.54	0.5	0	159.82	0.08679	0.01314	0.4254	2.91

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
227	Kachu, Potato, Brinjal, Sweet Pumpkin, Green Papaya		97.04	1.36	5.79	10.23	19.47	0.75	0	1045.24	0.09242	0.02148	0.4373	4.69
228	Potato, Potoi, Bori		121.41	3.69	5.63	14.72	28.22	1.71	0	165.78	0.1264	0.02555	0.7658	0
229	Potoi, Green Papaya, Potato, Sweet Pumpkin		83.59	1.29	5.56	7.51	18.02	0.8	0	1358.14	0.12651	0.01182	0.4777	5.04
230	Potoi, Sweet Pumpkin, Potato, Plaintain		94.14	1.65	5.52	9.87	18.28	0.78	0	1303.88	0.09587	0.01605	0.5241	5
231	Potato, Sweet Pumpkin, Ladiesfinger, Potoi		85.58	1.45	5.46	8.04	34.98	0.92	0	1512.37	0.08758	0.02337	0.4762	5.44
232	Bean, Potato, Brijal, Sweet Pumpkin, Plaintain		88.17	1.6	5.62	8.11	17.68	0.77	0	1275.24	0.04855	0.01488	0.4124	4.21
233	Jackfruit Seed, Potato, Brinjal, Sweet Pumpkin, GourdrIDGE		85.9	1.5	5.4	8.14	17.37	0.47	0	988.02	0.0569	0.01429	0.3105	4.37
234	Potato, Potoi, Radish, Green Papaya, GourdrIDGE		79.51	1.24	5.45	6.76	10.31	0.67	0	223.46	0.16646	0.00813	0.4135	5.33

Mixed Vegetable (MV)

235	Potoi, Plaintain, Gourdash	1 Cup	77.25	1.46	5.3	5.97	15.43	0.84	0	200.33	0.1009	0.01311	0.3143	0.91
236	Potoi, Potato, Snakegourd		85.84	1.29	5.53	8.38	14.61	0.78	0	212.78	0.10206	0.01257	0.5574	2.71
237	Cucumber, Potato, Kachu, Green Papaya		102.87	1.49	5.54	12.27	13.84	0.97	0	70.47	0.11633	0.01766	0.3746	3.42

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
238	Bottle Gourd, Sweet Pumpkin, Ladies finger		79.32	1.1	5.19	6.89	49.34	0.74	0	1959.76	0.02577	0.03138	0.191	5.39
239	Potato, Potoi, Green Papaya, Gourdrige		81.53	1.24	5.54	7.18	10.53	0.72	0	278.75	0.12686	0.0078	0.3989	2.64
240	Bottle Gourd, Potoi, Green Papaya, Gourdrige		64.84	1.11	5.34	3.09	14.11	0.87	0	254.13	0.13294	0.00842	0.2082	1.29
241	Potato, Potoi, Cowpea, Plaintain, Snakegourd, Choladal		130.85	4.07	6.08	15.31	19.97	2.36	0	178.11	0.12397	0.02369	0.7288	1.67
242	Carrot, Potato, BeanSeed Cowpea, Kakrol, Green Papaya		109.14	2.69	5.36	12.89	19.2	1.33	0	1226.01	0.09377	0.01618	0.4574	2.44
243	Carrot, Potato, Beanseed Bean, Cowpea, Sweet Pumpkin		159.77	7.07	5.45	20.88	32.09	2.08	0	2133.06	0.13594	0.02857	0.8175	4.01
244	Potato, Plaintain, Kakrol, Cucumber, Sweet Pumpkin, Cowpea		86.93	1.37	5.36	8.55	20.15	1.16	0	913.45	0.08727	0.01323	0.3599	3.53
245	Potoi, Kakrol, Plaintain, Sweet Pumpkin, Kachu, Papaya		99.33	1.99	5.38	10.76	23.52	0.92	0	1171.74	0.0823	0.02288	0.1621	2.89
246	Cauliflower, Cabbage, Shalgom, Radish, Spinach		69.76	1.57	5.16	4.26	34.06	2.56	0	1513.19	0.10263	0.01854	0.2947	8.92
247	Potato, Cauliflower, Cabbage, Green Tomato		85.57	1.64	5.32	8.25	22.61	1.13	0	339.77	0.05141	0.01189	0.5701	12.68

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbo-hydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
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9. Fruit and Fruit Juices.

248	Ambada (Amra)	1PC/61g	40.26	0.67	0.06	9.15	33.55	2.38	0	390.40	0.1708	0.0244	0.122	56.12
249	Amia	1PC/3.5g	3.36	0.03	0	2.42	1.19	0.04	0	0.00	0.0007	0.0028	0.006	16.21
250	Amsotta	1 PC/10g	34.01	0.11	0.02	8.34	7.2	1.5	0	9.66	0.00504	0.0021	0.0615	0.18
251	Apple Big Size	1/130g	98.8	0.52	0.39	23.53	26	1.3	0	0.00	0.156	0.039	0	5.2
252	Apple Medium Size	1/40g	30.4	0.16	0.12	7.24	8	0.4	0	0.00	0.048	0.012	0	1.6
253	Banana-Chapa	1/37g	40.33	0.26	0.3	9.25	4.81	0.33	0	31.67	0.037	0.0185	0.1332	8.88
254	Banana-others	1/70g	76.3	0.49	0.56	17.5	9.1	0.63	0	59.92	0.07	0.035	0.252	16.8
255	Banana Big Size-Sagor	1/100g	109	0.7	0.8	25	13	0.9	0	85.60	0.1	0.05	0.36	24
256	Banana-Big Size-Shobri	1/70g	76.3	0.49	0.56	17.5	9.1	0.63	0	59.92	0.07	0.035	0.252	16.8
257	Banana Medium Size- Sagor	1/80g	87.2	0.56	0.64	20	10.4	0.72	0	68.48	0.08	0.04	0.288	19.2
258	Banana Medium Size-Shobri	1/50g	54.5	0.35	0.4	12.5	6.5	0.45	0	42.80	0.05	0.025	0.18	12

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
259	Banana Small Size-Sagor	1/65g	70.85	0.46	0.52	16.25	8.45	0.59	0	55.64	0.065	0.0325	0.234	15.6
260	Banana Small Size-Shobri	1/25g	27.25	0.18	0.02	6.25	3.25	0.23	0	21.40	0.025	0.0125	0.09	6
261	Bilimbi	1/60g	30	0.3	0.6	5.7	6.6	0.72	0	0.00	0.072	0.024	0	36.6
262	Black Grapes	10 PC/40g	38.8	0.2	0.04	9.44	8.8	0.2	0	0.00	0.04	0.024	0.12	11.6

Fruit and Fruit Juices.

