Impact of Nutrition Education on Feeding Practices and Nutritional Status of Under 2 Years Children in Nilfamari District of Bangladesh.

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Certificate

This is to certify that the thesis titled "Effect of nutrition education on feeding practices and nutritional status of under two years children in Nilfamari District of Bangladesh" submitted by Nurjahan Moni, registration no-165, Session-1998-99 for the degree of Master of philosophy, University of Dhaka, Nurjahan Moni has carried out this research work under our joint supervision and guidance at the Institute of Nutrition and Food Science, University of Dhaka. The results or any part of work used in this thesis has not been submitted else where for the award of any other degree.

This thesis is worthy for the award of the degree of Master of philosophy in accordance with the rules and regulation of Dhaka University.

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Dissertation Submitted by Nurjahan Moni
In Partial Fulfillment of the Requirements
For the Degree of Master of philosophy,
University of Dhaka.
Registration No-165
Session-1998-99

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Dedicated to

My Family

Acknowledgements

I would like to express ever gratefulness to Almighty Allah.

It is my pleasure to express heartfelt thanks to my honorable guide professor Nazma Shaheen PhD, Institute of Nutrition and Food Science, University of Dhaka for her kind, constant and expert supervision. Praise worthy attention, sincere and Scholastic guidance for the completion of my thesis work.

I am grateful to my respected guide professor Md..Mohiduzzaman, Institute of Nutrition and Food Science, University of Dhaka for his encouragement and co-operation, valuable direction, sincere guidance, strong support and excellent suggestions throughout the study.

I am deeply indebted to Professor Dr.Abu Torab M A Rahim, Institute of Nutrition and Food Science, University of Dhaka, for his intellectual guidance, strong support, invaluable suggestion, inspirational guidance through scientific discussion, unparallel cooperation without which thesis would not have its present shape.

I would like to express my heartfelt thanks as well as grateful regards to SM Ziauddin Hyder, MD. Ph.D. Director, Research and Evaluation Division of BRAC, for his optimistic and sustained encouragement kind co-operation, excellent suggestions, strong support, attention and care throughout the course of this research work.

I appreciate and convey heartfelt thanks to Mr. Chowdhury SB Jalal, MD. Ph.D.Research coordinator, Research and Evaluation Division of BRAC, for his unconditional support and sincere co-operation., excellent suggestions, to give support to use their data base.

I express humbleness to all of my teachers of INFS.

I am also very much thankful to Md. Nazrul Islam, computer programmer cum system Analyst, INFS University of Dhaka for his excellent guidance in data analysis of the results. I am deeply grateful to the officers and stuffs of INFS, university of Dhaka.

Finally I would like to thanks every member of family especially my husband Md Ismat Takir and my two daughters Rudaiba and Rudmila, my mother, Sister and brother for their heartfelt concern and their prayers, support and patience during the completion of this thesis.

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Abstract

Objectives: 1) To study the effectiveness of a nutrition education package (NEP) to improve knowledge, attitude, and practice (KAP) of nutrition aspects among selected rural mothers. 2) To evaluate the Impact of improved KAP of mothers on the nutritional status of their ≤ 2 years children.

Study Design: A baseline cross-sectional survey was carried out among 600 mothers to identify their socio-demographic-economic variables and the nutritional status of the mother-child pair. A randomly selected cohort of mother-child pair (N=300) was selected for the intervention with a NEP adopted from by BRAC along with the same numbers of control group. After a follow up period of 4 months, both KAP of the mother and nutritional status of the children in all groups were determined and compared.

Study Location: The study was carried out in six Unions of Nilfamari District during February, 2008 to December, 2008.

Materials and methods: A pretested structured questionnaire was used to obtain data from the selected households. The tools used in the NEP were based on information of: a) exclusive breast feeding; b) complementary feeding; c) micronutrients; d) mothers knowledge and practices on maternal nutrition; e) Food consumption pattern; f) initiation of breast feeding of colostrums; g) hygiene and sanitation; h)general illness and immunization; i) nutritious food of children.

Face-to-face interview and FGD was the methods for opinion and socio-demographic-economic data. Training sessions were carried out for KAP intervention while anthropometry of mother and children was the method for nutritional status determination.

The KAP score and nutrition status of <2 children were compared between baseline and the follow-up, both horizontally and vertically.

Results: The interventional study reveals that 50% study households were food secured. The family size was 5 ± 2. Around 54.3% of households had own homestead and 33.0% had agricultural land and 42.2% did not have any income deficit. Most of the mothers were found housewife (90%) and 1/3rd of the mothers were illiterate; mean age of the mothers was 23 ± 5.2 years and age of study children were 11.1 ± 6.5 months.

The KAP assessment reveals that at baseline only 3.65% mothers were found "excellent" while 35.5% mothers were found "poor" in KAP test. At the end of the follow-up period the KAP of the mothers increased significantly in intervention group compared to control. On the other hand, "excellent" score was secured by 62.5% mothers of the intervention group from the Score of 3.1% at baseline.

The nutritional status of the children in the intervention group showed that prevalence of malnutrition reduced significantly compare to the children of the mothers of non-intervene group. Prevalence of stunting (HAZ), wasting (WHZ) and underweight (WAZ) among intervention group children at baseline were 47.1% ,15.3% and 37.0% which were found to be 40.5%, 8.4% and 31.1% respectively in follow-up.

The chronic energy deficiency (CED) status of mothers revealed that 50% mothers were normal at baseline, while after intervention the percentage of normal category increased to 65%. KAP was also found to increase this two indicators thus revealing that the intervene group had consumed good and nutritious food.

Conclusions: The NEP used in the study was found effective to increase nutritional KAP of mothers and consequently reduce the malnutrition of children of the intervene group. The findings of the study pointed to the notion that nutrition education programs are still an effective and less costly approach to reduce malnutrition in situations where food insecurity is not severe.

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LIST OF ACRONYMS

BMI	Body Mass Index
BRAC	Bangladesh Rural Advancement Committee
CI	Confidence Interval
FANTA	Food and Nutrition Technical Assistance
GOB	Government of Bangladesh
GP	Group
HH	Household
HoH	Head of Household
HKI	Helen Keller International
LBW	Low Birth Weight
MNCH	Maternal Neonatal and Child Health
MNI	Mainstreaming Nutrition Initiative
MNIBP	Mainstreaming Nutrition Initiative into BRAC's Programme
NCHS	National Centre for Health Statistics
NGO	Non –Governmental Organization.
NID	National Immunization Day
NNP	National Nutrition Project
NVAC	National Vitamin A Plus Campaign
NSP	Nutrition Surveillance Programme
PPS	Probability Proportional to Size
RED	Research and Evaluation Division
UP	Union Parishad
SD	Standard Deviation
SPSS	Statistical Package for the social Sciences
UZ	Upazilla (Sub-district)
VAC	Vitamin A Capsule
VAD	Vitamin A Deficiency
WHO	World Health organization
WAZ	Weight for age Z score
WHZ	Height-for age Z score
OMS	Open market Sale
IYCF	Infant and young child feeding
IYC	Infant and young children
NEP	Nutrition Education Package
NE	Nutrition education
NEI	Nutrition education intervention

CHAPTER - 1

INTRODUCTION

1.1 Background

Malnutrition is one of the major public health challenges in Bangladesh. Malnutrition occurs throughout the lifecycle and begins in mother's womb resulting in low birth weight, and subsequent under weight, wasting and stunting during childhood. Nutritional disorders specially micronutrient deficiencies among mothers' and young children in Bangladesh are common and reflect a combination of high burden of morbidity, poor health and nutritional status. Though Bangladesh has shown impressive progress in child health and nutrition in the last few decades, child malnutrition is still wide spread specially in rural areas.

The Period of up to 2-3 years of age provides an opportunity for ensuring adequate future growth, development and nutritional status. Therefore, child malnutrition would effect adolescent growth, maternal nutrition and material size, and finally low-birth weight baby. These intergenerational effects can be turned in to a vicious cycle.

Child malnutrition rates in Bangladesh remain very high among the highest in the world. Bangladesh is among the least developed countries of the world which represents all the characteristic features of under development. Some of the pictures are about 84% of 0-5 years children are suffering form some degree of malnutrition.[1] National Nutrition Survey in 1995-96 revealed that among the children from 6-7 months 26.6% were normal and 73.4% children were malnourished .Among the malnourished children 9.2% children were underweight but not stunted and 51.2% were both stunted and under weight.[2]

Maternal nutrition is the foundation of child nutritional status and infant feeding practices constitute a major component of child caring practices, play an important role in their growth and development and there fore considered as one of the significant determinant of young child nutritional status.

Recent survey indicates that, Bangladesh has 46% and 36% of moderate to severely under weight and stunted children respectively. All these children are at risk of growing up with some consequent disadvantage.

The world health organization (WHO) considered health as a state of complete physical, mental and social well being and not merely the absence of disease; Food,

health and care are interrelated and the combination of the three determines nutritional status of children and also others. Especially the nutritional status of children depends on different interrelated factors such as intake of balanced diet including colostrums and breastfeeding, proper weaning food practices in time, sufficient child care nutritional knowledge of mothers', immunization received, hygienic and sanitation practices and health seeking behaviors of children's families, and events of attacking by infections diseases etc.

Nutrition education is a strategy, which has been used by many developed and developing countries over a number of years to improve the nutritional well being of vulnerable populations. The effectiveness and reach of nutrition education endeavors very considerably. The differences are primarily due to financial constraints, the availability of trained nutrition educators and the extent to which nutrition educations efforts are carefully planned and evaluated. As developing countries experience rapid social and economic changes, new issues for nutrition education emerges, which demand attention.

Infant and young child feeding are a cornerstone of care for childhood development. World-wide about 30% of children under five are stunted as a consequence of poor feeding and repeated infections. Even in resource poor settings, improved feeding practices can be lead to improved intakes of energy and nutrients, leading to better nutritional status

In Bangladesh, not only low dietary intake but also ignorance about food is one of the vital causes of malnutrition. Majority of our population is illiterate. They have no knowledge about nutritive value of food. For this reason, usually they cannot take balanced diet resulting malnutrition and ultimately attacked by various nutritional deficiency diseases. This situation is worst among slum and rural area of our country.

1.2 Rational of the study

The overall picture of nutritional status of infant and young children and mother also in Bangladesh is very grim. In the developing countries where poor nutritional status at mass level is not only due to poverty but also related to superstitions, misbelieve,

insufficient food intake, ignorance, illiteracy and lack of knowledge regarding basic nutrient content of the available food

Nutrition is a fundamental right because of its relation with food and health. Mental development and normal physical growth in early stages of childhood depends on nutritionally adequate food intake. The Period of up to 2-3 years of age provides an opportunity for ensuring adequate future growth, development and nutritional status. The children are considered as future mothers of a country. Therefore, child malnutrition would effect adolescent growth, maternal nutrition and material size, and finally low-birth weight baby. These intergenerational effects can be turned in to a virtuous cycle. Thus, it is very important for a nation to know the status of nutrition at all stages of life and take appropriate measures to improve the situation, especially for the children. In this light, the present study thus intended to understand deeply and explore the cumulative effect of nutrition education intervention among the respondent mothers of under age two years' children of rural Bangladesh to reduce the malnutrition of children.

Child malnutrition has multi-factorial reasons and is a topic of current and future researches worldwide. To reduce child malnutrition at household level, there are various approaches put forward by researchers and policy makers.

Nutrition education (NE) is one of these approaches usually taken when the households (HH) food and nutrition situation is at steak due to poor KAP of the family members specially the mothers.

Under such circumstances, an intervention with a NEP can improve the KAP of the mothers which in turn can effect the child malnutrition situation. Moreover, NEPs are relatively easy to implement as well as less expensive indeed.

1.3 Study Hypothesis

In moderately food insecure households, improvement of mothers' KAP of nutritional aspects could assert a positive effect on the nutritional status of their under two years old children.

1.4 Objective of the study

General Objective

To evaluate the effect of a nutrition education package (NEP) in reducing prevalence of malnutrition among under two years old children

Specific Objectives

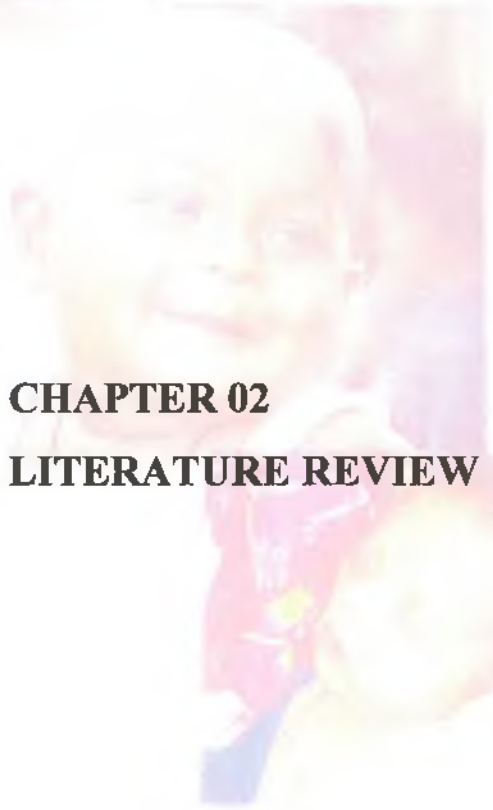
1) To harmonize an adopted NEP containing:
    a) training programs using flip charts
    b) oral presentation
    c) audio like short drama and song

2) To evaluate the KAP of nutritional aspect among selected mothers before and after intervention with the NEP

3) To determine the nutrition status of intervene mothers and their <2 years children

4) To correlate and qualify the level of mothers' KAP with nutritional status of <2 years children

5) To compare and contrast the findings with others



CHAPTER 02
LITERATURE REVIEW

2.1 The Nutritional Situation of Children and Mother's

Today's children are tomorrow's world or tomorrow's father" this slogan is riding a massive wave of concern throughout the world. Children of, all over the world are deprived of adequate food for growth, proper child care exposed. Hunger and malnutrition make them worst sufferers and these pose potential threats to mankind as a whole or to the civilization itself. The children of Bangladesh are particularly more marginalized than those in other part of the world.[1]

Although a steady decline in the infant mortality rate in Bangladesh indicates remarkable improvement in infant mortality rate (87 per thousand live births in 1993-1994 to 65 per thousand in 2004) but overall health condition and nutritional status of children is still a public health problem.[2]

Bangladesh has the highest prevalence of childhood underweight among all countries in the world, except North Korea, and only seven countries have a higher prevalence of child stunting. Trends of low birth weight of Bangladeshi children are the highest in the world with 20-40% of babies weighted less than 2.5 kg at birth. Improved nutrition for mothers during pregnancy would reduce this rate.[3] The percentage of children aged 6-59 months with stunting decreased from 64.2% (1992) to 48.3% (2000) and 42.4% (2005), under weight decreased from 68.3% (1992) to 51.0% (2000) and 47.8% (2005), and wasting decreased from 16.7% (1992) to 12.0% (2000) and remained at 12.7% (2005).[4]

With low resource base and almost perennial recurrence of natural calamities Bangladesh is a developing and densely populated country of the world.
Extreme poverty and misdistributions of public resource leads malnutrition, has become a major public health problem in our country associated with so many problems like high population growth, land scarcity, and low land man ratio. Limited job opportunities cause internal migration of rural people to urban areas, resulting to urban slums. According to BBS survey conducted in 2001, 76.4% people are living in the rural areas.[5]

Bangladesh has shown impressive progress in health and nutrition in the last few decades; initiatives taken to prevent illness have substantially reduced six vaccine-

preventable and the diseases of diarrhoea killed hundreds of thousands of children even two decades ago. Also, between 1990 and 2000, with the proportion of underweight children were falling from 66.6 percent to 51.1 percent, and the level of child stunting falling from 65.5 percent to 48.8 percent. Nevertheless, the prevalence of child stunting and under-weight in 2000 is still "very high" according to World Health Organization (WHO) criteria.[6]

Though Bangladesh has succeeded in nearly halving (77 deaths per 1000 live births) its under-5 mortality rate (MR) Since its 1990 rate of 151 deaths per 1000 live births but away from achieving millennium development goal (MDGS) 4 (under-5 MR) to 51 deaths per 1000 live births) and 5 (Maternal Mortality Rate 143/1000,000 live births) by 2015. Diarrhoea, acute respiratory illness, low birth weight, birth injuries are the leading causes of death for children.[7] Malnutrition is a prevalent public health problem in Bangladesh, where nearly half of the population is children, who are suffering from protein energy malnutrition and multiple micro nutrient deficiencies which are the quite common malnutrition in this country. After the first month of life, child under nutrition is a major cause of death and debility in children in Bangladesh. 20 micro nutrient deficiencies are quite common; nearly 75% of Children life are spent here in illness mostly due to malnutrition related debility and infections. Thus, it is indeed major impediment to socio economic developments and contributes to a vicious circle of under development to the detriment of already underprivileged groups and has been long ranging effects on health, learning ability and productivity.[8]

Different studies have been showed that nutritional status of under-5 in Bangladesh is still remarkably worse. Low birth weight and malnourished children susceptible to infections roughly two thirds of under five deaths are attributed to malnutrition.[9] Some 56 per cent of Bangladeshi children of under five age have been suffered from moderate and severe malnutrition 21 percent of whom are severely under weight, and studies show that more than 70 percent of pregnant and breast feeding women are also malnourished.[10] In 2001, half of all children below the age of five were underweight, 571 of them were stunted and 47% were a anemic most children aged 1-5, though revive of vitamin supplementation in their diets, with the result that less than 1 percent suffers from night blindness. There are major discrepancies in the knowledge and practices of early childhood care and development for the under -5 children.[11]

The exceptionally high rates of malnutrition in south Asia are rooted deep because of inequality between men and women. The major causes of malnutrition in many Asian countries are poverty. The low social statuses of women take care a little bit during pregnancy. High rates of low high weight, population densities unfavorable child caring practices and poor access to health case.[12]

10 facts on child health[31]

Fact 1

A child's risk of dying is highest in the first month of life, when safe childbirth and effective neonatal care are essential. Preterm birth, birth asphyxia and infections cause most newborn deaths. Once children have reached one month of age, and up until the age of five years, the main causes of loss of life are pneumonia, diarrhoea, malaria, measles and HIV. Malnutrition contributes to more than half of all child deaths.