263	Black Berry	10/52.5g	5.78	0.53	0.42	0.74	11.55	2.26	0	50.40	0.04725	0.0126	0	31.5
264	Boroi (small size)	10 PC small size /50g	52	1.45	0.05	11.9	5.5	0	0	9.60	0.01	0.025	0.3	25.5
265	Boroi (big size)	10 PC big size/80g	83.2	2.32	0.05	19.04	8.8	0	0	15.36	0.016	0.04	0.48	40.8
266	Coconut Milk (Dab water)	1 CUP/120g	27.6	2.76	0.6	2.88	18	0.12	0	0.00	0.132	0.024	0.12	6
267	Coconut Milk (Narikeler dudh)	1 CUP/120g	516	5.16	48	14.28	6	1.92	0	0.00	0.096	0.048	0	3.6
268	Custard Apple	1/30g	27	0.54	0.03	6.18	5.1	0.45	0	0.00	0.021	0.042	0.177	14.4
269	Dalim	1 PC/80g	59.2	1.28	0	13.52	16.8	0.24	0	0.00	0.016	0	0	20.8

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
270	Date Dry (Khurma)	1PC/3g	9.72	0.07	0.02	2.33	1.89	0.22	0	0.00	0.0024	0.0006	0	0
271	Dates	1PC/70g	10.08	0.08	0.03	2.37	1.54	0	0	0.00	0	0	0	0
272	Grapes	10/17g	16.49	0.09	0.02	4.01	3.74	0.09	0	0.00	0.017	0.0102	0.051	4.93
273	Grapes (Small size)	60PC/100g	97	0.5	0.1	23.6	22	0.5	0	0.00	0.1	0.06	0.3	29
274	Grapes, Big Size	10PC/45g	43.65	0.23	0.05	10.62	9.9	0.23	0	0.00	0.045	0.027	0.135	13.05
275	Guava (Kazi), Large	1 PC/500g	255	4.5	1.5	56	50	7	0	400.00	0.15	0.15	2	1060
276	Guava (Kazi), Medium	1PC/300g	153	2.7	0.9	33.6	30	4.2	0	240.00	0.09	0.09	1.2	636
277	Guava (Kazi), Small	1PC/200g	102	1.8	0.6	22.4	20	2.8	0	160.00	0.06	0.06	0.8	424

Fruit and Fruit Juices.

278	Guava (Local)	1PC/40g	20.4	0.36	0.12	4.48	4	0.56	0	32.00	0.012	0.012	0.16	84.8
279	Jackfruit Ripe	1PC/27g	12.96	0.49	0.03	2.67	7.02	0.14	0	1015.20	0.0297	0.0405	0.0324	5.67
280	Kashor	1PC/35g	26.25	0.56	0.04	5.95	3.85	0	0	0.00	0	0	0	0

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
281	Khira	1PC/18g	3.96	0.29	0.02	0.63	2.52	0.27	0	0.00	0.0288	0.0036	0.0306	0.9
282	Kismish	10PC/2.4g	9.44	0.05	0.01	2.3	2.14	0.05	0	0.00	0.00778	0.00292	0.0292	1.41
283	Kodobebe Ripe	1/45g	22.05	1.58	0.05	3.87	26.55	0.27	0	0.00	0.36	0.0135	0	5.85
284	Lemon	1PC/2.5g	1.18	0.01	0.02	0.25	1	0.06	0	0.28	0	0.00075	0.002	1.18
285	Lichis	1/13.5g	8.24	0.15	0.03	1.84	1.35	0.09	0	0.00	0.0027	0.0081	0.054	4.2
286	Loquat(Lotcon)	1PC/3g	4.3	0.06	0.03	0.96	3	0.13	0	4.47	0	0	0	0
287	Mango Juice	1 CUP/120g	69.64	0.04	0.27	16.43	7.29	0.51	0	2592.24	0.03904	0.02733	0.2616	16.01
288	Mango Ripe (Big Size)	1/375g	337.5	0.38	2.63	75	60	4.88	0	8229.00	0.375	0.2625	2.5125	153.75
289	Mango Ripe (Medium Size)	1/150g	135	0.15	1.05	30	24	1.95	0	3291.60	0.15	0.105	1.005	61.5
290	Mango Ripe (1 piece)	30g	27	0.03	0.21	6	4.8	0.39	0	658.32	0.03	0.021	0.201	12.3
291	Mango Ripe (Small Size)	1/112g	100.8	0.11	0.78	22.4	17.92	1.46	0	2457.73	0.112	0.0784	0.7504	45.92
292	Melon (Bungli)	1PC/53g	9.01	0.16	0.11	1.86	16.96	0.74	0	71.66	0.0583	0.0424	0	73.78
293	Olive	1/9g	6.3	0.09	0.01	1.46	1.98	0.28	0	0.00	0.0027	0.0009	0	3.51

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
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Fruit and Fruit Juices.

294	Orange (Medium)	1/50g	21.5	0.35	0.05	4.65	11	0.15	0	441.60	0.02	0.005	0	20
295	Orange (Malta)	1/50g	27	0.1	0.05	6.55	15.5	0.5	0	0.00	0.075	0.005	0	42
296	Orange juice	1PKT/175g	10.5	0.35	0.18	1.75	8.75	1.23	0	21.32	0.105	0.035	0.7	11.2
297	Paniphal	10PC/65g	37.05	1.63	0.59	7.61	6.5	0.52	0	9.36	0.117	0.0325	0.468	9.75
298	Papaya Ripe	1PC/50g	21	0.95	0.1	4.15	15.5	0.25	0	3240.00	0.04	0.015	0.075	28.5
299	Pears	1/40g	27.6	0.24	0.12	6.4	2.4	0.2	0	0.00	0.052	0	0	2.8
300	Pomegranate (Bedana) Juice	1TSP/5g	1.07	0.06	0	0.64	0.9	0	0	0.00	0.001	0	0	1.3
301	Pineapple Juice	10ml/10g	5.6	0.04	0	1.36	1.72	0.03	0.13	0.00	0.0056	0.0024	0.024	1.08
302	Pineapple	1/20g	6	0.18	0.04	1.24	3.6	0	0	292.80	0.022	0.008	0.012	4.2
303	Pineapple Juice	1CUP/120g	67.2	0.48	0	16.32	20.64	0.34	1.59	0.00	0.0672	0.0288	0.288	12.96
304	Pomegranate (Bedana)	1PC/100g	74	1.6	0	16.9	21	0.3	0	0.00	0.02	0	0	26
305	Pommelo	1CUP/55g	20.9	0.28	0.17	4.68	20.35	0.11	0	52.80	0.033	0.022	0.1265	57.75

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
306	Pommelo	1PC/15g	5.7	0.08	0.05	1.28	5.55	0.03	0	14.40	0.009	0.006	0.0345	15.75
307	Rose Apple	1/4g	1.56	0.03	0.01	0.34	0.4	0.02	0	4.51	0.0004	0.002	0.016	0.12
308	Sopheda	1PC/75g	73.5	0.53	0.83	16.05	21	0.94	242.26	0.01	0.0225	0.15	6	0.12
309	Tetul	1PC/11g	31.13	0.34	0.01	7.3	18.7	1.2	0	5.28	0	0.0077	0	0.33

Fruit and Fruit Juices.

310	Tomato Ripe	1/100g	20	0.9	0.2	3.6	48	0.4	0	280.80	0.125	0.06	0.4	27
311	Tomato Salad	1 CUP/80g	38	0.9	2.2	3.6	48	0.4	0	280.80	0.125	0.06	0.4	27
312	Water Melon	1PC/150g	24	0.3	0.3	4.95	16.5	11.85	0	0.00	0.03	0.06	0.15	1.5
313	Water Melon	1CUP/100g	16	0.2	0.2	3.3	11	7.9	0	0.00	0.02	0.04	0.1	1
314	Wood Apple	1CUP/60g	52.2	1.56	0.12	11.28	22.8	0.36	0	26.40	0.018	0.012	0.42	5.4
315	Wood Apple, Shorbot	1CUP/120g	85.8	0.78	0.06	20.55	13.2	0.18	0	13.20	0.009	0.006	0.21	2.7

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
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10. Milk and Milk Products

316	Butter Milk (Ghol)	1CUP/120g	56.3	0.88	1.21	10.49	34.2	0.88	0	0.00	0	0	0	0
317	Curd	1CUP/133g	79.8	4.12	5.32	3.99	198.17	0.27	135.66	0.00	0.0665	0.2128	0.133	1.33
318	Curd	1TBSP/30g	18	0.93	1.2	0.9	44.7	0.06	30.6	0.00	0.015	0.048	0.03	0.3
319	Fat-free Milk	1 OZ/30g	10.41	0.98	0	1.48	36.98	0.01	60.74	0.00	0.0088	0.0208	0.0246	0.12
320	Full Cream Powder Milk	1TSP/5g	24.8	1.29	1.34	1.9	47.5	0.03	70	0.00	0.0155	0.068	0.04	0.2
321	Half Cream Milk	1 OZ/30g	8.7	0.75	0.03	1.38	36	0.06	0	0.00	0	0	0.03	0.15
322	Half Cream Powder Milk	1 OZ/30g	17.85	1.9	0.01	2.55	68.5	0.07	0	0.00	0.0225	0.082	0.05	0.25

Milk and Milk Products

323	Ice Cream	1BAR/55g	111.4	1.96	5.94	13.13	72.68	0.05	181.51	0.00	0.0217	0.1359	0.0568	0.31
324	Ice Cream	1CUP/70g	142.11	2.63	7.37	16.84	92.63	0.05	233.11	0.00	0.0263	0.1734	0.0526	0.53
325	Ice Cream	1TBSP/30g	60.9	1.13	3.16	7.22	39.7	30.23	99.91	0.01	0.0744	0.0225	0.2256	0
326	Ice Cream (Cone)	1 PC	163.08	2.64	6.83	22.93	47.63	0.03	119.88	0.00	0.01072	0.0446	0.027	0.14

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
327	Infant Formula	1TSP/5g	25.25	0.64	1.28	2.79	23	0.3	22.67	0.00	0.015	0.035	0.19	2.05
328	Margarine	1TSP/4g	28.57	0	3.14	0	1.14	0	39.71	0.00	0	0	0	0
329	Milk (Milk Powder + Water, 1:1)	1 OZ/5g	24.8	1.29	1.34	1.9	47.5	0.03	70	0.00	0.0124	0.034	0.04	0.1
330	Milk (Milk Powder + Water, 2:1)	1 OZ/10g	49.6	2.58	2.67	3.8	95	0.06	140	0.00	0.0248	0.068	0.08	0.2
331	Milk (Milk Powder + Water, 3:1)	1 OZ/15g	74.4	3.87	4.01	5.7	142.5	0.09	210	0.00	0.0372	0.102	0.12	0.3
332	Milk Condensed (Kheer)	1TSP/5g	10.56	0.41	0.73	0.58	23.28	0	14.52	0.00	0.0072	0.021	0.018	0.18
333	Milk Solid (Chana)	1TSP/5g	13.25	0.92	1.04	0.06	10.4	0	18.3	0.00	0.0035	0.001	0	0.15
334	Milk Solid (Dudher Chana)	100g	265	18.3	20.8	1.2	208	0	366	0.00	0.07	0.02	0	3
335	Milk Powder (S-26)	1TSP/5g	26.2	0.6	1.4	2.8	3.15	0.09	4.5	0.00	0.005	0.0075	0.0375	0.42
336	Prosobee	1TSP/5g	20.28	0.6	1.08	2.04	19.05	0.38	0	0.00	0	0	0	0
337	Whole Cow's Milk	100ml/100g	67	3.2	4.1	4.4	120	0.2	174	4.80	0.04	0.095	0.1	1
338	Whole Milk	1Glass/240g	160.8	7.68	9.84	10.56	288	0.48	417.6	11.52	0.096	0.228	0.24	2.4
339	Whole Milk	1 OZ/30g	20.1	0.96	1.23	1.32	36	0.06	52.2	1.44	0.012	0.0285	0.03	0.3