Fact 2

Newborn life is fragile. Almost four million children die every year within a month of their birth. Health risks to newborns are minimized by:

- quality care during pregnancy,
- safe delivery by a skilled birth attendant, and
- strong neonatal care: immediate attention to breathing and warmth, hygienic cord and skin care, and exclusive breastfeeding.

Fact 3

Pneumonia is the largest single cause of death in children under five years of age. Out of 154 million cases each year, nearly three-quarters occur in just 15 countries. Addressing the major risk factors for the illness - malnutrition and indoor air pollution - is essential to prevention, along with vaccination. Antibiotics and oxygen are vital treatment tools.

Fact 4

Diarrhoeal diseases are a leading cause of sickness and death among children in developing countries. Exclusive breastfeeding helps prevent diarrhoea among young children. Treatment for sick children with Oral Rehydration Salts (ORS) and zinc supplements is safe, cost-effective and saves lives. The lives of more than 50 million children have been saved in the last 25 years as a result of ORS.

Fact 5

Every 30 seconds a child dies from malaria in Africa. It is the leading cause of death in that region among under-fives. Insecticide-treated nets prevent transmission and increase child survival. Early treatment with anti-malarial medication saves lives.

Fact 6

Over 90% of children with HIV are infected through mother-to-child transmission, which is preventable with the use of antiretrovirals, as well as safer delivery and feeding practices. An estimated 2.3 million children under 15 years of age are living with HIV, and every day more than 1400 are newly infected. Without intervention, more than half of all HIV-infected children die before their second birthday. Antiretroviral therapy for HIV-infected children greatly improves survival rates and quality of life.

Fact 7

About 20 million children under five worldwide are severely malnourished, which leaves them more vulnerable to illness and early death. Around three-quarters of these children can be treated with "ready-to-use therapeutic foods". These highly fortified and energy-rich foods provide ample nutrients for malnourished children aged over six months to be treated at home. They need no refrigeration, and can be used even where hygiene conditions are not ideal.

Fact 8

Child survival rates differ significantly around the world - three-quarters of child deaths occur in Africa and South-East Asia. Within countries, child mortality is higher in rural areas, and among poorer and less educated families.

Fact 9

Child health is improving, but serious challenges remain to achieve global goals to reduce deaths. Still, about two-thirds of child deaths are preventable through access to practical, low-cost interventions, and effective primary care up to five years of age. Stronger health systems are crucial for improving access to care and prevention.

Fact 10

Greater investment is key to achieving the target of Millennium Development Goal 4: to reduce the under-five mortality rate by two-thirds by 2015. Public and private partners must come together to fill the gap - estimated at around US$ 50 billion - in order to meet this ambitious, but achievable, goal. The launch of the International Health Partnership, the related Global Campaign for the Health MDGs, and several large bilateral donor pledges in recent months are important steps in the right direction.

2.2 Health and nutritional status of infant and young children in Bangladesh.

About 36% of newborn babies are of low birth weight (weight at birth 2500gm) that results in a high infant mortality rate.[13] children in Bangladesh suffer from short-term acute food deficits as reflected in low weight-for-age or low weight-for-height as well as from longer term, chronic under - nutrition as manifested in high rates of stunting. The nutrition surveillance programmed (NSP) of HKI recorded substantial improvements in child nutritional status in rural Bangladesh during the last decade. There has been a steady decline in the prevalence of stunting and underweight among

children aged 6-59 months.[14] However, child malnutrition rates in Bangladesh remain very high among the highest in the world.

Chronic under nutrition accounts for a large number of child deaths. Malnutrition manifested as growth failure carries increased risk of mortality and sickness, and can inhibit educability, adult fitness and thus productivity. The high level of growth failure there fore represents an enormous loss of human capital (ADB-2001).[15]

Malnourished children are physically weak, lack resistance to diseases. They do less well at school, they are less productive as adults and they remain vulnerable for the rest of their lives.

Different studies showed that nutritional status of under-5 in Bangladesh is still remarkably worse. Low- birth weight and malnourished children are susceptible to infections; roughly two- thirds of under-fiver deaths are attributed to malnutrition. [16] Some 56% of Bangladeshi children of under-five age suffer from moderate and severe malnutrition, 21% of whom are severely underweight, and studies show that more than 70% of pregnant and breast feeding women are also malnourished. [17] In 2001, half of all children below the age of five were under-weight 57% of them were stunted and 47% anemic. Most children are aged 1 to 5, though they receive vitamin A supplementation in their diets. With the result that less than 1 percent suffers from night blindness. There are major discrepancies in the knowledge and practices of early child hood care and development for the children under the age of 5.[18]

2.3 Health and nutritional situation of mothers in Bangladesh.

At the national level, about one third (34%) of women aged 15-49 years have Body Mass Index (BMI) less than 18.5 and are categorized as chronically energy deficient (CED), this figure is even higher among rural women (37%) and also among mothers' (38%) of under five children.[19]

The affect of Malnutrition among children and mothers' are a major concern. The nutritional statuses of women in Bangladesh are also alarming. The healths of women are a crucial factor for the health of children, but gender discrimination leaves women particularly vulnerable to disease and death. The vicious cycle of malnutrition among

the women of rural Bangladesh perpetuates the cycle of malnutrition and poverty for both men and women in all of Bangladesh. The truth is that a woman's health, from the time she is in her own mothers' womb, is the single most important factor in determining the health of her child. When children are born malnourished and underweight they are at severe risk of personal development, health and mental capacity. They are physically weak and lack resistance to diseases. They face a lifetime of disabilities like lowered capacity for learning and productivity. Maternal malnutrition, infections during pregnancy, anemia and repeated pregnancies contribute to low birth weight babies and a high rate of maternal mortality.[20]

2.4 Nutrition Education

Nutrition education has been defined by Andrien in 1994 as "that group of communication activities aimed at achieving a voluntary change in nutrition related behavior to improve the nutritional status of the population."

The adaptation of existing methods and the adoption of new approaches are required to solve new problems. While economic conditions and food supplies are improving in many countries large numbers of people continue to subsist on monotonous diets of staple foods that do not fill all nutritional needs. Rapid social and technological changes resulting in different life styles and food habits represent major challenges for nutrition education. Nutrition education programs must be taken into account, the economic, organizational and environmental factors, which can positively or negatively, affect dietary habits. Improved nutrition education will involve working in new ways to reach large sections of the population.[21]

While the focus of education activities is on changing individual behaviors, there has been a growing recognition that the health of individuals and their health related behavior is the product of that individual's continuous interaction with his or her environment. This includes, the family, community, culture, social structure, and physical environment.[22]

2.5 Mother's knowledge and feeding practice on exclusive breast feeding and complementary feeding in Bangladesh.

Over the past decades, the evidence of biological requirements for appropriate nutrition, recommended feeding practices and factors impeding appropriate feeding has grown steadily. Moreover, much has been learned about interventions that are effective in promoting improved feeding. For example, recent studies in Bangladesh, Brazil and Mexico have demonstrated the impact of counseling, in communities and health services, to improve feeding practices, food intake and growth.[23]

Targeting nutrition interventions in early life particularly before child become under nourished, is more effective in reducing the childhood under-nutrition (Lancet 2008). Appropriate feeding practices are therefore important for the nutrition, growth, development and survival of infants and young children. These feeding practices include breast feeding and complementary feeding. Improving women's health and reducing maternal and child malnutrition become major challenges to human development in this millennium. Maternal nutritional care through adequate diet and micronutrient supplementations during pregnancy is likely to contribute in child nutrition by giving birth to well nourish newborns. The benefits of exclusive breast feeding for infants and child health resulting in reduced rates of morbidity and mortality in early infancy have been observed in many studies.[24] Immediate breast feeding within the first hour, followed by early exclusive breast feeding improves the health and survival status of newborns.[25] Findings from a Ghana community based study by clearly showed that, initiation of breast feeding within 1 hour of birth could reduce 22% of all neonatal mortality.[26] For all countries combined, it was estimated to be 31% based on this estimation in Bangladesh, about one fifth (20.3%) of the under-5 deaths could be averted annually if all newborns were to be breast feed in the first hour of birth.[27] If this were to happen, "initiation of breast feeding within an hour of birth as a single intervention would make a significant contribution to achieving MDG 4 for which many countries are seriously off track.[28] Lancet child survival series also showed the role of exclusive breast feeding from birth to 6 months to reduce an estimated 13% of all under five child deaths if coverage levels are increased to near universal and another 6%deaths of the some age group could be prevented further by proper complementary feeding from the age of 7 moths.[29]In Bangladesh, lack of food

is not the main cause of malnutrition. The lack of proper caring practices for children and pregnant women is an important contributing factor. Other factors that contribute to malnutrition are lack of sanitation facilities pure water supply and nutritional knowledge etc. In Bangladesh only 48% population have access to proper sanitation facilities.[30]

2.6 Nutrition education programs

Nutrition education programs must take into account the economic, organizational, and environmental factors, which can positively or negatively, affect dietary habits. Improved nutrition education will involve working in new ways to reach large sections of the population.[32]

The Butula Family Life Training Center is one of several centers throughout Kenya that offer nutrition rehabilitation and instruction for mothers of the malnourished children. Three-week courses include health education, agriculture, nutrition, and family planning. This study included home interviews with 53 mothers and found that poor feeding practices, such as skipping breakfast and poverty were the major contributing factors to childhood malnutrition. Effects of the education program were satisfactory: There was some increase in knowledge, but little change in behavior. Recommendations include better staff training, increased community demonstrations (such as gardening), and encouragement of successful participants to become role models in the community, explaining lessons (such as causes of malnutrition) to other mothers. Follow up and recruitment programs could improve the effectiveness of extension workers.[33]

A nutrition education program was successfully integrated into a supplementary feeding program administered by Catholic Relief Services. Educators were trained through a hierarchy of nutrition professionals, supervisors, and local-level teachers. After initial support from USAID, there project was administered by the Ministry of Social Affairs through a well-organized system of 300 centers. The local costs of the costs of the centers and teachers' wages were financed by the participating mothers. Evaluation 14 months after expiration of the initial USAID grant showed that the social education centers had positively influenced the nutritional levels of the children. According to one analysis, the program resulted in a 69% reduction in the incidence of moderate and severe malnutrition, apparently through increases in

mothers' knowledge and resulting changes in their food related practices. Lessons learned through this project include the need for a unified and centralized record-keeping system to document program activities and progress, and the recommendation that dependency on imported foods be minimized.[34]

Nutrition education project directed in Nigeria in rural villages. It was a local community project using communication strategies to reduce vitamin A deficiency through the increased consumption of locally grown foods which are rich in beta-carotene and vitamin A. The community project was reported to be very successful and the program was expanded from 3 to 80 villages.

In Paris, 1982 UNESCO designed to help primary school teachers integrate nutrition education into their existing curricula. It can be used as pre-service or in-service guidance, to promote the exchange to information and ideas about nutrition education at the primary level. In Cyprus, nutrition was integrated into lessons on outline presents nutrition as a unifying theme in courses in mathematics, social studies, and science.[35]

Nutrition education research begins by justifying the need for nutrition education by noting that each new generation must be taught to use and existing food supply intelligently, and that the body of facts which makes up to science of nutrition is evolving. Including studies from 1900 to 1970; the author assumes that certain reports have not been extensively reviewed and that a comprehensive review of the literature is a logical first step toward developing a method to use in evaluating the effectiveness of nutrition education. Indeed, one of the most successful programs reviewed was described in 1910; it provided incentive for children to participate in a weight monitoring and improvement project.[35]

Nutrition training program conducted in Germany in 1920 to provide the population with information on new food products and the general principles of eating for good health, in a way which was accessible, credible and relevant people's lives. The target group was key change agents like health professionals, teachers, community leaders and pre-school children, parents, women. The evaluation shows that national standards for training are needed there is a need for further co-ordination of activities

and for evaluation and assessment of cost effectiveness. This strategy of working within local communities and in client-centered way seems to be working.[37]

A substantial amount of recent research has examined people's knowledge and attitudes about nutrition, and some studies have attempted to relate knowledge to behavior.

Regarding nutrition knowledge, several studies suggest that consumers understand poorly the functions of effects of specific nutrients in the body [18,19]. Those people who tend to be more knowledgeable are younger, better educated, and more affluent, though these variables often showed weak relationships [20,21]. As for attitudes about nutrition the results indicated that individuals who have more favorable attitudes toward nutrition are more likely to have adequate nutrient intakes; but again these relationships were rather weak. Other studies suggest that when people use their nutrition knowledge, they are limited in their ability to use it to select foods and to plan meals.[38]

Many strategies are employed in India to alleviate poverty and malnutrition. The Tamil Nadu Integrated Nutrition Programme (TINP) is a large-scale programme, implemented in the South Indian State of Tamil Nadu since the 1980s. TINP is funded by the World Bank and integrates health and nutrition interventions with a major communication component. The objective of the project was to reduce malnutrition and the consequent high mortality in children less than three years of age and to improve the health and nutritional status of children under three years and that of expectant and nursing mothers. The programme achieved a 55% decline in malnutrition over 72 months. In areas where the programme was evaluated over four years, the reduction was about 35%. Overall a 40% decline was achieved, with spectacular decreases in clinical deficiency signs.[39]

The effects of nutrition education were investigated in Ibadan, Nigeria. Mothers were interviewed about their nutrition knowledge, feeding practices, water supply, cooking facilities, and other household background. The study provides specific suggestion for improving mothers' habits, such as adding powdered milk to the weaning food, a

starchy gruel to improve children's intake safely. Other recommendations cover food storage and preparation and personnel training needs.[40]

A combined Ecuadorian and French study concluded that the health sector or the agriculture sector along could not resolve malnutrition. They also concluded that what was needed was a multi-disciplinary team working on the different cause of malnutrition, whether they were insufficient food supplies, economic difficulties, socio-educational and behavioral maladjustment, or health problems. This study led to the development of ANDES-an analysis-action-training programme. The programme is multi-disciplinary and multi-sectoral. It employs a community development approach which calls on people to participate in a meaningful way and in accordance with their social norms. This programme includes strategies for food production, food security health services, improved sanitation and water, and education and training in the formal and informal sectors among all community members of all ages. Children's knowledge attitudes, and gardening skills were evaluated using experimental and control classes. Tests were validated and results statistically analyzed. There were significant knowledge gains for all children. The children's skill levels increased markedly between the beginning and end of the school year. The results for increased self-esteem, self-confidence and application were extremely positive.[41]

A nutrition education project was taken in South Sumatra. A detail household interviews and field trials were conducted in the developmental phase of the project. The open-ended, participant-observed interviews with 328 households served as the basis of trials of new weaning foods. The results of the trials are discussed in detail, providing and example of the exhaustive formative research which was one reason for the program's success. The mass of information about the women's knowledge, attitudes, and practices includes data contrary to that, which would have been assumed without such advance research.[42]

Nutrition instruction provided at maternal and child health centers by trained nurses was evaluated by interviewing kikuyu mothers of children 6 month to 5 years old. Data were collected on maternal nutrition knowledge, child food consumption, and anthropometric measures. Impact of the program was evaluated by comparing a group

who attended frequently with a group of mothers who were infrequent visitors to the health centers. Nutrition education did succeed in increasing knowledge & the authors conclude that more effective interventions should be sought.[43]

A Successful Health Education Program was conducted in Sierra Leon in 1980. The objective of this project was to develop educational materials for use in rural villages and measure their ability to produce behavioral changes in lactating women. Pregnant mothers were interviewed about their demographic and household characteristics, health and nutrition practices, and dietary intakes, survey findings were used to develop ten group discussion sessions about health and nutrition. A flip chart presented photographs illustrating the lessons, and health education teams were trained in communications and evaluation. Follow-up interviews with women fitting the same socioeconomic backgrounds as the original group found that those receiving education through this program had made several changes, notable more mothers' boiled drinking water, and both mothers and their infants ate more fruits, vegetables, and protein foods.[44]

A nutrition education program was conducted in remote northern communities, both inuit and indian. The program identifies nutritious foods in company stores, A nutritionist works with store personnel and community members to promote awareness through activities such as a newsletters and workshops emphasizing nonverbal messages. The authors conclude that such repeated, consistent messages from a variety of sources confirm and reinforce the basic messages and could promote the adoption of new behavior and lead to improve nutritional status.[45]

In Indonesia, a project developed posters, radio spots, a flip chart, and a manual, using extensive preliminary research on local food habits and beliefs, as well as involving individuals in the development of the messages used. One of the materials' strengths is that each item (poster, radio spot, etc.) focuses specifically on one problem, transmitting a specific message; the posters also advise mothers to seek further information from health workers. The pilot project evaluation found positive associations among knowledge of the major messages, actual implementation of the

recommendations, increased protein and calorie consumption, and improved growth status of the children.