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
340	Whole Milk	1 CUP/120g	80.4	3.84	4.92	5.28	144	0.24	208.8	5.76	0.48	0.114	0.12	1.2

11. Fats and Oils

341	Butter	1TSP/6.5g	47.39	0	5.27	0	0	0	208	0.00	0	0	0	0
342	Cooking Oil	1TSP/3.5g	31.5	0	3.5	0	0	0	0	0.00	0	0	0	0
343	Ghee	1TSP/5g	45	0	5	0	0	0	100	0.00	0	0	0	0

12. Fast Food

344	Beef Patties, Large	1pc/80g	189.81	13.51	3.43	25.95	7.04	1.59	0	0.00	0.04648	0.03845	1.5038	0
345	Beef Patties, Medium	1pc/60g	142.87	9.53	2.33	20.76	5.43	1.13	0	0.00	0.03472	0.02565	1.0498	0
346	Beef Burger	1pc/165g	331.76	16.3	4.86	61.25	24.85	2.94	14.08	0.00	0.23816	0.0047	4.6271	0.23
347	Beguni	1pc/13.2g	15	1.1	0	0	3.1	0.6	0	0.00	0	0	0	0
348	Biscuit, Bekary	1pc/10g	45	0.64	1.52	7.19	0	0	0	0.00	0	0	0	0
349	Biscuit, Cream	1pc/12g	58.5	0.7	2.67	7.91	0	0	25	0.00	0	0	0	0

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
350	Biscuit, Packet	1pc/5g	22.5	0.32	0.76	3.6	0	0	0	0.00	0	0	0	0
351	Biscuit, Salted	1pc/4.25g	22.7	0.27	1.38	2.32	0	0	0	0.00	0	0	0	0
352	Biscuit, Toast	1pc/20g	107.77	1.94	4.71	14.41	8.08	1.84	0	3.71	0.0784	0.464	0.688	0
353	Biscuit, Toast	1pc/5g	26.93	0.48	1.18	3.6	2.02	0.46	0	0.93	0.0196	0.0116	0.172	0

Fast Food

354	Cake	1pc/40g	136.23	1.74	4.64	23.19	36.52	0.58	5.98	0.00	0.04638	0.05797	0.0406	0
355	Cake, Fruit	1pc/43g	165	2	7	25	41	1.2	43.29	0.00	0.08	0.08	0.5	16
356	Chanachur	1TSP/3g	10	0.2	0	0	0.69	0.08	0	0.00	0	0.08	0	0
357	Chanachur	100g	333.33	6.67	0	0	23	0.5	0	0.00	0	0	0	0
358	Chatpati	1cup/120g	171.46	7.6	3.96	26.56	47.43	3	132	68.80	0.13744	0.05585	1.2348	1.78
359	Chicken pates	1pc/90g	197.15	11.55	0.63	36.33	13.58	1.12	191.06	0.00	0.05526	0.01647	1.9489	0
360	Chocolate Cake	1pc/40g	136.23	1.74	4.64	23.19	36.52	0.58	16.81	0.00	0.0464	0.0579	0.0458	0
361	Corn flakes	1cup/12.5g	47.5	1.05	0.05	10.5	3	0.25	0	0.00	0.04	0.005	0.0003	0

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
362	Cutlet	1pc/70g	164.5	14.15	11.1	1.99	16.93	1.01	463.05	17.70	0.0424	0.0468	3.245	0.12
363	Dalpuri	1pc/35g	92.65	2.64	3.93	11.67	6.23	0.88	0	8.02	0.02582	0.00748	0.3408	0
364	Dry Cake	1pc/12.5g	68.32	0.92	3.51	8.25	5.25	0.72	66.58	7.16	0.02498	0.01199	0.2611	0
365	Egg-loaf Toast	1pc/50g	182.59	3.68	10.57	18.17	39.39	0.43	139.02	36.96	0.0273	0.03805	0.1876	0.07
366	Halim	1cup/130g	158.93	7.93	7.75	14.35	53.94	1.73	0	0.00	0.04032	0.72865	1.4573	1.71
367	Lachii	1glass/240g	115.78	3.72	4.8	14.53	180.12	0.24	122.4	0.00	0.048	0.096	0.12	0.6
368	Nimki	1pc/1.4g	5.26	0.05	0.41	0.33	0.1	0.01	0	0.09	0.00043	0.00016	0.0108	0
369	Nimki	1cup/26g	134.64	1.98	8.16	13.3	4.14	0.45	0	3.60	0.01728	0.0063	0.432	0

Fast Food

370	Papor (Big)	1pc/6.7g	27.32	1	1.35	2.79	4.26	0.92	0	0.00	0	0	0	0
371	Pastry	1pc/70g	293.33	5.33	16	34.67	80	1.47	75.48	0.00	0.17064	0.1133	1.8666	0
372	Piazo	1pc/10.7g	13	0.2	0	0	10	0.1	0	0.00	0	0	0	0
373	Pizza	1pc/185g	306.25	9.75	0.88	64.88	13.75	1.38	0	0.00	0.07	0	0.875	0