A nutrition program operated in nutrition centers in seven villages around Bulape, Zaira. Malnourished children 5 to 24 months old accompanied by their mothers spent 12 weeks in the centers. Families provided wood and foods; the centers provided a trained auxiliary who provided nutrition education and supervised food preparation. Children were evaluated upon discharge and nine and 12 months later. Compared with matched control children, who had not attended the centers, participants showed little advantage: boys' weight for age and weight for height improved during their stays at the centers.[46]

Teachers from 40 randomly selected schools in Combinatore District, India, were given a five-day course in principles of nutrition and health. They then taught nutrition in the classrooms, integrated into the regular curriculum. The course promoted the selection, production, preparation, conservation, and consumption of a well balanced diet. Evaluation showed improved knowledge of both the teachers and the students, differing significantly from a control group. Beliefs and practices also improved; for example, the teachers had improved the lunch served at the schools.[47]
Nutrition Education program were conducted in Uganda, 1971-1972. The major purpose was to contribute to methods in evaluative research in nutrition intervention programs. Conducted in the inpatient and outpatient departments of a Nutrition Rehabilitation Center (NRC) in Kampala & an outpatient clinic at Luteete, the study administered pre-and post- tests to mothers receiving nutrition education. Nutrition knowledge & food preferences were improved, & more mothers could recognize signs of malnutrition.[48]

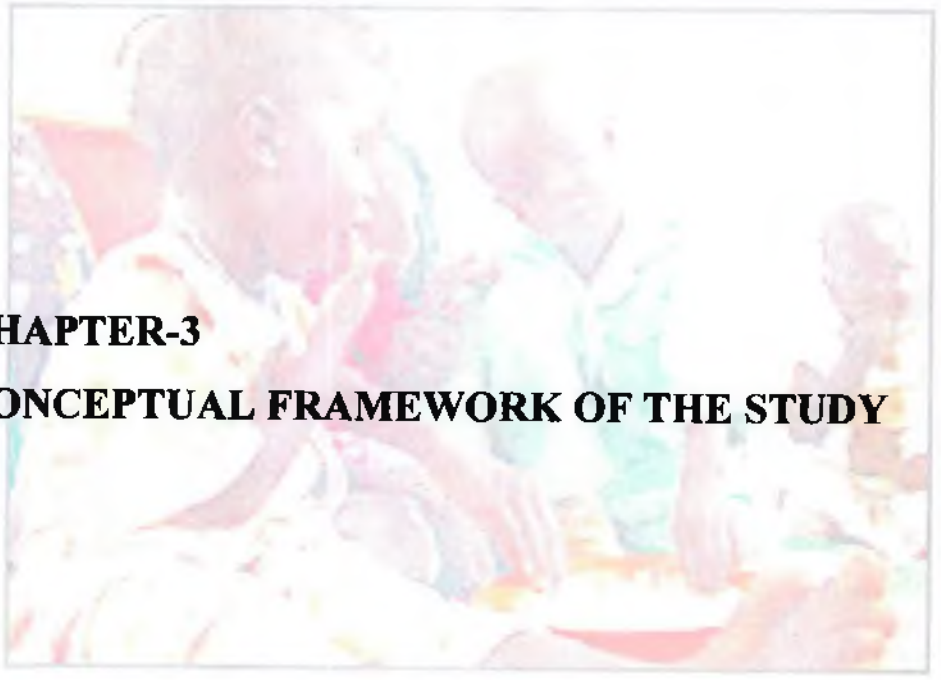
The U.S. national Nutrition Education & Training Program (NETP) was conducted to provide nutrition education to school children, their teachers, and food service personnel; and food service personnel; and to provide for the development of nutrition education materials. A preliminary evaluation after two years of operation found that the program was meeting its initial objectives: programs were operating in nearly all states; funds were being used as intended, focusing on local rather than large-scale

development; programs were addressing the problems identified in state-level needs assessments. Both centralized (state- level curricula) and decentralized (multiple or generalized curricula) were found to have had large positive influence on children's nutrition- related knowledge. There was some willingness to try new foods (a major attitude change) & some positive effect on food preferences and other attitude.[49]
Mothers of 200 children under one year old receive nutrition education through the pediatric department of a general hospital in Bombay, India. Pediatric social workers & cooks gave presentations including the importance of breast feeding, early introduction of semi-solid foods, frequent small meals, cheaply available nutritious foods and hygiene. Flip charts and other aids were used. A questionnaire at the end of the session indicated that 40% of the mothers had fully understood the presentation.[50]

It has been shown that household decision-making does indeed change with the education of women, with greater shares of household resources becoming available to women and children. Clearly the effects of women's education on their nutritional status and on that of their children is exerted through their roles as providers of household health and nutrition care.[34]

A training program was arranged in conjunction with the Bangladesh Rural Development Board (BRDB). Field-level workers, including female co-operators of the BRDB, were trained to direct the program using lectures, discussions, and demonstrations. Trainers were grouped into teams of three, one of whom was the leader. Mobile units for education and training were made available with UNICEF assistance. Booklets written in Bengali, posters, slides and photographs presenting nutritional deficiency diseases, and flannel board demonstrations of the function of food groups were some of the educational aids used in the program. The contents of the training covered breastfeeding, infant feeding, clean water, environmental hygiene, and immunization. Pre- and post-tests indicated that the messages did reach the learners. There was no systematic evaluation for long-term impact. However, female co-operators responded positively to follow-up visits and have disseminated the knowledge to their fellow co-operative members. Further evaluation is required to assess the effectiveness of their influence on food behaviors and practices and on the nutritional status of the people.[35]

A study was undertaken among the mothers of one hundred fourteen hospitalized children aged below five years. Half of the study children were grouped as cases, whose respondent mothers received nutrition education and mothers of the another half didn't received any nutrition intervention. Nutrition education sessions using a specific method and structured questionnaire were conducted among the respondent's mothers of cases after the collection of baseline information. A significant improvement of knowledge, attitude and practice about balance diet, food preparation, hygienic condition, childcare and food misbelieve were observed among intervention group as compared to control group. 10.6% and 24.6% respectively from baseline to follow-up in cases decreased prevalence of underweight and wasting. The study indicates the importance and effectiveness of the nutrition education sessions as shown by the improvement of the knowledge, attitude and practice of the respondent mothers.[36]



CHAPTER-3
CONCEPTUAL FRAMEWORK OF THE STUDY

Conceptual framework of the study

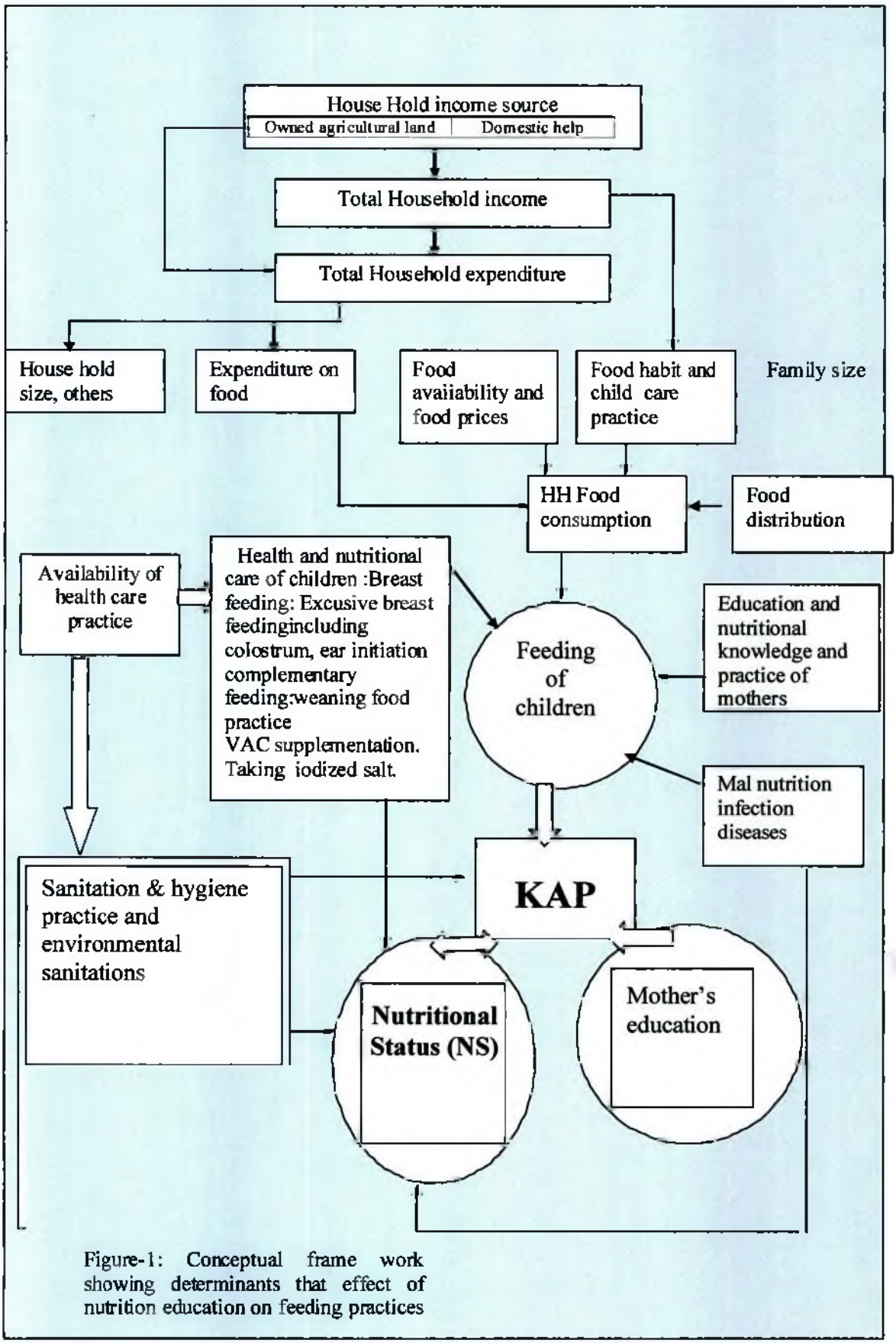


Figure-1: Conceptual frame work showing determinants that effect of nutrition education on feeding practices

3.1 Factors of health and nutritional status of infant and young children.

Food, health and care are all necessary for healthy survival, growth and development; according to the UNICEF conceptual frame work, All three elements must be satisfactory for good nutritional status.

Figure-1 is a model which shows how nutritional status of infant and young children could possibly be influenced by three main factors manly

1. Nutrition education, knowledge and
2. Food and nutrient intake and feeding practices including Breast feeding initiation, exclusive breast feeding and complementary feeding, etc.
3. Caring practice of mothers.

3.1.1 Caring practices of the infant and young children's mothers.

The three underlying causes of malnutrition namely food, health and care, the one with the least investigated and the least understood role is care. But for young children the relationship between care and nutrition is especially important than other cases.[33] Engle provided a working definition referring to the care of young Children; "Care refers to care giving behaviors such as breast feeding diagnosing illness, determining when a child is ready for supplementary feeding, Stimulating language and other cognitive capacities and providing emotional support." Even when Poverty causes food insecurity and limited health care, enhanced care giving can optimize the use of existing resources to promote good health and nutrition in women and children. Breast feeding is an example of a caring practice that provides food, health and care simultaneously.[34]

3.1.2 Mothers Education and Nutritional knowledge

Mothers' education and nutritional knowledge is a factor affect of health and nutritional status of infant and young children. Level of education improves health and nutritional status. Education can have an impact on nutritional status for better

chance of obtaining employment opportunities and income security and it improve people's ability to access and understand information to help keep then healthy. With low educational attainment and restricted employment opportunities, the house hold has low socio-economic status leading to low food purchased, consequently. to inadequate food intake. Format education of parents especially the mother has an important role in influencing food consumption, both in the household and in the individual level. It is generally expected that the education of parents would have an effect on the adequacy of nutrient intake of family members. Better educated mothers tend to make decisions by choosing and preparing nutrition's food. Different researches suggested that mothers' education is one of the more important factors in promoting family health and nutrition increasing household income.[35]

The problem of inadequate nutrition is often attributed to lack of nutrition knowledge among mothers. Study in diet of young children in Ohio, in the United States indicated that mothers with better education had a tendency to stress the vitamin and mineral rich foods rather than energy risk foods. Furthermore, it was reported from different studies that the consumption of vitamin A and C rich foods was positively correlated with the education of the mother and found that the average daily intake of calorie, protein calcium, iron, vitamin A and vitamin C of children were parallel to the education of the mother. This means that, as the mothers schooling increased, so Sid the nutrient intake of the children. Moreover, diet rating and adequacy of protein intake has significant positive co-relation with mother's education. This mother's education and knowledge of nutrition could directly affect food consumption and well health and nutrition status of the children.

3.1.3 Health status of the infant and young children.

The world health organization (WHO) defines health as "a state of complete physical, mental, and social well being and not merely the absence of disease." Health status is another determinant that affects food consumption and nutritional status of household or an individual. Health and nutrition is interrelated and the synergistic effect of the both make one physically and mentally sound as well as free from diseases affects nutritional status through the adverse effect on the body system intake, utilization,

absorption and immunity. Good health status is a pre-requisite for good nutrition status; other wise it would impair food intake, to aggravate poor nutritional status.

Health and nutritional status of infant and young children depends on some important factors, these are

3.2 Morbidity Pattern.

Morbidity pattern of the children affects food and nutrient consumption as well as health status simultaneously. Infectious diseases such as diarrhea, ARI pneumonia and measles precipitate malnutrition due to its adverse effect on hurt and thus influence both health and nutritional status simultaneously. It is reported that frequent episodes of infections can cause malnutrition .[39] IN less developed countries, the high incidences of these diseases are linked by poverty with its implication on nutrition status. In Guatemala, Gambia and Bangladesh, children suffering from diarrhea experienced weight deficit 10-15 percent reaching one Kg or more per year. Thus infections diseases directly affect health and nutritional status of infant and young children.

3.3 Preventive and Nutrition education services.

An important preventive service of primary health care (PHC) is 9-vaceinations package of newborn under EPI program which play an important role for the better most of health and nutrition of under-5 children by preventing these deadly infectious diseases. Health and nutrition education campaign for the promotion of breast feeding among pregnant and lactating mothers can also be a remarkable preventive service of primary health centers.

3.4 Breast milk.

Have anti-infective properties and rich immune-nutrient constituents which interact with epithelial surface or specific substances in the gastrointestinal lumen during digestion and absorption of milk. Exclusively breast feed babies are less likely to be exposed to contaminated foods and may have a better nutritional status in the months of life that may contribute to reduction in the incidence and severity of infectious

diseases. Compared to exclusive breast feeding for the first few months of life, a partial or no breast feeding has been reported to be associated with much higher risk of infant deaths resulting from all causes and ARI. Breast feeding lowers the frequency and duration of acute respiratory infections and diarrhea in infants.[40]
Nutrition education can improve on the following topics of health, nutrition, infectious diseases, malnutrition, child care including Brest feeding and weaning practice and environmental sanitation and personal hygiene etc.

3.5 Economic factors

Economic factors such as income, expenditure food availability and expenditure on food can greatly affect household food consumption which eventually can influence food and nutrient intake of the children. A number of studies have illustrated that children from poor households tend to be more undernourished than children in wealthier households.[41]

3.6 Environmental factors.

Poor environmental sanitation may cause high incidence of water borne disease (Diarrhea cholera, shigellosis and typhoid) , air born diseases (Influenza, measles, mumps, pneumonia, whopping cough or pertussis) vector-born disease Malaria , dengue, filariasis) and other diseases related to poor housing condition and hygiene. Environmental sanitation factors such as waste excrete disposal and source of drinking water have a direct influence on health status of the young children. Poor waste disposal system may cause outbreaks of disease such as diarrhea, typhoid fever, Scistomiasis and hepatitis that can be easily contacted by under -6 children through agents.

3.7 Family Size.

Household size also influences the distribution of food within the household. Family size is one of the important factors affecting food consumption and nutritional status. An increase in the number of the household members may lead to detrimental effect on food consumption especially for the poor households. As the member of household member increases there is likely to cause a decrease in the allocation of food per child. This leads to a reduction in nutrient intake of the house holds members.

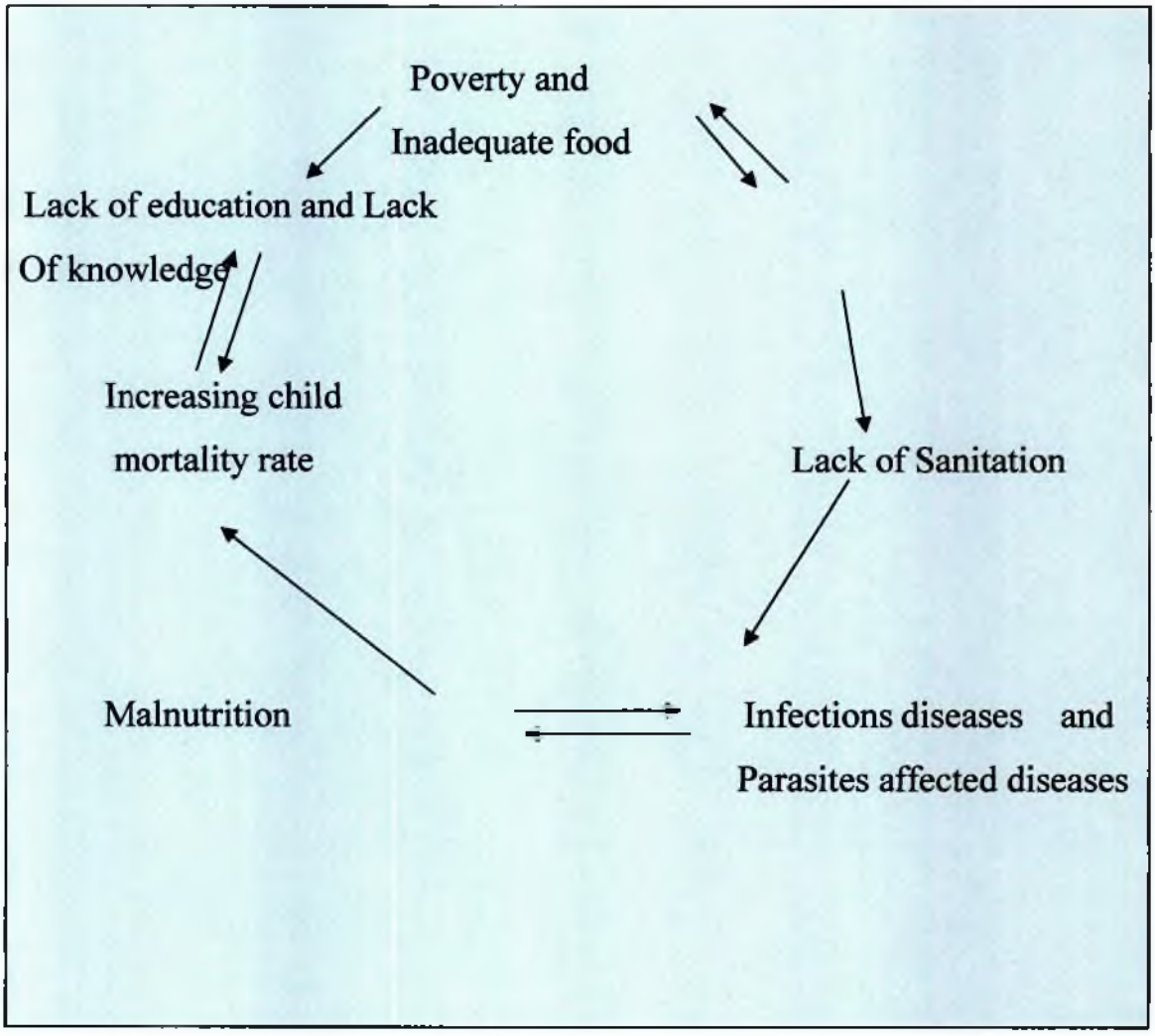
3.8 Mothers age and nutritional status.