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
374	Potato Chips	1PKT./38g	199.5	1.9	13.3	19	9.5	0.38	0	0.00	0.0456	0	1.52	7.6
375	Potato Chips (Home made)	1Potato/40	210	2	14	20	10	0.4	0	0.00	0.048	0	1.6	8
376	Potato Chop	1pc/50g	129	0.64	10.24	9.04	4.4	0.28	0.08	0.00	0	0	0	2
377	Potato Crackers	1PKT./38g	199.5	1.9	13.3	19	9.6	0.38	0	0.00	0.0456	0	1.52	7.6
378	Potato Chips	100g	525	5	35	50	25	1	0	0.00	0.12	0	4	20
379	Ring Chips	1PKT./23g	136.56	1.69	10.37	9.13	3.87	0.5	0	4.87	0.02	0	0.309	0.01
380	Samucha	1pc/35g	72.1	1.75	5.18	4.62	1.91	0.19	2.81	1.25	0.0116	0.00315	0.4502	0.05
381	Sandwich	1pc/36g	104.7	4.82	4.19	11.94	9.28	0.52	187	48.00	0.02984	0.0215	0.641	0.08
382	Singara, Liver	1pc/82.8g	172.8	6.24	8.83	15.67	9.76	1.88	8780	4.90	0.0824	0.6808	3.892	2.74
383	Singara, Potato	1pc/40g	136.53	2.72	5.33	19.68	6.48	0.66	0	6.87	0.03156	0.00864	0.6942	1.01
384	Tang	1Glass/20g	71.12	0	0	17.78	0	0	0	0.00	0	0	0	74

Serial	Food	Quantity	Energy	Protein	Fat	Carbohydrate	Calcium	Iron	Vitamin A	Carotene	Thiamin	Riboflavin	Niacin	Vitamin C
No			Kcal	(gm)	(gm)	(gm)	(mg)	(mg)	(micro g)	(micro g)	(mg)	(mg)	(mg)	(mg)

13. Pithas

385	Banana Bora	1pc/11g	24.81	0.44	0.17	5.37	5.5	0.13	6.16	3.82	0.00678	0.00505	0.0887	0.49
386	Borphee (Coconut)	1pc/25g	145.79	0.91	8.8	15.7	6.93	0.36	10	0.00	0.00848	0.00065	0.4	0.47
387	Chittoi Pitha, Dry	1pc/85g	246.86	4.86	0.36	55.86	7.14	2.21	0	0.00	0.03429	0.02143	1.3572	0
388	Chittoi Pitha, Wet	1pc/130g	332.36	7.54	3.04	69.51	124.64	2.27	140	0.00	0.05909	0.08943	1.4372	0.2
389	Halua Choladal	1TSP/8g	23.78	0.47	1.52	2.05	9.04	0.21	32.13	3.22	0.00644	0.0054	0.0621	0.07
390	Halua, Semolina	1TSP/28g	57	0.37	2.18	8.97	1.33	0.06	43	0.00	0.00345	0.00054	0.0574	0
391	Oil Pitha (Rice)	1pc/50g	194.35	2.09	7.16	30.31	8.63	1.74	0	0.95	0.01564	0.01048	0.6098	0
392	Palm (Tal) Bora	1pc/11g	23.93	0.44	0.15	5.2	5.34	0.09	6.16	0.40	0.00358	0.00405	0.0743	0.01
393	Patishapta	1pc/70g	198.1	3.87	1.73	41.67	54.4	1.07	29.72	2.46	0.03537	0.03316	0.7982	0.18
394	Puli pitha	1pc/83g	300.29	5.01	4.5	59.76	12.99	3	0	0.90	0.03706	0.02633	1.3798	0.05
395	Vapa Pitha	1pc/97g	162.33	2.81	0.22	37.17	29.39	1.23	0	0.00	0.01911	0.01195	0.7566	0

Seial Nor	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
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14. Mixed Dishes

396	Custard (Banana)	1cup/140g	97.35	5.59	1.78	13.75	74.8	0.34	6813.8	15.93	0.03856	0.07295	0.2367	2.32
397	Custard Apple	1cup/140g	89.27	5.53	1.68	12	75.56	0.33	6813.8	0.16	0.03898	0.07074	0.1705	0.42
398	Custard Apple	1oz/30g	27	0.54	0.03	6.18	5.1	0.45	0	0.00	0.021	0.042	0.177	11.4
399	Dudh Semai	1cup/135g	243.11	6.28	5.8	41.39	210.22	0.29	302.4	0.00	0.06588	0.14891	0.3186	0.43
400	Egg Noodles	1cup/80g	156.04	2.71	11.2	11.09	8.25	0.54	96	41.40	0.0208	0.02125	0.36	0
401	Firni	1cup/160g	327.64	8.31	7.99	55.53	288.02	0.47	416.5	0.00	0.07824	0.20509	0.4145	0.6
402	Fish Head Ghonto	1cup/120g	162.39	4.97	13.05	6.67	110.38	0.62	96	6.08	0.03778	0.01356	0.4544	3.6
403	Khichuri (2 Rice: 1pulse)	1cup/80g	140.76	2.68	7.61	15.36	6.16	0.91	0	15.30	0.04928	0.01063	0.7218	0
404	Khichuri (3 Rice:1 Dal)	1cup/80g	140.8	2.35	7.6	15.71	5.1	0.89	0	11.48	0.04587	0.0093	0.743	0
405	Khichuri (1 Rice : 1 Dal)	1cup/80g	140.67	3.35	7.62	14.65	8.29	0.93	0	22.96	0.0561	0.01329	0.6796	0

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
406	Khichuri :Vegetable Meat (Rice+Dal+Meat+Veg.)	1cup/80g	124.36	7.06	5.99	10.55	12.72	1.29	12.63	230.21	0.06506	0.01117	1.7521	1.08
407	Khichuri : Vegetable (Rice+Dal+GLV+Veg.)	1cup/80g	118.08	3.28	5.57	13.72	41.4	3.53	0	1767.73	0.05326	0.02489	0.5583	1.14
408	Khichuri : Vegetable (Rice+Dal+Veg.)	1cup/80g	118.82	3.08	5.59	14.06	14.15	1.5	0	306.94	0.05306	0.00928	0.5398	1.16
409	Lachy Semai	1cup/120g	258.6	6.26	10.43	34.87	194.7	0.37	405	2.00	0.0592	0.1395	0.4	0.4
410	Milk Suji	1cup/125g	10.69	3.3	4.29	12.95	111.72	0.12	186.02	0.00	0.03162	0.07952	0.1394	0.23

Mixed Dishes

411	Milk Suji	1TSP/12.5g	10.39	0.33	0.43	1.29	11.14	0.01	18.64	0.00	0.00315	0.00793	0.0139	0.02
412	Noodles + Egg	1cup/85g	100	3.5	1	18.5	8	1.3	56.61	0.00	0.088	0.0325	0.95	0
413	Noodles + Egg+Vegetable	1cup/85g	116.14	4.51	3.5	16.12	17.94	0.21	51.29	0.00	0.008	0.02	0	0
414	Noodles + Egg+Vegetable	1cup/90g	96.63	6.01	2.21	8.37	14.96	1.76	159.33	781.27	0.08424	0.04448	1.3172	0.72
415	Noodles+Vegetable	1cup/90g	98.84	3.18	2.17	16.12	11.94	1.25	0	171.31	0.08496	0.02955	0.8155	0.77
416	Noodles + Meat+Vegetable	1cup/90g	88.26	3.87	1.96	8.98	15.67	1.91	153.33	1025.98	0.07645	0.0436	716.6	0.82

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
417	Pudding	1 Slice/40g	272.58	8.57	8.8	39.7	259	0.45	532	67.20	0.07568	0.2048	0.208	0.52
418	Pudding	1pc/60g	181.54	5.71	5.86	26.44	172.49	3.3	354.31	44.75	0.063	0.1363	0.0692	0.35
419	Puibora (Indian Spinach)	1pc/15g	30.77	1.14	1.71	2.71	28.48	1.95	0	1648.40	0.00818	0.02904	0.1036	0.52

15. Soups, Sauces, Salad and Chatnies

420	Achar (Mango)	1TSP/8g	27.19	0.07	2.41	1.31	1.04	0.54	0	7.20	0.0032	0.0005	0.02	0.15
421	Chatni (Chalte)	1cup/5g	9.6	0	1	0	0.16	0.73	0	0.00	0.01848	0.00055	0.451	0
422	Chatni (Tetul)	1TSP/4g	109.34	1.18	0.24	25.23	64.6	4.14	0	18.24	0	0.0266	0	0.14
423	Chatni, Coriander	1TSP/4g	12.35	0.07	0.51	1.87	3.89	0.37	0	110.69	0.0008	0.0006	0.016	0.14
424	Chicken Soup	1cup/120g	96.92	15.21	3.17	1.89	18.1	1.01	524.88	36.29	0.04838	0.0534	3.3912	0

Soups, Sauces, Salad and Chatnies

425	Chili red (Dry)	1pc/1g	2.46	0.16	0.06	0.32	1.6	0.02	0	2.76	0.0093	0.0043	0.095	0.5
426	Corn Soup	1cup/120g	96.92	15.21	3.17	1.89	18.1	1.01	524.88	36.29	0.04838	0.0534	3.3912	0
427	Khaja	1pc/100g	468.9	3.66	10.66	89.49	300.2	2.1	40	9.60	0.16	0.034	0.88	0

Serial No	Food	Quantity	Energy Kcal	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Calcium (mg)	Iron (mg)	Vitamin A (micro g)	Carotene (micro g)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
428	Morobba (Mango)	1pc/25g	44.2	0.07	0.01	10.95	2.2	0.54	0	7.20	0.0032	0.0005	0.02	0.15
429	Prown Soup (Thai Soup)	1cup/120g	105.47	18.84	3.1	0.44	109.42	2.69	1683.4	1.86	0.04685	0.0963	5.101	0.88
430	Salad (Cucumber)	1cup/65g	36.88	0.97	2.58	2.35	9.4	0.96	0	0.28	0.096	0.01275	0.104	4.18
431	Sauce (Tomato)	1 TSP/3.5g	1.07	0.04	0	0.26	0.49	0.03	11.42	0.00	0.0023	0.0019	0.0399	0.46
432	Tomato Catsup	1 TSP/4g	4	0.07	0.02	0.99	0	0	0	0.00	0	0	0	0
433	Vegetable Soup	1 Cup/ 120g	66.05	8.25	2.12	3.62	14.38	1.08	243.6	6217.66	0.05472	0.0258	2.04	1.23

16. Miscellaneous

434	Chocolate Powder	1 TSP/2.5g	12.95	0.27	1.34	0.71	1.96	0.17	0.3	0.00	0.0009	0.0062	0.0357	0
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INSTITUTE OF NUTRITION AND FOOD SCIENCE
UNIVERSITY OF DHAKA

Serial Number:

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Ph.D. Thesis Topic: A study on food refusal among urban middle and upper socio-economic class children.

Checklist for examining children to obtain aetiology of reluctance to take food and nutritional status of the children among urban middle and upper socio-economic class.

INTERVIEW SCHEDULE FOR MOTHER/FATHER:

1. Children's Name							
2. Household identification		<table border="1" style="display: inline-table;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>					
3. Date of Birth	____/____/19____	<table border="1" style="display: inline-table;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>					
4. Birth Weight	____ Kg./ ____ lb.	<table border="1" style="display: inline-table;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>					
5. Place of Delivery	1. Home 2. Govt. Hospital 3. Clinic 4. Others _____	<table border="1" style="display: inline-table;"> <tr> <td style="width: 20px; height: 20px;"></td> </tr> </table>					
6. Birth Attendant	1. Elderly relative/neighbours 2. Untrained dai 3. Trained dai 4. Nurse 5. Doctor 6. Others _____	<table border="1" style="display: inline-table;"> <tr> <td style="width: 20px; height: 20px;"></td> </tr> </table>					
7. Parent's age at the Birth of 1st child	1. Mother's age _____ 2. Father's age _____	<table border="1" style="display: inline-table;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table> Mother <table border="1" style="display: inline-table; margin-left: 20px;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table> Father					
8. Including yourself how many people (adults, children) live in your house	1. Total _____ 2. Adult _____ 3. Children (upto 18 yrs.) _____	<table border="1" style="display: inline-table;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>					

9. How many children do you have from 1-12 years of age (eldest to youngest)

Birth Order	Name	Sex M=1, F=2	Date of Birth Dd Mm Yy			Alive=1 Dead =0
1						
2						
3						
4						
5						

10. Birth order of the study child

☐

11. Schooling of the study child

1. Yes 2. No

If Yes 1. Bengali medium

2. English medium

3. Others _____

☐

12. Parent's occupation

Mother's : 1. Housewife
2. Non Govt. Service
3. Govt. Service
4. Unemployed
5. Business
6. Student.