Mothers' age and nutritional status is considered as an important factor that influences nutritional status of the children.

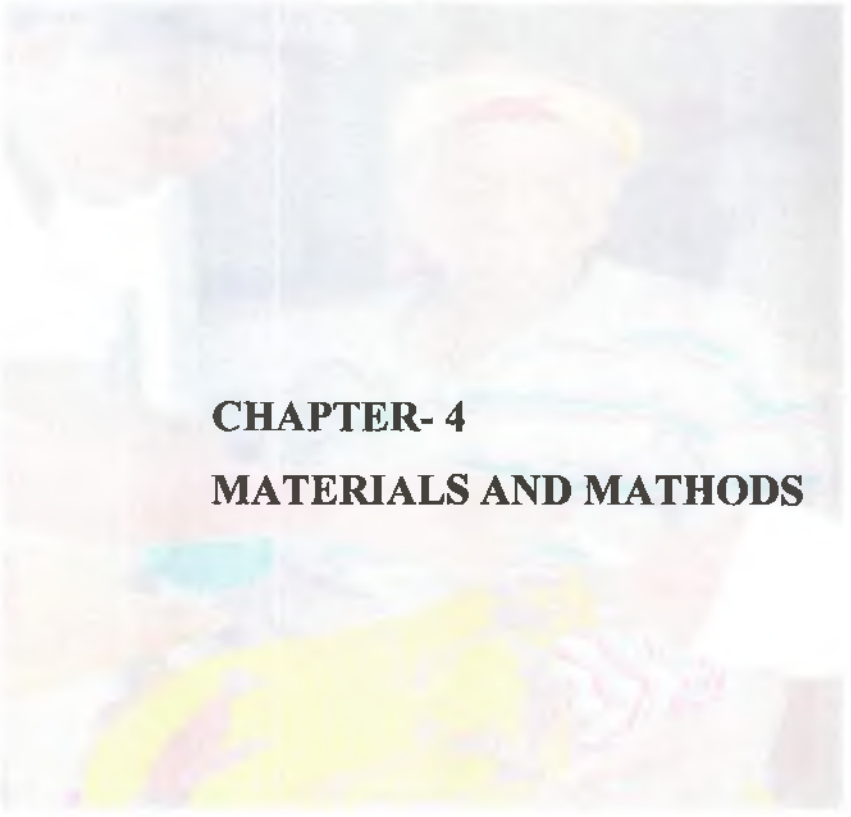
3.9 Social factors.

Some social factors i.e. food habit, family size, food availability food security, food prices also affect nutrient intake of the children. Thus, nutritional status of infant and young children can be determined by different types of influential factors such as economic factors, and expenditure on food, these factors influence the activities in purchasing as well as consumption of food, which eventually affect the nutritional status of IYC. Some social factors (i.e. mothers' age, education, and nutritional knowledge) and morbidity (i.e. infectious diseases and malnutrition) also influence food and nutrient consumption of under two years' children. More over, immunization, exclusive breast feeding, colostrums, complementary feeding VAC directly affects health and nutritional status of IYC. Environmental sanitation factors (i.e. safe drinking water, personal hygiene) also directly influence nutritional status of `IYC. Child caring practices of mothers alone can affect a lot on the nutritional status. The children as it is considered as an important driving force of child well being.

Figure-ii. Social Causes of Malnutrition



Poverty creates illiteracy, illiteracy bars creating habits of sanitation and health. Lack of sanitation pollutes environment and spread contagious diseases. As a result break out of contagious diseases becomes a day today matter. In other words lack of nutrition education and awareness go with contamination and malnutrition hand in hand. That means contamination causes serious hindrance to the utilization of find and thus deteriorates the nutrition situation. In conclusion it can be said that nutritional knowledge, awareness, proper weaning parties, exclusive breast feeding and food habit, adequate food supply, sanitation and personal hygiene practices of mothers develops child immune system and removes malnutrition of children.



CHAPTER- 4
MATERIALS AND MATHODS

4.1 Study Design

A cross-sectional survey was carried out among 600 mothers of Nilfamari District during February to December, 2008 to identify their socio-demographic-economic variables and nutritional status of them and their <2 children.

A cohort of mothers (N=300) was selected using a selection criteria for the intervention with the developed NEP. The mother-child cohort was followed up to 4 months along with a matched-paired control (N=300).

At the end of follow-up period, the KAP levels of mothers, the nutritional status of mothers and the nutritional status of their <2 years children were determined in all groups. The KAP score and nutrition status of <2 children were compared between baseline and the follow-up both vertically and horizontally.

4.2 Sample size and sampling

The sample size was determined on the basis of the prevalence of the key nutritional stains and IYCF variables such as underweight (46%), exclusive breast feeding rate (36) etc. Calculation was done with the assumption of 90% CI. 5% error level and 10% were added for possible non-responses.

Sampling flow-chart is shown below:

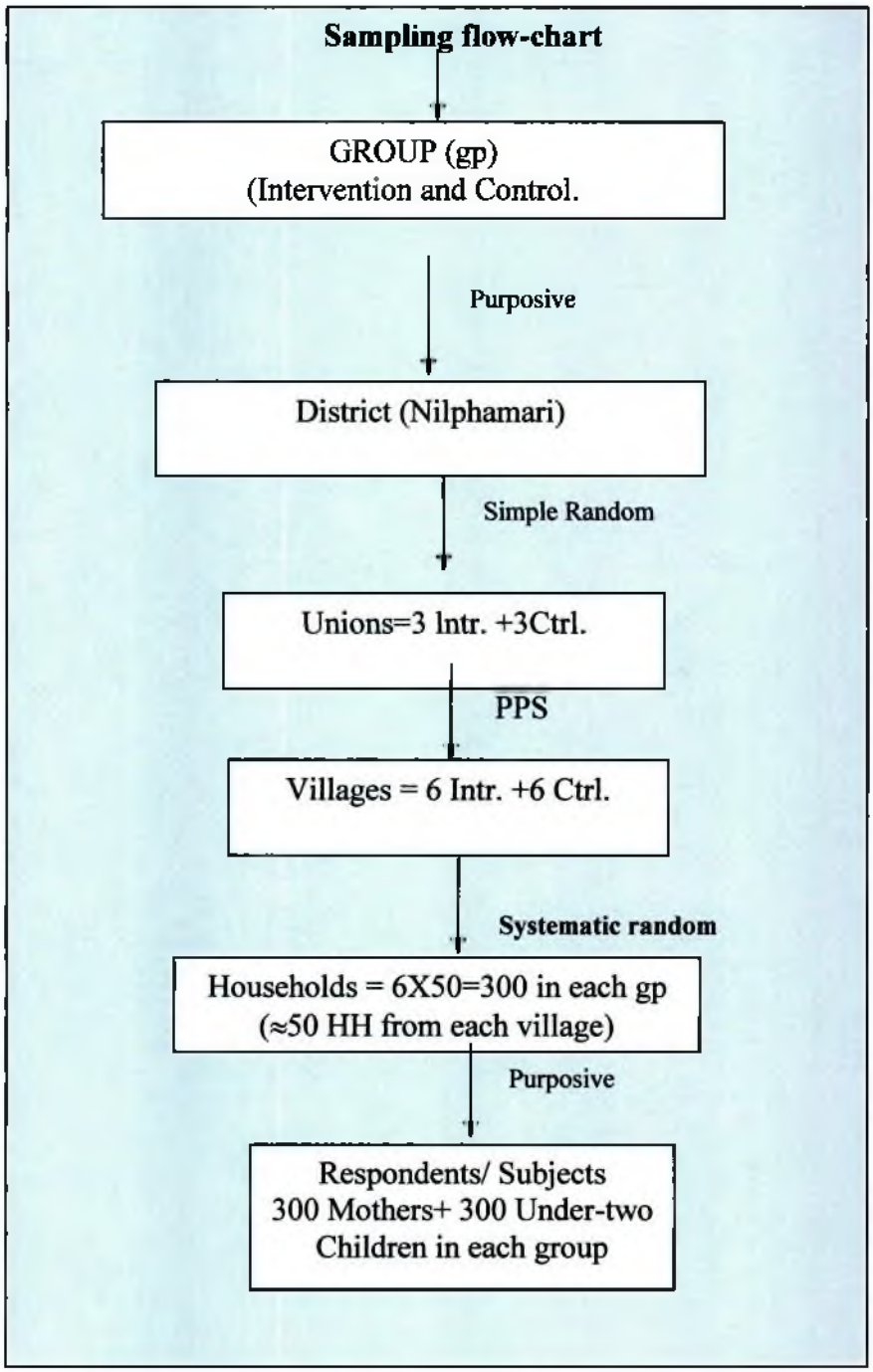


Figure-3 Sampling flow-chart

4.3 Sample Selection criteria

- All the households with under-two children (0-23 months old) in the selected villages were eligible to be included in the survey. However, since there were 6 villages for covering 300 households in each group, equal number of

households from each village (300/6=50 HHs) attempted to select using systematic random method.

- Household screening was done anti-clock wise that started from a point of the villages. In the bigger Villages Where more than 50 households with under-two children were found, first 50 were selected.

- In the Small villages where 50 households with under-two children were not found, shortage numbers of households were covered from the next selected villages under same union.

- If there were more than one under-two children with the mother selected for interview, youngest child was considered for nutritional assessment and feeding information.

Box 1. Key sampling features

- ❖ Equal number of unions from each group (Intr. and Ctrl)
- ❖ Equal number of Villages per unions selected as per PPS method.
- ❖ Targeted equal number of Households per village
- ❖ Included last child in case of household with more than one under-two
- ❖ Selected households with at least one under-two-child

4.4 Study location

The study was conducted 6 unions of Nilphamari District. Their are 3 unions for intervention and 3 unions for control group .6 villages for intervention and 6 villages for control group are selected from those 6 unions (Respective data were collected on 600 mothers and 600 under two children from the randomly selected).

Box 2. Over view of study location according to sampling units

Group	Upazila	Unions	Villages	No. of HH Surveyed
Intervention	Saidpur	Bangalipur	Bangalipur	55
			Laksmanpur Bala	45
	kishoriganj	kishoriganj	Kishoriganj	52
			Madhya Rajib	56
			Ismail	52
	Domar	Domar	Bara-Rauta	52
			Total =	312
Control	Sadar	Hakhola	Hakhola	61
			Sreenath	38
	kishoriganj	Bahagili	Dakshin	50
			Duraputi	
			Uttar Bahagili	50
	Dimla	Nautara	Kakra	50
			Shalhati	51
			Total=	**300**

4.5 Study population

Mothers with infant (<12 month) and young children (>24 months) included as study population to conduct the study, written consent was taken from the mothers with under-two children.

4.6 Time frame

The baseline and the follow up data were collected including conduct of nutrition education sessions were undertaken between February, in 2008 to December, in 2008.

4.7 Study instruments

1) Questionnaire
2) Measuring instruments
   i) Bathroom Scale (TANITA, Japan): weight measurement
   ii) Wooden height cum length board.
3) NEP
   i) Tanning programs using flip charts
   ii) Oral presentation
   iii) Audio like short drama & song

4.8 Development of questionnaire

A standard questionnaire was developed in accordance with the study objectives to obtain relevant information regarding dietary practice during pregnancy, socio-economic status such as educational status, self occupation, family size, number of children, colostrums feeding, breast feeding period and anthropometric indices such as weight, height were included in the questionnaire to obtain data from the households who had male and female, children between 0 month to 23 months. The questionnaire is enclosed in Appendix-1. The questionnaire consisted of five major components which are given bellow as box format:

Box-3 The overview of the questionnaire summary is given as box format

A. INFORMATION ON HOUSEHOLDS (HH)	
1. Demographic Characteristics	Household size (members eating together for 6 months or more), Gender of the head of the household (HoH), Education of HoH, Religions Status of the household, number of dwelling rooms and type of main dwelling rooms in the household.
2. Economic Status	Ownership of homestead, ownership and size of agricultural land, Perceived Economic Status for the one year prior to the interview, food Security status in terms of consumption of 3 meals per day all-time by all members over the year,
3. Sanitary Habits and type of water used	Types of toilet facilities used by the household, Sources of drinking, cooking, bathing water
B. INFORMATION ON THE MOTHERS	
1. Background Characteristics	Age, marital status, age at first marriage, educational status, occupational status,
2. Fertility Status	Number of live births, still births and abortion, gestational period (duration) for last child
3. Personal Hygiene practice	Type of agent and water used for washing hands before feeding child, own eating, after cleaning the child after defecation and after using toilet herself.
C. INFORMATION ON THE STUDY CHILDREN (0-23 M)	
1. Background Characteristics	Age, sex, birth-weight birth order immunization status, morbidity status for last one week (incidence of selected illness), weight at birth.
2. Feeding Status	Breastfeeding initiation after birth, colostrums and exclusive breastfeeding status,
D. MOTHER'S NUTRITIONAL KNOWLEDGE	
1. Material Nutrition	Food consumption pattern during pregnancy, benefits of iron supplements during pregnancy and vitamin A supplements during post-partum
2. Infant and Young Child feeding	First feed for newborn, Breastfeeding initiation time after birth, exclusive breastfeeding period, time of complementary food initiation, nutritious food for children
E. NUTRITIONAL PRACTICES	
1. Maternal Nutrition	Food consumption pattern during last pregnancy, taken iron supplements during last pregnancy and taken vitamin A supplements during last post partum period.
2. Infant and Young Child feeding	For last child: Breastfeeding initiation time, exclusive breastfeeding period, time of complementary food initiation
3. Household	Use of iodized salt for household cooking
F.NUTRITIONAL STATUS	
1. Mother:	Height, Weight (Converted into BMI)
2. Child	Weight, Length (Converted into WAZ, HAZ, WHZ) Nutritional status according to independent variables predictors of Under nutrition.

4.9 Pre-testing of questionnaire

The questionnaire was pre-tested among respondents in another area of the same socio-economic status (Daudkandi Thana) who were unaware about the study purpose. Then it was modified as required as per their responses and finalized to obtain study data.

4.10 Recruitment of the project personnel and study team

Only two staff members namely one 'Field Assistant' were recruited under this study. They were provided a 15 days training from 3rd February to 17th February, 2008.

4.11 Pronouncement of consent

The purpose of the study was explained to each respondent mother. After having verbal permission from them, the data were collected from them.

4.12 Conduct of Field work

Firstly we went to rural of Nilfamari district and identified the families having < 2 years children. A close ended questionnaire was filled in by interviewing the mothers, weight, height of the <2 years children were recorded.

At the same time we have conducted nutrition education sessions each having 45 minutes duration among the intervention group mothers as per following schedule-

Session 1: Food consumption pattern and correct knowledge on food consumption during pregnancy.
Session 2: Benefits of iron supplements during pregnancy and vitamin A supplements during post-partum.
Session 3: First feed for newborn, Breastfeeding (colostrums) initiation time after birth.
Session 4: Exclusive breastfeeding period, time of complementary food initiation.
Session 5: Nutritious food for children and including immunization.
Session 6: Personal hygiene and sanitation.
Session 7: Importance of practice on colostrums feeding and
Session 8: Importance of practice of mothers about increasing breast milk.

Each group of intervention group mothers was exposed to nutrition education session once weekly during May to August 2008 by us. Audio-visual aids including posters, leaflets and audio-cassettes were used during the deliberation of nutrition information.

4.13 Information of NEP

- Exclusive breast feeding
- Complementary feeding
- Micronutrients
- Balance diet
- Mothers knowledge and practices on maternal nutrition.
- Food consumption pattern
- Initiation of breast feeding of colostrums
- Hygiene and sanitation
- General illness and immunization

4.14 Conduct of follow up examinations

After 4 (four) months of baseline survey and subsequent exposure to nutrition education, the whole exercise of assessment of nutritional knowledge, attitude and practice (KAP) with same questionnaire as well as anthropometric measurements of respondents were carried out

4.15 Training programs using flip charts

The flip charts are shown in the followings:

চার্ট- ১

গর্ভকালীন মাকে প্রতিবেলা খাবার কিছুটা বেশি পরিমাণে খেতে দিন।

- মা ও গর্ভের শিশুর পুষ্টির জন্য মায়ের একটু বেশি খাবার প্রয়োজন।
- একটু বেশি খাবার খেলে গর্ভের শিশু সঠিকভাবে বাড়বে ও সুস্থ থাকবে।
- প্রসবের সময় মার প্রচুর শক্তির প্রয়োজন হয়, তাই গর্ভকালীন মাকে বেশি পরিমাণে খেতে দিলে মা দুর্বল হয়ে পড়বে না।
- প্রতিবেলায় ছবিতে দেখানো ৩ ধরনের খাবার থেকে সাধ্যমতো কিছু না কিছু খাবার মাকে খেতে দেবেন।
- রান্নায় আয়োডিনযুক্ত লবণ ব্যবহার করুন, তবে পাতে কাঁচা লবণ না খাওয়াই ভাল।

চার্ট- ১

চার্ট- ২

গর্ভের ৫ মাস থেকে প্রসবের পর ৩ মাস পর্যন্ত মায়ের প্রতিদিন ১টি করে আয়রন-ফলেট বড়ি খাওয়া উচিত।

- এতে মায়ের রক্তস্বল্পতা কমে যাবে।
- শিশুর জন্মকালীন ও জন্মপরবর্তী রক্তস্বল্পতা হবে না।
- গর্ভের শিশুর বুদ্ধির বিকাশ সঠিকভাবে হবে।

প্রসবের পর থেকে ৪২ দিনের মধ্যে মাকে ১টি উচ্চ ক্ষমতাসম্পন্ন ভিটামিন-এ ক্যাপসুল খেতে হবে।

- এতে মায়ের স্বাস্থ্য ভাল থাকবে।
- মায়ের দুধের মাধ্যমে শিশু চাহিদা অনুযায়ী ভিটামিন-এ পাবে। ফলে ডায়রিয়া ও নিউমোনিয়া হওয়ার আশঙ্কা কমে যাবে।

চার্ট- ২

চার্ট- ৩

জন্মের সঙ্গে সঙ্গে (গর্ভফুল পড়ুক বা না পড়ুক) নবজাতককে শালদুধ দিন।

- জন্মের পর যত দ্রুত সম্ভব (১ ঘন্টার মধ্যে) নবজাতককে শালদুধ খাওয়ান।
- শালদুধ নবজাতকের প্রথম টিকা হিসেবে কাজ করে যা নবজাতককে বিভিন্ন রোগ থেকে বাঁচায়।
- নবজাতকের শরীরের জন্য যা প্রয়োজন তার সবই শালদুধে আছে।
- শালদুধকে খারাপ বা দূষিত দুধ বা পচা দুধ মনে করে ফেলে দেওয়া যাবে না।
- জন্মের সঙ্গে সঙ্গে অন্য কোন দুধ, মধু, চিনি বা মিছরির পানি বা অন্য কোন কিছু দেওয়া যাবে না।
- শালদুধ খাওয়ালে মায়ের গর্ভফুল পড়তে সাহায্য করে ও জরায়ুকে পূর্ব অবস্থায় ফেরত আসতে সাহায্য করে।

প্রসবের পরে প্রথম তিনদিন যতটুকু শালদুধ আসে তাই নবজাতকের জন্য যথেষ্ট।

চার্ট- ৩

চার্ট- ৪ (ক)

সঠিকভাবে শিশুকে মায়ের দুধ খাওয়ান।

- সঠিকভাবে মায়ের দুধ খাওয়ালে শিশু যথেষ্ট পরিমাণে দুধ পাবে।
- মায়ের দুর্বল স্বাস্থ্য অথবা সিজারিয়ান অপারেশন, শিশুর পর্যাপ্ত দুধ পাওয়ার জন্য বাধা নয়।
- মা আরাম করে বসে বা শুয়ে শিশুকে মায়ের দুধ খাওয়াবেন। শিশুকে এমনভাবে ধরবেন যাতে শিশুর মাথা ও পিঠ মায়ের দিকে ফেরানো থাকে, শিশুর ঘাড় মায়ের এক হাতের কুনইয়ের ভাঁজের উপর থাকবে ও অপর হাত দিয়ে শিশুর নিতম্ব ধরে থাকবেন। শিশুর মুখ মায়ের স্তনের দিকে ও নাক স্তনের বোঁটা বরাবর থাকে। মায়ের পেটের সঙ্গে যেন শিশুর পেট লাগানো থাকে।
- মা শুয়ে খাওয়ালে শিশুকে মায়ের হাতের উপর রেখে পাশ ফিরে শোয়াতে হবে এবং মা নিজেও একপাশ ফিরে শোবেন, মায়ের পেটের সঙ্গে যেন শিশুর পেট লেগে থাকে।

শিশুকে রাতের বেলায়ও মায়ের দুধ দিতে হবে।

- মনে রাখবেন, শিশুকে রাতের বেলায় মায়ের দুধ দিলে, পরের দিন মায়ের বুকে অনেক দুধ তৈরি হয়।

চার্ট- ৪ (ক)

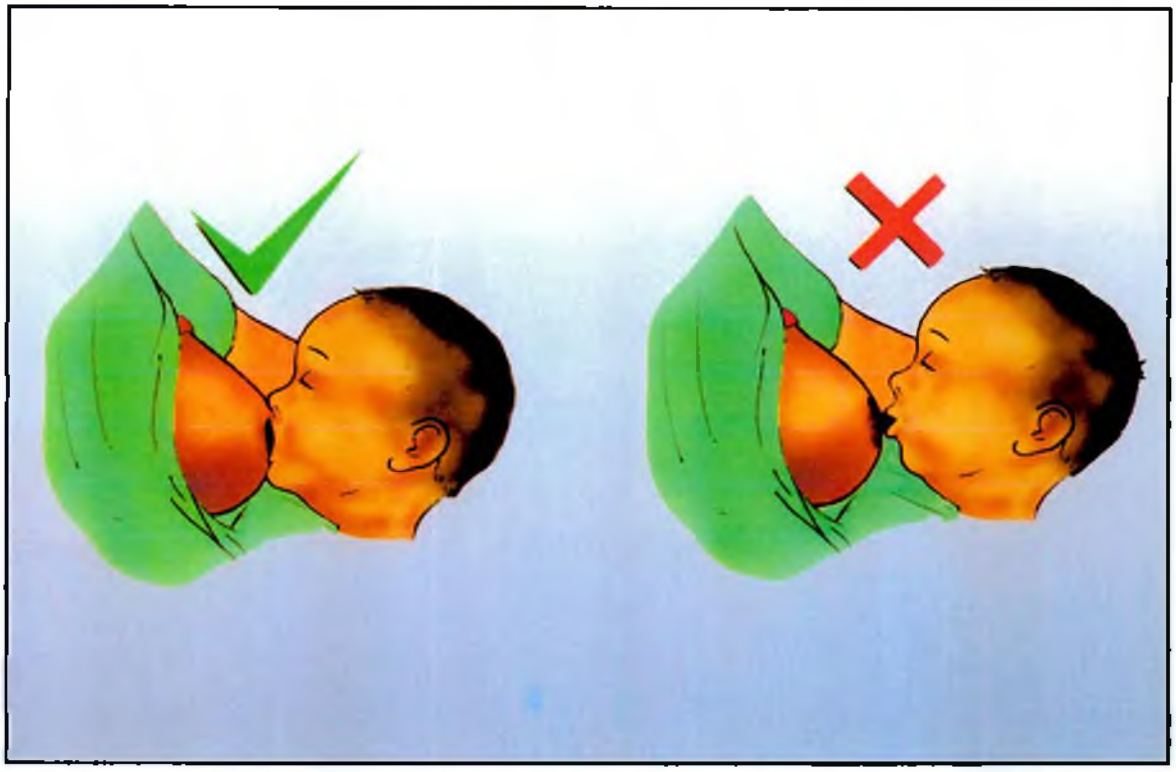
চার্ট- ৪ (খ)

- বুক স্পর্শ করালে শিশু যখন বড় হা করবে, তখন বোঁটার চারপাশের কালো অংশসহ শিশুর মুখে দিতে হবে। কারণ বোঁটার চারদিকের কালো অংশের নিচে বুকের দুধ জমা থাকে।
- এভাবে দুধ খাওয়ালে মায়ের বুকের বোঁটা ফেটে যাবে না, শিশু বেশি দুধ পাবে।

প্রতিবারে কেবল এক বুকের দুধ খাওয়ান। পরের বার অন্য বুকের দুধ খাওয়ান।

- এতে করে বাচ্চা পরিমাণ মতো দুধ পাবে।

চার্ট- ৪ (খ)



চার্ট- ৫ (ক)

জন্মের পর পুরোপুরি ৬ মাস বয়স পর্যন্ত শিশুকে শুধু মায়ের দুধ খাওয়ান।

- জন্মের পর পরোপুরি ৬ মাস বয়স পর্যন্ত শিশুকে শুধুমাত্র মায়ের দুধ খাওয়ালে অন্য কোন খাবার এমনকি পানিরও প্রয়োজন নেই।
- শিশুকে কখনও এমনকি গরমকালেও আলাদা করে পানি দেওয়ার দরকার হয় না। কারণ মায়ের দুধে প্রচুর পরিমাণে পানি থাকে।
- ৬ মাস বয়স পর্যন্ত শিশুর সঠিক বৃদ্ধি ও বিকাশের জন্য প্রয়োজনীয় সব পুষ্টি উপাদানই মায়ের দুধে আছে।
- মায়ের দুধ জীবাণুমুক্ত, যা শিশুকে বিভিন্ন রোগ থেকে রক্ষা করে।
- শিশুকে কৌটার দুধ, গরু, ছাগল বা মহিষের দুধ খাওয়ালে তার অসুখ বেশি হয়।
- মায়ের দুধ খাওয়াতে বাড়তি খরচ নেই এবং সংসারের কাজের ফাঁকে ফাঁকে মা তার শিশুকে দুধ খাওয়াতে পারেন।

চার্ট- ৫(ক)

চার্ট- ৫ (খ)

জন্মের পর পুরোপুরি ৬ মাস বয়স পর্যন্ত শিশুকে শুধু মায়ের দুধ খাওয়ালে বিভিন্ন অসুখের আশঙ্কা কমে যায়। যেমন- ডায়রিয়া, নিউমোনিয়া ইত্যাদি ।

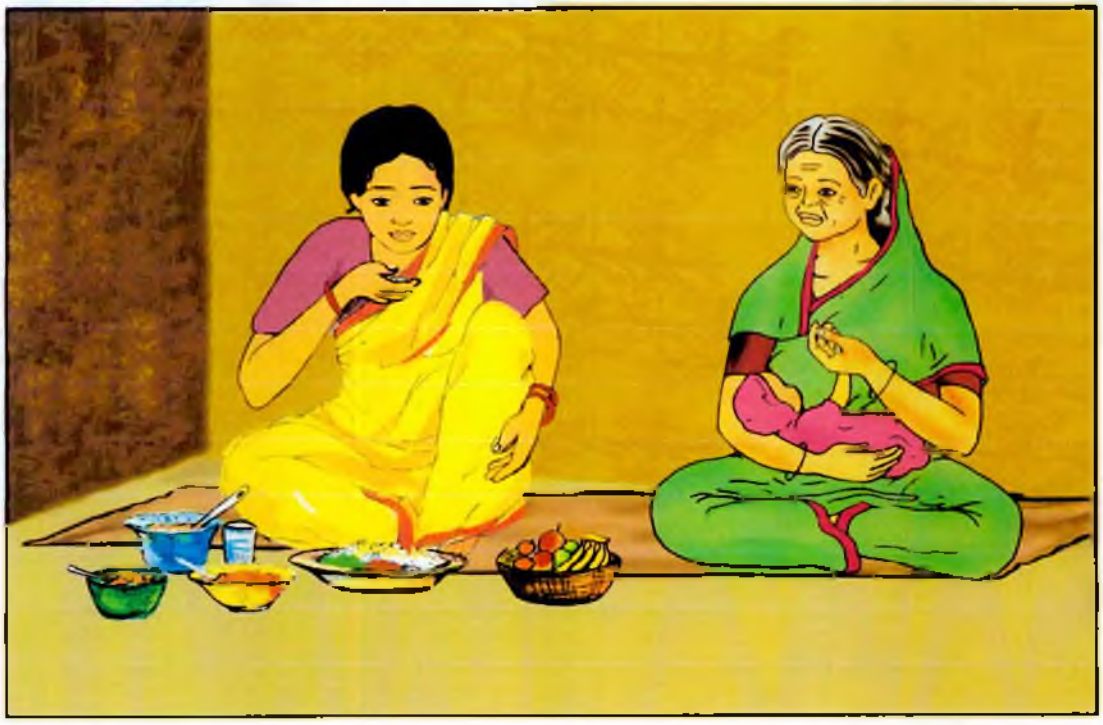
চার্ট- ৫(খ)

চার্ট- ৬

যে মা শিশুকে মায়ের দুধ খাওয়ান, তাকে স্বাভাবিকের চেয়ে প্রতিবেলা সব ধরনের খাবার কিছুটা বেশি পরিমাণে খেতে দিন এবং যথেষ্ট পানি পান করতে বলুন।

- এর ফলে মায়ের স্বাস্থ্য ভাল থাকবে এবং শিশুর জন্য মায়ের পর্যাপ্ত দুধ তৈরি হবে।
- এসময় পানি খেলে বাচ্চার ঠান্ডা লাগে না।

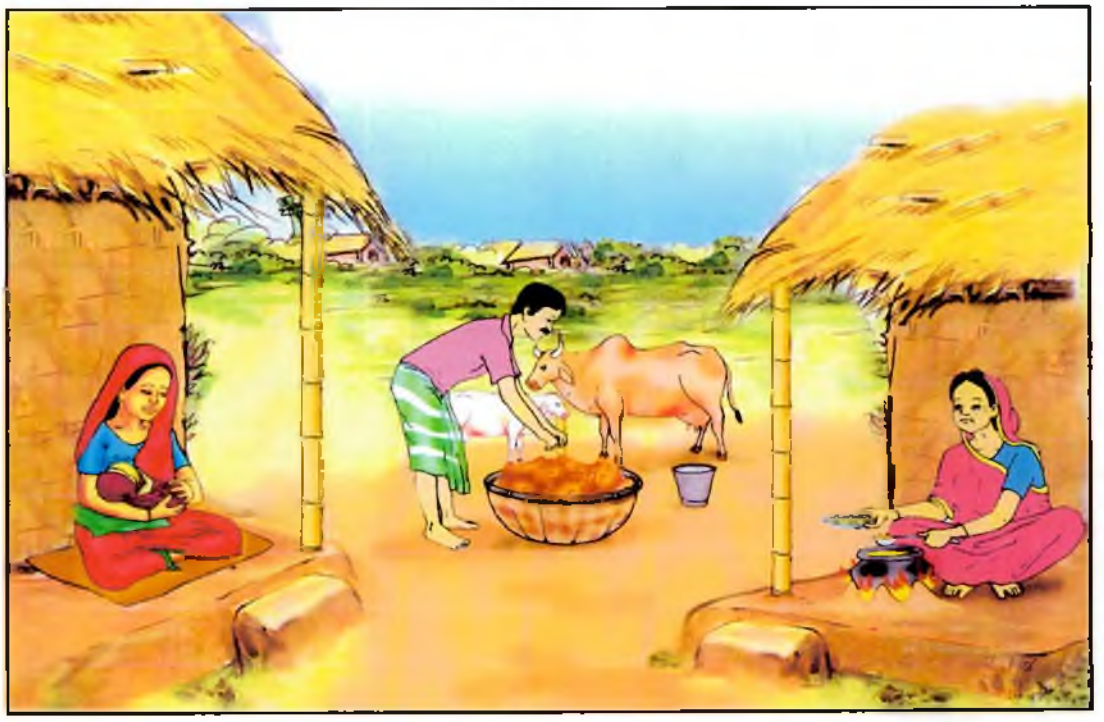
চার্ট- ৬



চার্ট- ৭

শিশুকে বারবার মায়ের দুধ খাওয়ানোর জন্য মাকে তার দৈনন্দিন কাজে সাহায্য করুন, যেন সে যথেষ্ট সময় নিয়ে শিশুকে দুধ খাওয়াতে পারে।

চার্ট- ৭



চার্ট- ৮

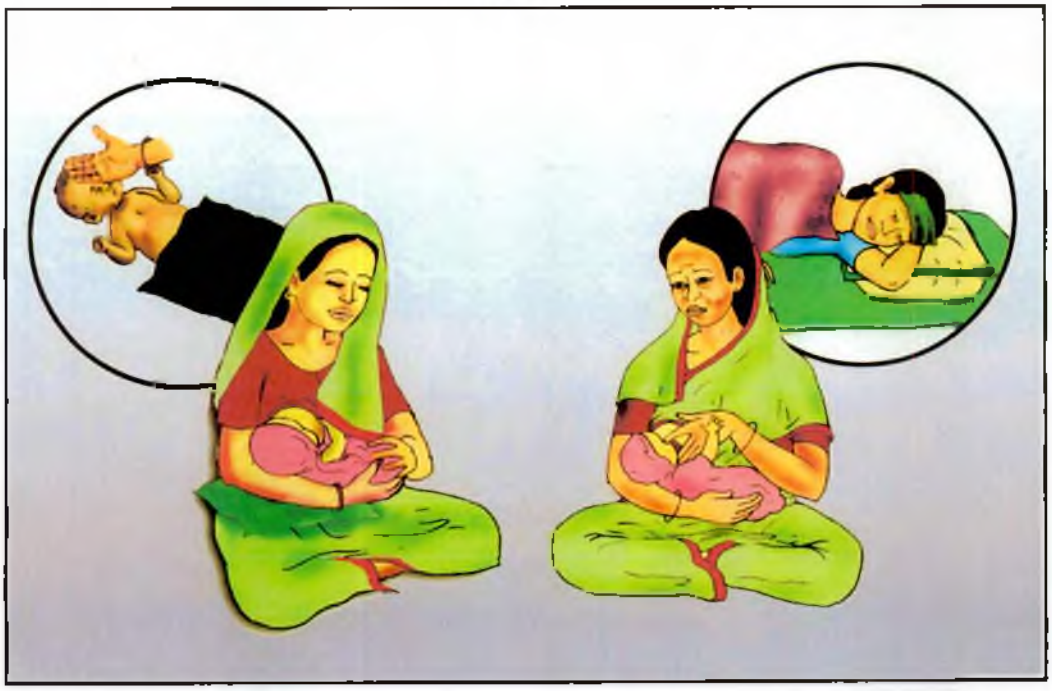
শিশুর যে কোন অসুস্থতায় ঘন ঘন মায়ের দুধ খাওয়ান।