☐

Father's : 1. Non Govt. Service
2. Govt. Service
3. Unemployed
4. Business
5. Student

☐

6. Others (note) : _____

13. Educational status of the parents

Father's 1. Illiterate
2. Class V
3. VI-X
4. S.S.C
5. H.S.C
6. Graduate
7. Master

☐

8. Others (note) : _____

Mother's 1. Illiterate
2. Class V
3. VI-X
4. S.S.C
5. H.S.C
6. Graduate
7. Master

☐

8. Others (note) : _____

14. Do you rent a house or do you own

1. Own

2. Rented

(If own please skip to 16)

☐

15. If rented how much is your monthly rent

Tk. _____

--	--	--	--	--

16. What is your approximate monthly net family income from all sources?

Tk. _____

--	--	--	--	--

17. Items present in household

Tick () if Yes

1. T.V. (Black & White)

☐

2. T.V. (Color)

☐

3. VCP

☐

4. VCR

☐

5. Refrigerator

☐

6. Deep Freeze

☐

7. Oven

☐

8. Car

☐

9. Jeep

☐

10. Motor Cycle

☐

11. Air Cooler/Condition

☐

12. Washing Machine

☐

18. Father

1. Yes 2. No

☐

Mother

1. Yes 2. No (skip to 20)

☐

19. Club attendance of father

1. Weekly 2. Monthly

☐

3. Yearly 4. Others _____

☐

20. Pleasure trip (Family)

1. Yes 2. No

☐

If Yes 1. Inside the country
2. Abroad

Inside the country 1. Once
2. Twice
3. Thrice
4. Others _____

☐

Abroad 1. Once
2. Twice
3. Thrice
4. Others _____

☐

21. Children mainly looked after by

1. Parents 2. Maid
3. Auntie 4. Grand mother/
Father 5. Other's _____

☐
☐

Following questions (22-32) are applicable upto 3 years of age of the study population.

22. What was the first food given birth to this child ?
 1. Breast milk 2. Honey
 3. Sharbat (sugar/candy)
 4. Cow's milk 5. Powder milk
 6. Others : _____ ☐
23. If breast fed, when did you start breast feeding the child ?
 1. Immediately after birth
 2. Hours after birth
 3. 2nd day
 4. 3rd day
 5. 4th day
 6. Others (note) : _____ ☐
24. How long breast feeding was given exclusively? _____ / _____ / 19 _____ ☐☐☐☐☐
25. How long breast feeding was given mostly Months _____ ☐☐
26. How long breast feeding was given partially ? Months _____ ☐☐
27. If on artificial feeding, when did you start? (multiple response)
 1. Cow's milk _____ ☐
 2. Formula _____ ☐
 3. Mixed feeding _____ ☐
 4. Cereals _____ ☐
 5. Others _____ ☐
28. Breast feeding stopped at the age of _____ / _____ / 19 _____ ☐☐☐☐☐

29. Weaning started regularly at the age of (other than milk):

	Months	Times of feeding
1. Liquid		
2. Semisolid		
3. Solid		

3. How often liquid, semisolid and solid was given at different ages ?

--	--

Age (month)	Liquid	Semi-solid	Solid
0-2			
2-4			
4-6			
6-8			
8-10			

Age (month)	Liquid	Semi-solid	Solid
10-12			
12-18			
18-24			
24-36			
36+			

31. Family food (food from family pot) introduced at the age of :

Months _____

--	--

32. Food intake as stated by mother

1. Overfed
2. Normal
3. Like all foods but intake is poor
4. Poor (Refuse/reluctance)
5. Very poor (strongly refuse/reluctance is strong)
6. Exceptionally poor (refuses all types of food)

--

33. When did the child start to refuse ?

____/____/19____

--	--	--	--	--

34. In mother's opinion, when the child is reluctant to take food?

1. _____
2. _____
3. _____
4. _____
5. _____

35. Type of food group refusal/liking :

1. **Milk – Group :**

REFUSAL:

1. Milk
2. Cheese
3. Ghee
4. Others _____

--

LIKING:

1. Milk
2. Cheese
3. Ghee
5. Others _____

--

2. Cereal – Bread group:

REFUSAL:

1. Rice
2. Rice product
3. Ruti
4. Parata
5. Bread
6. Cereals formula
7. Others (note) _____

☐

LIKING:

1. Rice
2. Rice product
3. Ruti
4. Parata
5. Bread
6. Cereals formula
7. Others (note) _____

☐

3. Vegetable–fruit group:

Vegetables *REFUSAL:*

1. GLV
2. Other Vegetable _____

☐

LIKING:

1. GLV
2. Other Vegetable _____

Fruit - *REFUSAL:*

1. Citrus
2. Other fruits _____

☐

LIKING:

1. Citrus
2. Other fruits _____

Others –*REFUSAL:*

☐

LIKING :