- এতে শিশু দ্রুত সুস্থ হবে।

মায়ের অসুস্থতাতেও শিশুকে দুধ খাওয়ানো চালিয়ে যান।

- মায়ের কোন অসুস্থতাই মায়ের দুধকে নষ্ট করে না, তাই এসময় মায়ের দুধ খেলে নবজাতকের কোন ক্ষতি হয় না।

চার্ট- ৮



চার্ট- ৯

মা জন্মনিয়ন্ত্রণ বড়ি খেলেও নবজাতককে দুধ খাওয়াতে কোন বাধা নেই।

■ মা জন্মনিয়ন্ত্রণ বড়ি খেলেও মায়ের দুধ নষ্ট হয় না বা কমে না।

প্রসবের ৪২ দিন পর থেকে পরিবার পরিকল্পনা পদ্ধতি গ্রহণ করুন।

চার্ট- ৯

চার্ট- ১০ (ক)

শিশু মায়ের দুধ টেনে খেতে না পারলে দুধ চেপে বের করে বাটি ও চামচ দিয়ে খাওয়ান।

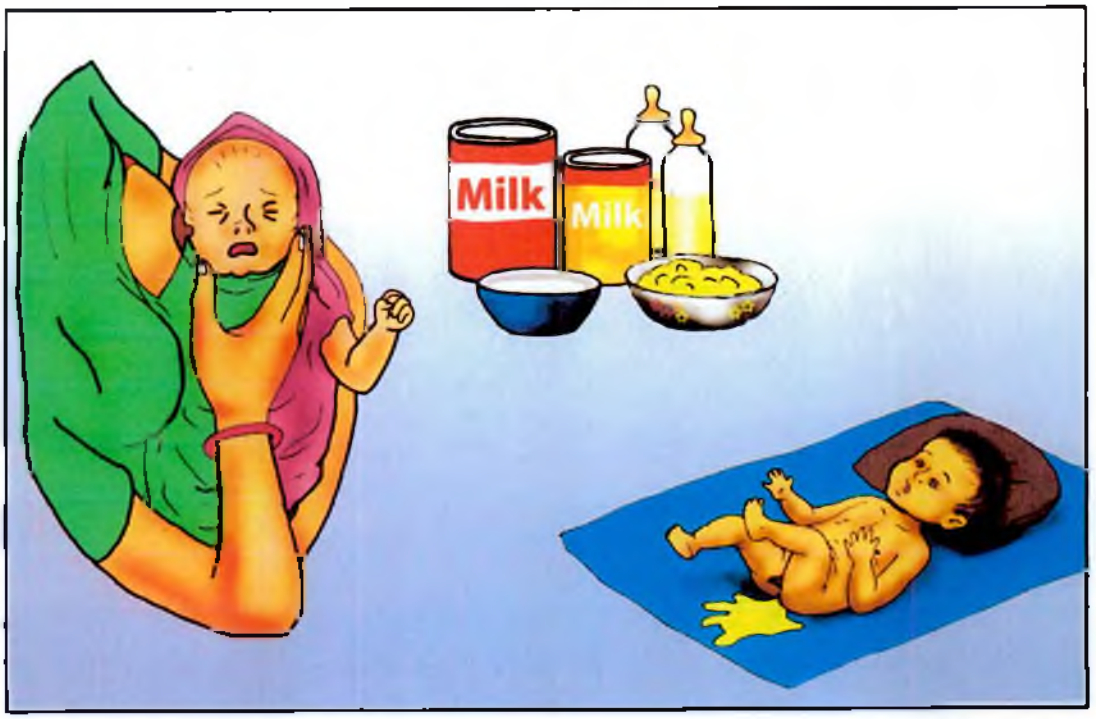
- বাটি ও চামচ দিয়ে খাওয়ানোর আগে অবশ্যই নবজাতককে মায়ের দুধ টানতে দিতে হবে। এতে করে কিছুদিনের মধ্যেই সে দুধ টেনে খেতে পারবে এবং মায়ের দুধের পরিমাণও বাড়বে।
- বাটি ও চামচ দিয়ে দুধ খাওয়ানোর আগে অবশ্যই বাটি ও চামচ পরিষ্কার পানি দিয়ে ধুয়ে নিতে হবে।

চার্ট- ১০ (ক)

চার্ট- ১০ (খ)

- মায়ের দুধ পাচ্ছে না মনে করে শিশুকে ৬ মাস পূর্ণ হবার আগেই বাড়তি/তোলা খাবার দেওয়া যাবে না।
- ৬ মাস পূর্ণ হওয়ার আগে শিশু বাড়তি খাবার হজম করতে পারে না।
- এতে করে শিশু মায়ের দুধ খাওয়া কমিয়ে দেয় এবং শিশু মায়ের দুধের পুষ্টি সঠিক পরিমাণে পায় না।

চার্ট- ১০ (খ)



চার্ট- ১১

শিশুর বয়স ৬ মাস পূর্ণ হবার পর তাকে মায়ের দুধের পাশাপাশি বাড়তি/তোলা খাবার দিন।

শিশুর বয়স ৬ মাস পূর্ণ হবার পর মায়ের দুধের পাশাপাশি শিশুকে অল্প অল্প করে কমপক্ষে দিনে ২/৩ বার নরম, ঘন ও মসৃণ বাড়তি খাবার খাওয়ান ।

৬ মাসের বেশি বয়সের শিশুর জন্য শুধু মায়ের দুধ যথেষ্ট নয়, সুতরাং অবশ্যই তাকে বাড়তি খাবার খাওয়াতে হবে।

- ৬ মাস পূর্ণ হওয়া পর্যন্ত যেমন শুধু মায়ের দুধ দরকার তেমনি ৭ মাস বয়স থেকে শুধু মায়ের দুধে শিশুর পুষ্টির চাহিদা পূরণ হয় না। তাই শিশুকে অবশ্যই সঠিক বাড়তি খাবার দিতে হবে। (৬--৮ মাস)
- ৯--১১ মাস পর্যন্ত মায়ের দুধের পাশাপাশি দিনে ৩/৪ বার বাড়তি/তোলা খাবার দিতে হবে।
- শিশুকে ১১ মাসের পরও দিনে কমপক্ষে ৩-৪ বার বাড়তি খাবার খাওয়াতে হবে । সম্ভব হলে ১-২ বার নাস্তা (এক টুকরো ফল বা বিস্কুট) দেওয়া যেতে পারে।

চার্ট- ১১

চার্ট- ১২

ঘরে যা আছে সেগুলো দিয়ে শিশুর বাড়তি খাবার তৈরি করুন।

- সাধ্যের মধ্যে, সহজে পাওয়া যায় এমন খাবার থেকে শিশুর বাড়তি খাবার তৈরি করা যায়।

চার্ট- ১২

চার্ট- ১৩

শিশুর শক্তি বৃদ্ধির জন্য খাবার রান্নার সময়ে তাতে ২/৩ চা চামচ তেল দিন।

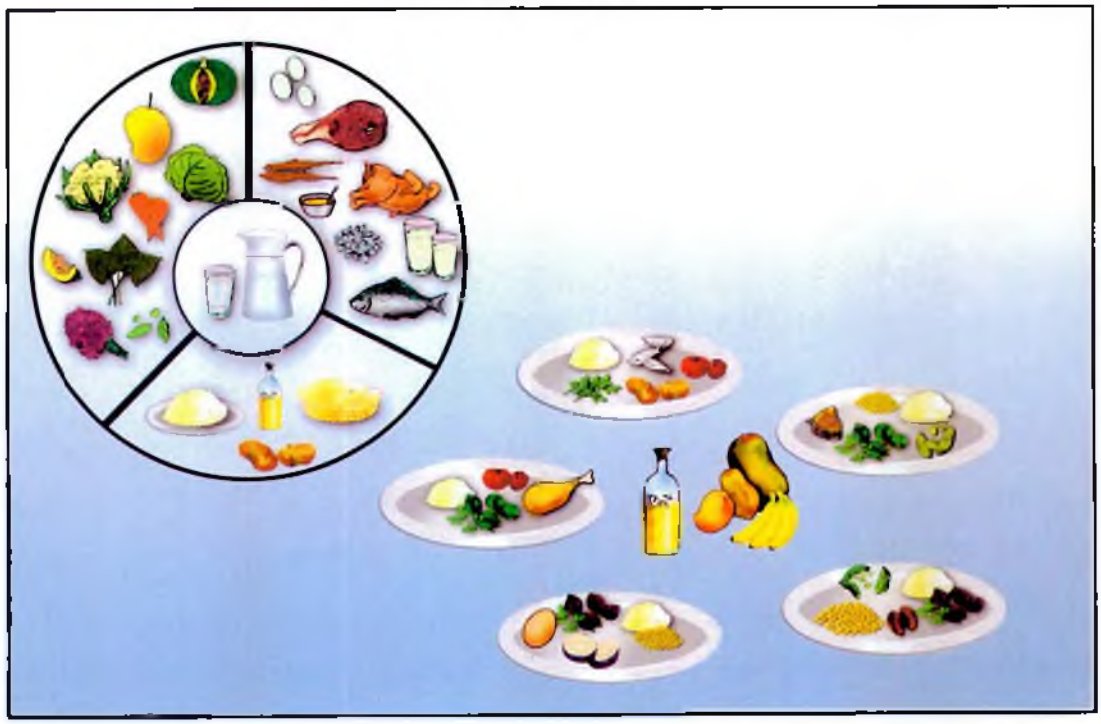
- এতে খাবার নরম হবে। ফলে শিশু তা সহজে খেতে পারবে এবং প্রয়োজনীয় শক্তির চাহিদাও পূরণ হবে।

শিশুকে বিভিন্ন খাবার ভাত/ ডাল/ মাছ /ডিম/ শাকসবজি (রঙিন শাকসবজি, গাঢ় সবুজ, কমলা, হলুদ ইত্যাদি) যখন যা ঘরে থাকে তাই দিন ।

- যেমন: ভাতের সঙ্গে কলা/ আম চটকিয়ে, পাউরুটি/বিস্কুট দুধে ভিজিয়ে, আলুর সঙ্গে ডিম চটকিয়ে, ভাতের সঙ্গে শাক, মাছ/ মাংস চটকিয়ে, ভাতের সঙ্গে ঘন ডাল, কুমড়া/যে কোন সবজি চটকিয়ে, ঘন করে খিচুড়ি ফিরনি তৈরি করে। তবে শিশুর খাবারে অবশ্যই তেল দিতে হবে।
- মিষ্টিজাতীয় খাবারও শক্তি চাহিদা পূরণ করে, তাই শিশুর খাবারে মিষ্টিজাতীয় খাবার দিতে হবে।
- শিশুকে মৌসুমি ফল খাওয়াতে হবে।

শিশুর দুই বছর বয়স পর্যন্ত স্বাভাবিক খাবারের পাশাপাশি মায়ের দুধ খাওয়ান।

চার্ট- ১৩



চার্ট- ১৪

রান্না করা খাবার থেকে শিশুর জন্য বাড়তি খাবার তৈরি করুন।

- রান্না করা বিভিন্ন খাবার থেকে বাড়তি খাবার তৈরি করা যায় ।
- তবে শিশুর খাবারে অবশ্যই তেল দিতে হবে।
- শিশুর খাবারে ঝাল মশলা না থাকাই ভাল। শিশুর খাবার তুলে রেখে তারপর পর রান্নায় ঝাল মশলা দিন।

চার্ট- ১৪

চার্ট- ১৫

শিশুকে খাওয়ানোর আগে শিশুর হাতমুখ, মায়ের হাত এবং থালাবাটি, চামচ ভালভাবে বিশুদ্ধ পানি দিয়ে ধুয়ে নিতে হবে।

চার্ট- ১৫

চার্ট- ১৬

পরিবারের সকলের সঙ্গে শিশুকে খেতে অভ্যস্ত করুন।

শিশু যদি নিজে হাতে খেতে পারে তাহলে তাকে নিজ হাতে খেতে দিন এবং পাশাপাশি নিজেও সাহায্য করুন।

শিশু প্রতিবার পরিমাণমতো খাচ্ছে কি না লক্ষ্য রাখবেন।

শিশুর দুই বছর বয়স পর্যন্ত স্বাভাবিক খাবারের পাশাপাশি মায়ের দুধ খাওয়ান।

চার্ট- ১৬

চার্ট- ১৭

যে কোন অসুস্থতায় পর শিশুকে স্বাভাবিক খাবারের সঙ্গে আরও কিছু বেশি খাবার দিন।

- যে কোন অসুস্থতার পর শিশু খুব দুর্বল হয়ে পড়ে, স্বাভাবিক খাবারের সঙ্গে আরও কিছু বেশি খাবার দিলে দুর্বলতা কেটে যায়।

চার্ট- ১৭

4.15 Data Collection

Data on the basic demographic and socio-economic status of the selected households, mothers knowledge and practices on maternal nutrition, food consumption pattern and recommended nutrient supplements during pregnancy and postpartum period and initiation of breast feeding of colostrums, exclusive breast feeding up to 6 months, introduction of complementary foods etc, were collected through face to face interview with mothers using structured pre-tested questionnaire. All the mothers were measured for weight and height and children were measured for weight and incumbent length following international standard procedures as described in the FANTA technical report.[42] Weight was measured with digital "Bath Room Scale" (TANITA, Japan) to the nearest 0.1 kg. Subjects were measured barefoot in light clothes. The weighing scale was checked for performance everyday before use. Height for mothers and incumbent length for children was measured to the nearest 0.1 cm with a locally constructed portable wooden height cum length board.

4.15.1 Demographic and Socio-Economic data collection

Socio economic status data included demographic and economic information such as; household size (members eating together for 6 months on more), gender of the head of the house holds, religious status of the house hold, number of dwelling rooms and type of main dwelling rooms in the household, ownership of homestead and agricultural land, perceived economic status for the last one year prior to the interview, food security status in terms of consumption of 3 meals per day all time by all members over the year. Types of toilet facilities used by the households, source of drinking, cooking and bathing water, etc. were noted

4.15.2 Mothers information data collection

Mothers back ground characteristics data including her age, marital status, age at first marriage, educational status and occupational status were collected. Thus mothers' fertility status and personal hygiene practice data included. Water used to washing hand before feeding child and own eating, cleaning the child after defecation, and after using toilet herself etc information were collected also.

4.15.3 Data collection of study children

Characteristics of study children are an important determinant of nutritional status of under two years children. Under two year's children age, sex, birth weight, birth order was assessed.

4.15.4 Data collection of mothers' nutritional knowledge practices

Mothers knowledge and practices on maternal nutrition food consumption pattern and recommended nutrient supplements during pregnancy and postpartum period, infant feeding, initiation of breast feeding, feeding of colostrums, exclusive breast feeding (6 months) introduction of complementary foods etc were collected through face to face interview with mothers using structured pre tested questionnaire.

4.15.5 Child caring practices data collection

As care is an important determinant of nutritional status of under two child are giving breast feeding initiation after birth, colostrums and exclusive breast feeding status, first food initiation of new born baby, complementary food of child were assessed.

4.15.6 Hygienic practices data collection

Sanitation and hygienic practices have an influential capacity to influence nutritional status. Safe water supplies, washing hand before feeding child, own eating, cleaning the child after defecation, and after practices among study families were also assessed.

4.15.7 Data collection of morbidity rate

Children as diarrhoea is a major cause of under two children deaths in Bangladesh, on the other hand fever, infection, Measles and jaundice are an important cause of affecting nutrition status of under two years children.

4.15.8 Assessment of nutritional status of under two children

Nutritional status is the condition of the body resulting from the utilization of the essential nutrients made available to the body. It depends also relative need of the body's ability to digest and utilization them. In fact, nutritional status is the health condition of the individual as influenced by the utilization of nutrient. It can be measured or determined by Anthropometric and dietary parameter. Nutritional status of the children aged 0-23 months was assessed by analyzing two nutritional parameters like anthropometry and dietary intake profile. Thus, Malnutrition is critical determinant of nutritional status. It is the syndrome that results from the interaction between poor diets and disease, and leads to the most of the anthropometric deficits in the children of less developed countries.

4.15.9 Anthropometric data collection

The anthropometrics data on height and weight were obtained from all children and their mothers. Anthropometry used the standard techniques. All the children and their mothers were measured for weight and height/length following international standard procedures as described in the FANTA technical report (Brkce cogill 2003).

Weight: Weight was measured with digital Bathroom Scale (TANITA, Japan) to the nearest 0.1Kg. Subjects were measured barefoot in light clothes. The weighing Scale was checked for performance every day before using.

Height: Height for mothers and incumbent length for children was measured to the nearest 0.1 cm with a locally constructed portable wooden height cum length board.