☐

4. Meat group:*REFUSAL:*

1. Meat
2. Fish
3. Egg
4. Pulses
5. Beans
6. Peas
7. Ground nuts
8. Others _____

☐*LIKING:*

1. Meat
2. Fish
3. Egg
4. Pulses
5. Beans
6. Peas
7. Ground nuts
8. Others _____

☐**3. Fat and sweets group :***REFUSAL:*

1. Oil
2. Butter
3. Jelly
4. Jams
5. Honey
6. Soft drinks
7. Others (Note) _____

☐*LIKING:*

1. Oil
2. Butter
3. Jelly
4. Jams
5. Honey
6. Soft drinks
7. Others (Note) _____

☐

	4. Others (note) :	
	<u>REFUSAL:</u>	☐
	1. _____	
	2. _____	
	3. _____	
	<u>LIKING:</u>	☐
	1. _____	
	2. _____	
	3. _____	
36. Father's opinion about the child's nutritional status:	1. Excellent	☐
	2. Good	
	3. Fair	
	4. Not satisfactory	
	5. Dangerous	
	6. Very dangerous	
37. Father's opinion on mother's patience during their child feeding	1. Excellent	☐
	2. Good	
	3. Fair	
	4. Poor	
	5. Very Poor	
38. Whether mother is pressing/forcing the child during feeding ? (Father/ Caretaker's opinion)	1. Yes 2. No	☐
39. Activity pattern of the study child.	1. Slow activity	☐
	2. Light activity	
	3. Moderate activity	
	4. Heavy activity	
40. Scope of play.	1. Very good	☐
	2. Good	
	3. Fair	
	4. Poor	
	5. Very poor	
41. History of immunization	1. Yes 2. No	☐
42. Past history of infectious disease	A. 1. Measles	
	2. Tuberculosis	
	3. Diphtheria	
	4. Whooping cough	
	5. Polio	☐
	6. Tetanus	
	7. Shigellosis	
	8. Typhoid/para typhoid fever	
	9. Malaria	
	10. Mumps	
	11. Chicken pox	
	12. Others : _____	

B. If YES, how many days ago :

Sl.	Day	Month	Year

Questionnaire related to mechanical entities

	Present	Absent		Present	Absent
43. Caries teeth			44. Large tonsil		
45. Stomatitis			46. Candidiasis		
47. Chelosis			48. Pharyngitis		

Morbidity Information of the study child in past 2 weeks

	Yes	no		Yes	no
49. Fever			50. Passed 3 loose stool in 1 day (any day)		
51. ARI			52. Cough / Difficulty in respiration		
53. Difficulty in micturation			54. Problem in throat		
55. Problem in nostril			56. Others _____		

Other morbidity information

	Yes	no	If YES
57. Chronic suppurative otitis media (CSOM) :			onset _____

58. Passed any worm : Day ____ month ____ back

59. Deworming : Day ____ month ____ back

60. Availability of food (food served/preserved) for the child :

A. AMONUT : 1. Abundant 2. Good 3. Fair 4. Poor

B. VARIETY : 1. Very rich 2. Good 3. Fair 4. Poor

61. Anthropometric measurements of the study child

1. Weight (Kg.) :

2. Length/Height :

3. MUCA (Cm.) :

4. Skin-fold thickness (Cm.) :

62. Clinical assessment of nutritional anaemia

1. Pulse rate _____ / minute

	Yes	no		mild	moderate	severe
2. Pallor (Conjunctiva)			If YES			
3. Palpitation			If YES			
4. Glossitis with atrophy of papillae			If YES			
5. Angular Stomatitis			If YES			
6. Dyspnoea			If YES			
7. Oedema			If YES			

8. Tiredness of papillae
9. Loss of energy If YES
10. Splenomegaly If YES
11. Pica (e.g. eating coal, earth)
12. Nail 1. Firm & Pink 2. Brittle 3. Spoonshaped (Koilonychia)
13. Systolic flow murmur : _____

63. Clinical assessment of vitamin-A status

	YES	NO
CODE		
1. Nightblindness		
2. Bitot's Spot		
3. Conjunctival Xerosis		
4. Corneal Xerosis		
5. Keratomalacia < 1/3 involvement		
6. Keratomalacia > 1/3 involvement		
7. Scar on Cornea		
8. Dryness of Skin (Xerosis)		
9. Sandpaper feel / follicular hyperkeratosis (toadskin)		
10. Others		

64. Clinical assessment of Riboflavin status

	yes	no		mild	moderate	severe
1. Angular Stomatitis			If YES			
2. Cheilosis			If YES			
3. Glossitis			If YES			

4. Magenta tongue ☐ ☐ If YES ☐ ☐ ☐

5. Nasolabial rash ☐ ☐ If YES ☐ ☐ ☐

6. Others ☐ ☐ If YES ☐ ☐ ☐

65. Clinical assessment of Vitamin-C status			
CODE	YES	NO	
1. Spongy gum bleeds easily	☐	☐	☐
2. Petchial haemorrhage in skin	☐	☐	☐
3. Ecchymosis / Bruises	☐	☐	☐
4. Painful limbs / epiphyses	☐	☐	☐
5. Fresh Wounds fails to heal	☐	☐	☐
6. Others	☐	☐	☐

66. Laboratory Investigation

1. Hb % : _____ gm / _____ %

2. Comments on blood film :

1. _____
2. _____
3. _____

Stool examination :

	YES	NO	CODE
1. Ascaris Lumbricodis	☐	☐	☐
2. Ancylostoma duodenale	☐	☐	☐
3. Trichuris trichura	☐	☐	☐
4. Pinworm	☐	☐	☐
5. Giardia Lamblia	☐	☐	☐
6. E. histolytica	☐	☐	☐
7. Others	☐	☐	☐

4. Urine examination :

1. Pus cell = _____ Cell / HPF
2. RBC = _____ Cell / HPF
3. Cast _____
4. Albumin _____

INTERVIEW SCHEDULE FOR MOTHER TO OBTAIN FEEDING PARCTICE
OF THE STUDY CHILD FOR PAST 24 HOURS

--	--	--

Name : _____

YESTERDAY

Date & Time	Description of food/drinks.	Amount of intake (Serving/gm/size)
Morning		
____ am		
____ am		
____ am		
____ am		
____ am		
____ am		
Noon		
____ p.m.		
____ p.m.		
____ p.m.		
____ p.m.		
Afternoon		
____ p.m.		
____ p.m.		
____ p.m.		
Night		
____ p.m.		
____ p.m.		
____ p.m.		