4.15.10 Anthropometric Assessment by Z-score Classifications

Several classifications of nutritional status are prevailed based on the anthropometric indices. The Z-score classifications are most modern and common indicators which are now widely used for the assessment of children nutritional status. The height and weight are converted into z-scores. Three anthropometric indices those are commonly

used as indicators of malnutrition in children are; height-for-age Z-score (HAZ), weight-for-age Z-score (WAZ), and weight-for-height Z-score (WHZ) were used to classify the nutritional status of the children and according to the US National Center for Health Statistics (NCHS) reference standard. Z-score classifications are relatively insensitive to 5% weight loss within one month and 10% weight loss over six months. It is more sophisticated modern method and interpreted in three indicators, for instance-normal, above normal (or high) and below normal (or low). In general a low weight-for-age can be taken as one which is more than one standard deviation below the median weight-for-t age of the reference population; however, multiples of 1 standard deviation such as -1.5, -2 or -2.5 can also be as cut of points. Conversely, a 'high' weight-for-age is in general more than one standard deviation above the median weight-for-age of the reference population. The same principle applies to the two other indicators: height-for-age, and weight-for-height. The conventional reference for adequacy of anthropometric attainment in children is the growth curve of the US National Center for Health Statistics (NCHS) reference standard. It is adopted by the UN agencies. The NCHS indices are- children less than <-2SD the NCHS median weight-for-age classifies as underweight, height-forage <-2SD indicates stunting and weight-for-height <-2SD is wasting.[43] Thus children <-2SD the NCHS median were classed as stunting, underweight, and wasting respectively. Also, combines the prevalence of severe and moderate malnutrition i.e. Z-score <-2SD denotes global malnutrition (Concern 2003).The following cut-off levels used in this study to categorize malnourished and normal status under stunting, underweight, and wasting:

Weight-for-age Z-score (WAZ)

WAZ= S-2SD	underweight
WAZ= S-2SD	Not underweight (normal status)

Height-for-age **Z-score (HAZ)**

HAZ= <-2SD	stunting
HAZ= >-2SD	Not stunting (normal status)

Weight-for-height Z-score (WHZ)

WHZ= <-2SD	wasting
WHZ= >-2SD	Not wasting (normal status)

Table- i. Classification of Nutritional Status by BMI according to WHO

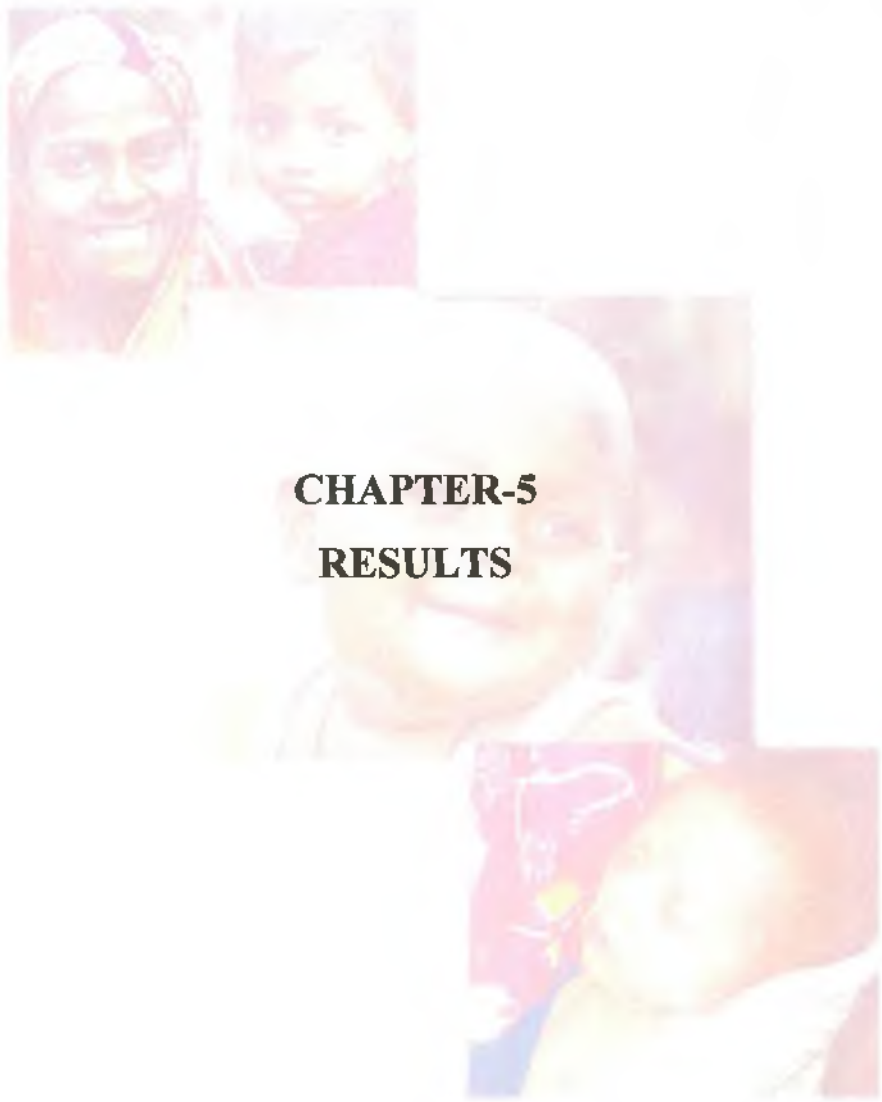
Classification of BMI according to WHO	
BMI	**Nutritional status**
Below 18.5	Under weight
18.5 to 24.99	Normal weight

4.16 Data analysis

The collected data were checked, rechecked and edited for inconsistency, wrong recordings and coding in the field. After rechecking all data were then analyzed using a PC/SPSS software package version 11.5 was used to analyze the data. Descriptive studies (Frequency, descriptive cross table) and compare means (independent sample test) were used to calculate all variables. Values were expressed as percentage mean and standard deviation. For testing the independence between the two variables chi-square tests and proportion tests were applied.

4.17 Flow sheet of Activities

A flow sheet of activities is given in Appendix-2



CHAPTER-5
RESULTS

Part I: The Baseline Cross-sectional Survey

The study was conducted to assess the effectiveness of the nutrition education package (NEP) which is improving nutritional status of infant and young children and their mothers in Nilfamari district in Bangladesh. The results of the study are as follows:

5.1 Demographic and socio-economic status of the households

The socio-demographic-economic characteristics of the selected households (HHs) were evaluated to set up for a background for the intervention with the adapted and harmonized NEP. A total of 612 HHs were surveyed from six Unions and 600 HHs were found to meet the selection criteria. These HHs were equally divided into two groups – one for intervention and the other as control. The findings of the baseline data are presented in the following sections.

Basic socio-economic and demographic profile of the selected HHs is presented in Table-1. From the study it was observed that, the family size was 5±2 for both intervention and control group. Majority of the HHs in both intervention and control group were male headed (92.3% and 96.0% respectively). About 82% and 87% of the HHs of intervention and control group were Muslim. Around 51.3% and 57.3% of HHs in both intervention and control group had own home stead and 33.0% of both groups had agricultural land. Among 40.4% of intervention group and 44.0% of control group did not have any income deficit. The results showed that 50.6% of the intervened and 47.7% of control group households were food secured. Few (23) number of the control group (8.3%) respondents that had participated in other nutrition programs. Majority of the HHS lived in other than tin and pucca house.

It was found that the mean age of respondent mothers in both groups were 23±5.2 years. The majority (90%) of the respondent mothers of both groups were house wife. This study showed that, in both groups nearly a third of the mothers were illiterate (31.1% and 39.3%) and another one third (34.9% to 30.0%) had up to primary level of education.

Using hygiene toilet by respondent mothers of both intervention and control group were very poor. At baseline 26% of the respondents of both groups used hygienic toilet.

Table 1: Demographic and socio-economic profile of the study house holds

Variable	Intervention			Control		
	Percent (%)	No	Mean±SD	Percent (%)	No	Mean ±SD
1. Mean family size			5.0 ± 2.1			5.1 ± 1.9
2. Land Ownership & homestead	51.3	154		57.3	157	
3. Agricultural land	33.0	99		33.0	91	
4. Self perceived economic[1] status: Do not have any income deficit	40.4	121		44.0	121	
5. Food security(%)[2]						
yes, could not	49.4	148		52.3	144	
No-never happened	50.6	152		47.7	131	
6. Participation in other nutrition programme (%)						
Yes	0.0	0		8.3	23	
No	100	300		91.7	252	
7. Type of main dwelling (%)						
pucca/ cement/tiles	11.9%	36		5.0	14	
Tin	24.7	74		23.3	64	
Others	63.5	190		71.7	197	
8. Mean age of study mothers (years)			23.16 ± 5.16			22.89 ± 4.73
9. Occupation of mothers (%)						
House wife	89.7	269		87.7	241	
Involved in any occupation	10.3	31		12.3	34	
10. Educational Status						
Can not sign/only sign/ <class 1	31.1	93		39.3	108	
Primary (1-5th grade)	34.9	105		30.0	82	
Secondary (6-9th grade)	27.6	83		25.0	69	
S.S.C or above	6.4	19		5.7	16	
11. Religious Status						
Islam	88.7	266		87.7	241	
Hindu	10.9	33		12.3	34	
Others	.3	1		0.0	0	
12. Toilet facilities						
Non hygienic (without seal)	74.0	222		74.0	203	
hygienic toilet	26.0	78		26.0	72	

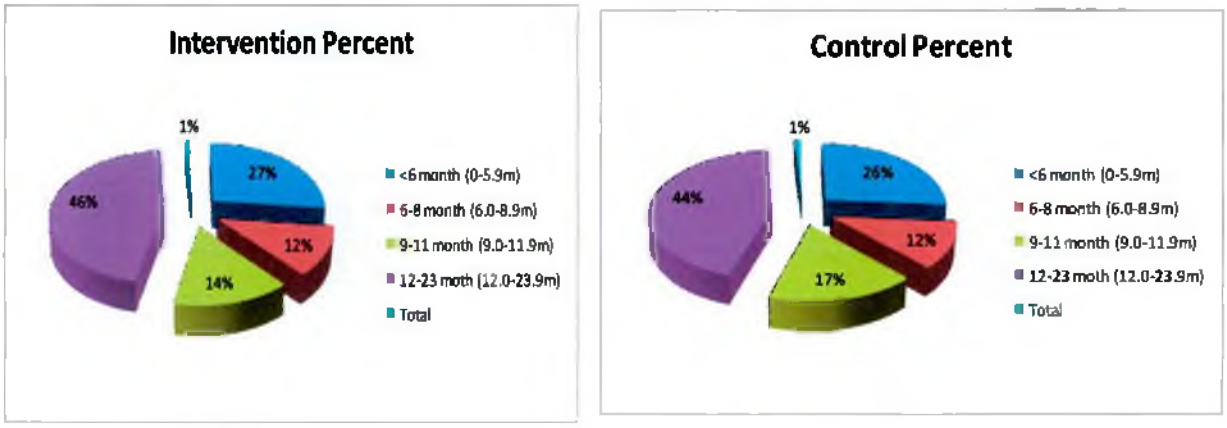
1. A condition reported basically based on income and food expenditure in a year prior to the interview in Bangladesh poor families spend 70% or more of their expenditure was on food (ADP, 2001)

2 Can have 3 meals /day by all members most of the time over a year Full meal is referred as an amount of meal just enough (quantity) to appetite.

5.2 Characteristics of the respondent children

Figure 1 shows number of children was higher in the 12-23months age group in both intervention and control. In his age group the percentage of children were 46% for intervention and 44% for control. Remaining age groups had similar percentage of children.

Figure 1: Distribution of the under two years old children by age



On the other hand, the distribution Table-2 reveals characteristics of the respondent children regarding to their age, sex and their birth weight. It was found that the mean age of the respondent children was 11±6.6 months for intervention group, 10.2±6.5 for control group. Although children were selected randomly, proportions of male and female children were 49.4% and 50.6% of intervention group and 54.3% and 45.7% of control group. It was also found that 54.8% and 45.2% respondent children of intervention group were within <12 m (0-11.9mon) and >12 m (12.0-23.9m) of age group respectively. On the other hand 58.9% and 41.1% children of control group were within <12 m (0-11.9mon) and >12m (12.0-23.9mon) of age group respectively. It was found that mean birth weight of the children of both intervention and control group were 7.33±1.99 and 7.06±1.94 kg respectively.

Table 2: Distribution of the respondent children by age, sex, weight, birth weight, and immunization

Variable	Intervention			Control		
	Percent (%)	No	Mean ±	Percent (%)	No	Mean±
Mean age of study children (month)			11.1 ±6.6			10.2 ±6.5
Children in various age categories						
<12m (0-11.9month)	54.8	164		58.9	162	
>12m (12.0-23.9)	45.2	136		41.1	113	
Sex of the study children						
Male	49.4	148		54.3	149	
Female	50.6	152		45.7	126	
mean weight (kg) of the children			7.33 ±1.99			7.06 ±1.94
Birth Weight						
Low birth weight (<2.5 kg)	20.7	62		25.6		
Normal birth weight (>2.5 kg)	79.3	238		74.4	70	
					205	
Completed all (9) vaccine (>9mo.)	85.6	257		72.2	199	
Not Completed all (9) vaccine (>9mo.)	14.4	43		27.8	76	
Total	100%	300		100%	275	

So it can be said that the children of both groups are matched (Same) in term of mean body weight. However, proportion of low birth weight (LBW) children (<2.5 kg) of intervention group was 20.7% and normal birth weight (>2.5 kg) was 79.3% while in case of control group children the percentage were 25.6% and 74.4% respectively. Percent distribution of study children according to all vaccines (>9 months)coverage amongst the respondent children presented in table and showed that at baseline 86% and 72% of children of intervention and control group completed all (9) vaccine respectively,

Table 3: Distribution of respondent mothers by anthropometry

Variable	Baseline	
	Intervention	Control
1. **Mean Weight (kg)**	44.10 ± 5.9	43.7 0 ± 5.5
2. **Mean Height (cm)**	150.68 ± 5.7	150.66 ±5 .2
3. **Mean BMI (Wt(kg)/ht^2 (m)**	19.4 ± 2.3	19.20 ± 2.1

From the Table-3 it was observed that mean body weight, height and BMI of respondent mothers were similar in both groups at baseline which was 44.1±5.9, 150.68 ±5.7, and BMI was 19.4 ± 2.3 for intervention group mothers and 43.7±5.5, 150.66±5.2 and 19.2 ± 2.1 respectably.

5.3 The Baseline KAP of the respondent mothers

Table 4-reveals the KAP of the mothers by relevant questions. Correct answer of all questions except of a few were observed in similar both intervention and control group during cross-sectional survey. Higher percentages of correct answer were observed. On importance of breast milk <2 years, where correct answer were 83.2% for intervention and 81.7% for the control. But the correct answer received about the intake of vitamin a supplementation was very law, which was 16.3 % for intervention group and 32.7% for control group.

Table 4: The KAP of the mothers by relevant questions

Questions	Answers by the respondents	Intervention. (% & N)	Control (% & N)
1. Which dietary pattern we should follow during last trimester of pregnancy?	Consumes more than normal	49.4 (148)	58.7 (161)
	Normal	18.3 (55)	23.7 (65)
	Less than normal	32.4 (97)	17.7 (49)
2. What is the benefit of more food consumption during pregnancy?	More food keeps fetus and mother healthy	76.7 (230)	75.7 (208)
	baby gets bigger	8.1 (24)	7.3 (20)
	Less food does not cause difficult delivery	3.3 (10)	3.3 (9)
	giving smaller baby	2.6 (8)	1.4 (4)
	More food gives uneasy feeling	3.8 (11)	7.3 (20)
	More food may cause high blood pressure	1.3 (4)	1.3 (4)
	More food stoops Fetus's movement	0.0 (0)	1.3 (3)
	More food makes baby intelligent	4.2 (13)	1.4 (7)
3. What in the benefit of taking Iron tablet during pregnancy?	**Mothers doesn't get anemia	30.5 (92)	30.0 (83)
	After delivery baby doesn't get anemia	20.7 (62)	18.7 (51)
	Keeps mother / baby healthy	13.5 (40)	13.5 (37)
	Others	35.3 (106)	37.8 (104)
4. What is the benefit of taking vitamin 'A' after pregnancy?	***Child gets more vitamin-A from BF	42.9 (128)	40.5 (111)
	Does not get night blindness	20.1 (60)	25.3 (69)
	Gives eye power	17.4 (52)	20.7 (56)
	gives energy and keeps healthy	20.0 (60)	10.0 (27)
	makes blood good	0.0 (00)	3.5 (10)
5. What should we feed a new born baby?	Colostrums/ Shaldud	72.0 (218)	74.0 (203)
	Water	0.7 (2)	0.0 (0)
	Honey/Sugar water	15.2 (46)	13.0 (36)
	Others	5.3 (16)	7.3 (20)
	Cow's milk	5.0 (15)	5.7 (16)
	Don't Know	1.0 (3)	0.0 (0)
6. When should we start breast feeding to a new born baby?	Within 1 h (<=1h)	49.7 (149)	50.5 (139)
	Within 24h (1day)	28.7 (86)	29.0 (80)
	After 24 h but (<3 day)	15.3 (46)	13.5 (37)
	Can't remember/Don't know	6.3 (19)	7.0 (19)
7. Up to which age a baby should be given breast feeding (exclusive breast feeding) only ?	Right answer (6m)	72.1 (216)	75.0 (206)
8. From what age should a baby be given complementary foods along with breast feeding?	<6 months 6 months 7 months Don't know	69.0 (207)	27.0 (74)
9. What will happen if a baby is given other food then breast feeding before six month of age	Harmful for children	78.2 (235)	75.2 (207)
	Makes no difference/don't know	21.8 (65)	24.8 (68)
11. Should a baby be given breast feeding upto two years of age?	Yes	83.1 (249)	76.3 (210)
	No	16.9 (51)	23.7 (65)
12. Which one is best food for a child aged 0-2 years?	Cow's milk	13.8 (41)	15.3 (42)
	Breast milk	83.2 (250)	81.7 (225)
	Powder milk	1.1 (3)	1.8 (5)
	Don't know	1.9 (6)	1.2 (3)

13. How many times a day does you feed your baby? Frequency of Feeding for 7-11 month children	Right know (3-4 times/day) Wrong knowledge Don't know	55.8 (167) 31.7 (95) 12.5 (47)	52.7 (145) 32.3 (89) 15.0 (41)
Frequency of Feeding 12-16 moth	Right know (4-5 times/day) Wrong knowledge Don't know	38.1 (114) 49.7 (149) 12.2 (37)	40.5 (111) 43.5 (120) 16.0 (44)
Frequency of Feeding 17-23 moth	Right know (4-5 times/day) Wrong knowledge Don't know	35.9 (108) 50.3 (151) 13.8 (41)	47.1 (129) 45.8 (126) 7.1 (20)
14. Do you take iron tablet at any time?	No Taken Iron Supplement Taken Iron for any duration	37.2 (112) 62.8 (188)	24.3 (67) 75.7 (208)
15. Do you take vitamin 'A' tablet?	Yes, taken vit-A No, did not take	16.3 (49) 83.7 (251)	32.7 (90) 67.3 (185)
16. Do you use iodized salt for cooking food?	Iodized Non Iodized	73.7 (221) 26.3 (79)	82.7 (227) 17.3 (47)
17. When did you start breast \feeding to your last born baby?	Within 1 h (<=1h) Within 24h (1day) After 24 h but (<3 day) Can't remember/Don't know	59.6 (179) 24.4 (73) 1.6 (5) 14.4 (43)	60.0 (165) 27.7 (76) 2.3 (6) 10.0 (28)
18. Did you give colostrum to your baby after its birth?	yes feed colostrums no, not fed colostrums	72.0 (216) 28.0 (84)	69.0 (190) 31.0 (85)
19. What are you doing for increasing of breast milk?	Did not do anything Ate extra/more food Drunk more liquid/others	76.9 (231) 19.2 (58) 3.8 (11)	71.3 (196) 24.7 (68) 4.0 (11)
20.What is the demerits of not introducing complementary food at 7 months	Harmful for children Makes no difference/don't know	77.2 (232) 22.8 (68)	78.5 (216) 21.5 (59)

5.4 Mothers knowledge on micronutrient

Table -5 shows the Percent distribution of respondent mothers according to correct knowledge on micro nutrients. Knowledge of respondent mothers was almost similar on micronutrients in baseline, but higher percentage (86.1%) of control group mother had the knowledge on vitamin A deficiency then their intervention (79.7%) counter-parts.

Table 5: Distribution of respondent mothers by correct knowledge on micro nutrients

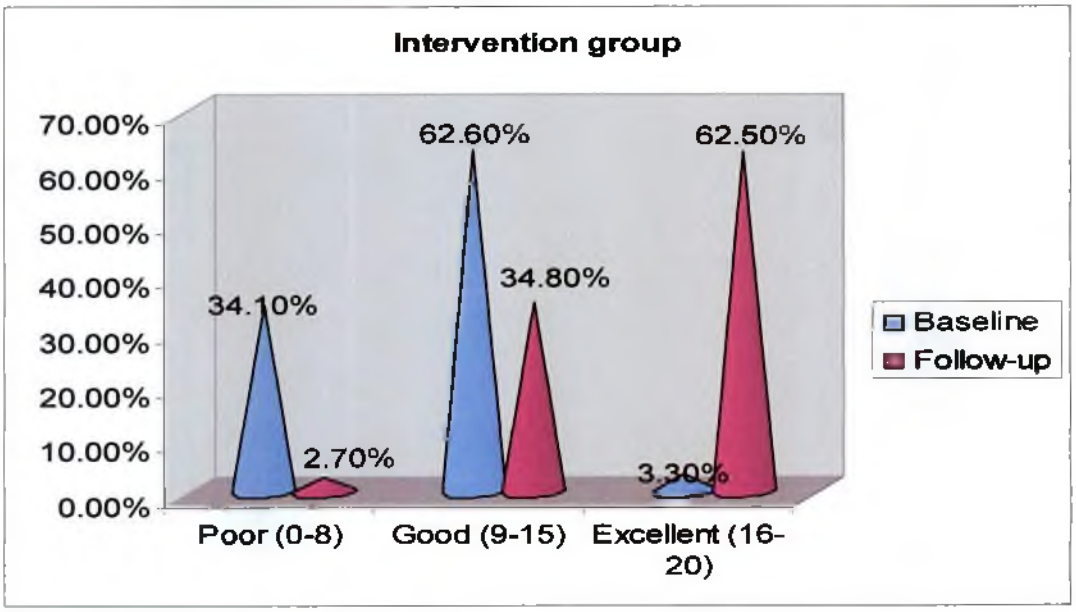
Variables	Intervention (% & N)	Control (% & N)
Have knowledge on iodine deficiency disorders (IDD)		
Consequences if ID	37.7 (111)	40.1 (110)
Prevention if IDD	35.7 (105)	32.8 (90)
Have knowledge on vitamin-A deficiency		
Aware of night blindness(NB)	79.7 (232)	86.1 (237)
Cause of NB	55.3 (163)	47.2 (130)
Symptoms of NB	77.3 (228)	69.3 (190)
Prevention of NB	59.0 (174)	57.1 (157)
Have knowledge on iron deficiency		
Aware on anemia (IDA)	72.0 (212)	68.0 (187)
Cause of IDA	19.7 (58)	22.4 (62)
Symptoms of IDA	56.3 (166)	61.1 (168)
Prevention of IDA	53.3 (157)	48.2 (132)

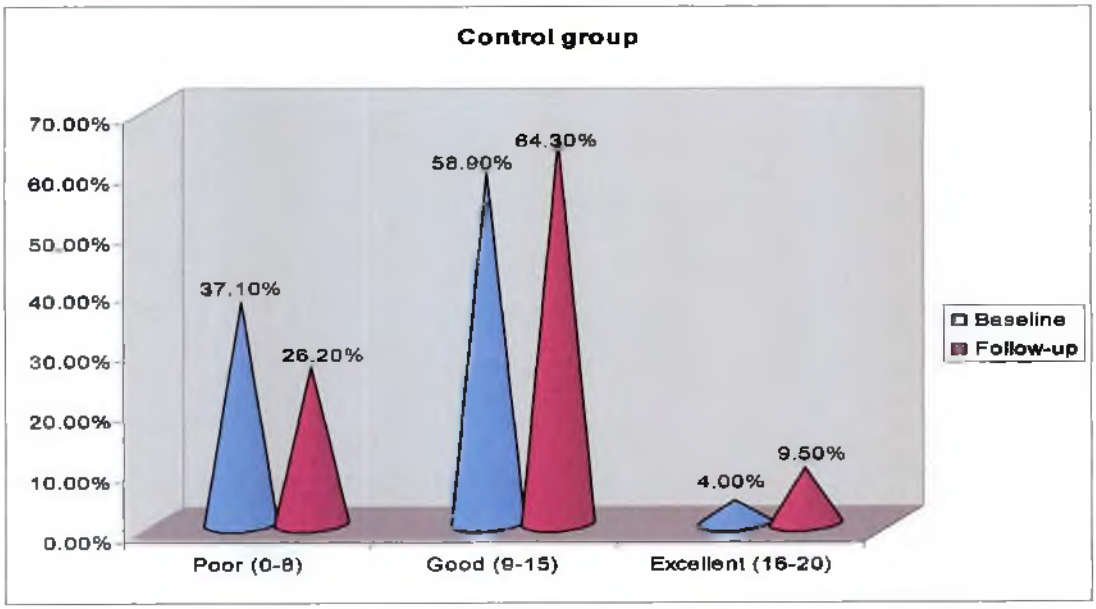
Part II: The Follow-up Survey after Intervention

5.5 The effect of NEP on KAP of respondent mothers

Figure-2 reveals the KAP score of respondent mothers after NEP (intervention group). Nutrition education had noticeable impact on respondents KAP. The numbers of respondents dramatically fail in the poor category form 34.1% to 2.7% where as in excellent category the rate sharply increased from 3.3% to 62.5%, but in control group there was no mentionable differences among the three score category in baseline and follow-up.

Figure-2 The KAP score of respondent mothers after NEP (intervention group)





5.6 Hygiene and sanitation practices

Table-6 shows the Distribution of the study children by proper hand washing and general illness in last week prior to interview. Connecting with of improvement in proper hand washing (with soap and water) before feeding child and hand washing before own eating among intervention group mothers (from 39.5% to 45.5% and 9% to 26% respectively.

Table 6: Distribution of the study children by proper hand washing and general illness in last week prior to interview

Variable	Baseline		Follow-up	
	Intervention (% & N)	Control (% & N)	Intervention (% & N)	Control (% & N)
Personal hygiene – proper hand washing by mothers.				
Before feeding child	39.5 (119)	33.4 (92)	69.9 (204)	38.7 (102)
Before own eating	9.0 (27)	18.7 (51)	45.5 (133)	27.1 (71)
After using toilet	62.8 (188)	56.3 (155)	80.8 (236)	59.7 (157)
After cloning child (After defecation)	65.7 (197)	67.7 (186)	85.9 (251)	66.3 (174)
No illness	34.0 (102)	38.0 (105)	34.3 (100)	36.3 (95)
Fever / Cold/ cough	48.7 (146)	46.7 (128)	55.7 (162)	50.1 (132)
Diarrhea/ dysentery / vomiting	14.1 (42)	11. (8)	4.0 (12)	10.6 (28)
Infection (ear/eye/skin/ mouth	2.9 (9)	1.3 (4)	4.0 (12)	2.0 (5)
Measles/ jaundice	0.3 (1)	?	2.0 (6)	1.0 (3)

Table-6 also showed the comparison of all general illness. About two third of the children in both groups suffered from various general illness in the last week prior to interview and the proportion were same during baseline and follow-up visits. Most common illness observed was fever and or cold/cough (49%-56% in intervention and 47%-55% in control group). Within group comparison showed that, though the

improvement was not much, in case of diarrhea, dysentery vomiting had a significant change (p=0.00) which decreased from 14.1% to 4% after intervention.

5.7 The anthropometry of studied children

Figure 3-reveals the distribution of respondent's children by weight.Mean weight of at baseline of the intervention group was 7.33 kg. which increased significantly (p=0.00) after the intervention and the increased mean at was found to be 8.18 kg, but in terms of the control group the increase of weight was not observed during follow up, the values were 7.06 kg at baseline and 7.56 kg in follow-up.

Figure 3: Distribution of respondent's children by weight

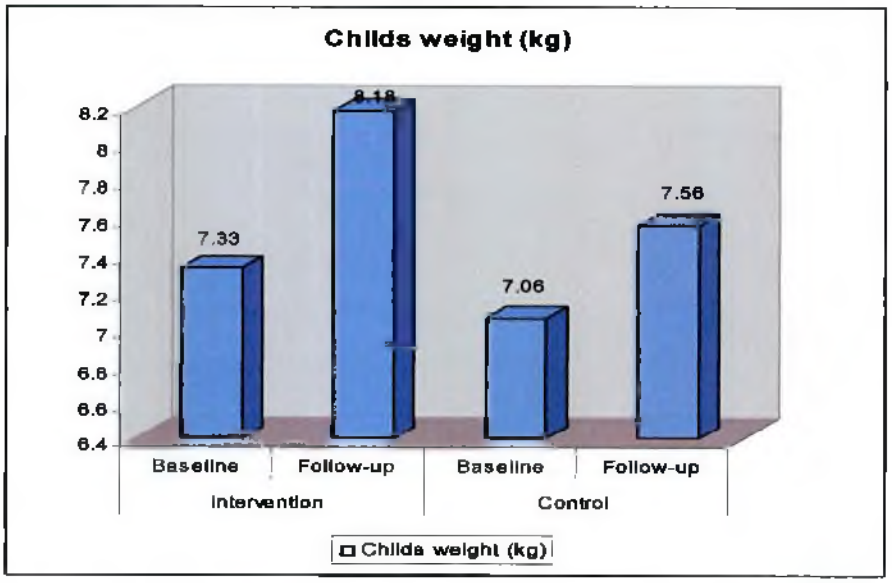


Figure 4: Distribution of respondent's children by height

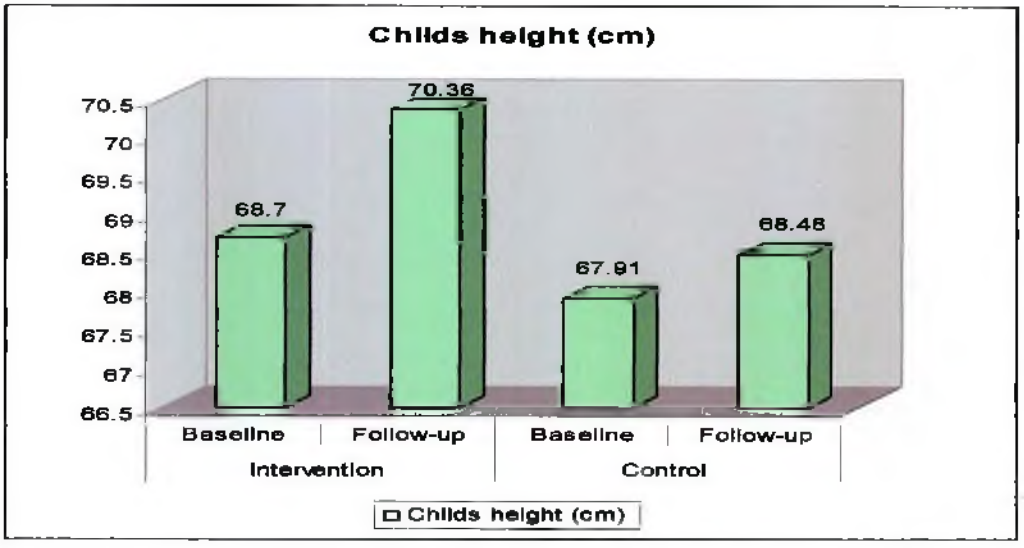


Figure 4-shows the distribution of respondent's children by height.Mean height at baseline of the intervention group was 68.7 ± 8.14 cm. Which increased significantly (p = 0.22) after the intervention and the increased mean was found to be was 70.36 ± 8.63 cm , but in trams of the control group the increase of heights was not observed during follow up, the values were 67.91 ± 7.94 cm. at b baseline and 68.48 ± 9.30 cm in follow up.

5.8 Anthropometry of the respondent mothers

From the Table-7 it was observed that mean baby weight, height and BMI of respondent mothers were more or less equal at both baseline and follow up which were 44 ±kg, 150±5cm and 19.4±2 respectively.

Table 7: Distribution of respondent mothers by anthropometry

Variable	Baseline		Follow-up	
	Intervention	Control	Intervention	Control
Mean Weight (kg)	44.1 ± 5.9	43.7 ± 5.5	43.4 ± 7.0	42.4 ± 5.9
Mean height (CM)	150.68 ± 5.7	150.66 ± 5.2	150.6.8 ±5.5	150.33 ±4.4
BMI (Wt(kg)/ht (cm)	19.4 ± 2.3	19.2 ± 2.1	19.0 ± 2.5	18.8 ± 2.3

Figure 5: Nutritional Status by CED of study mothers (%)

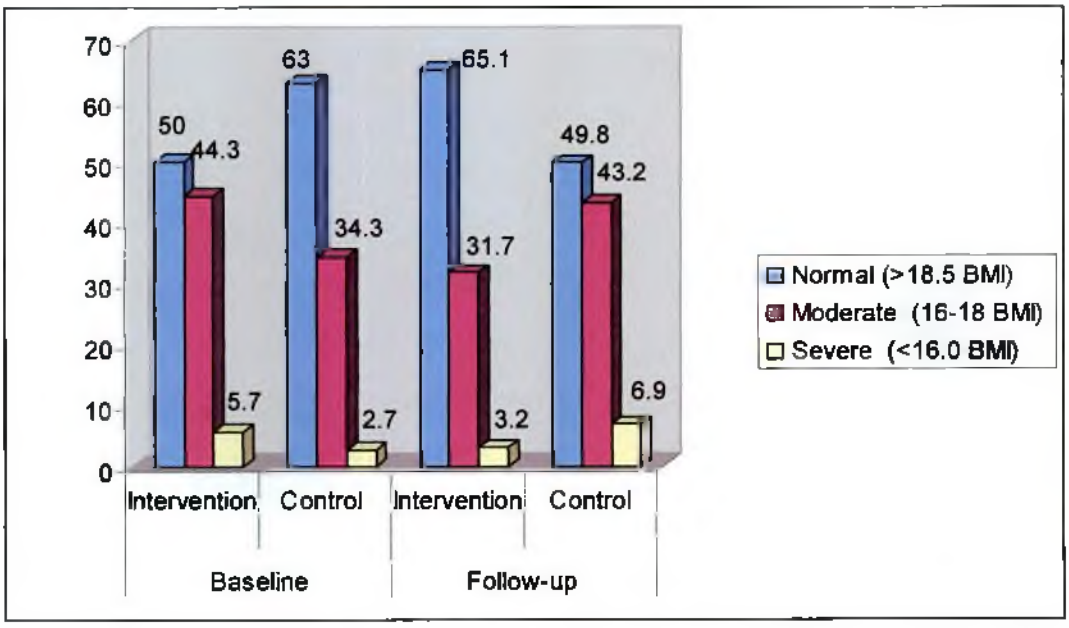
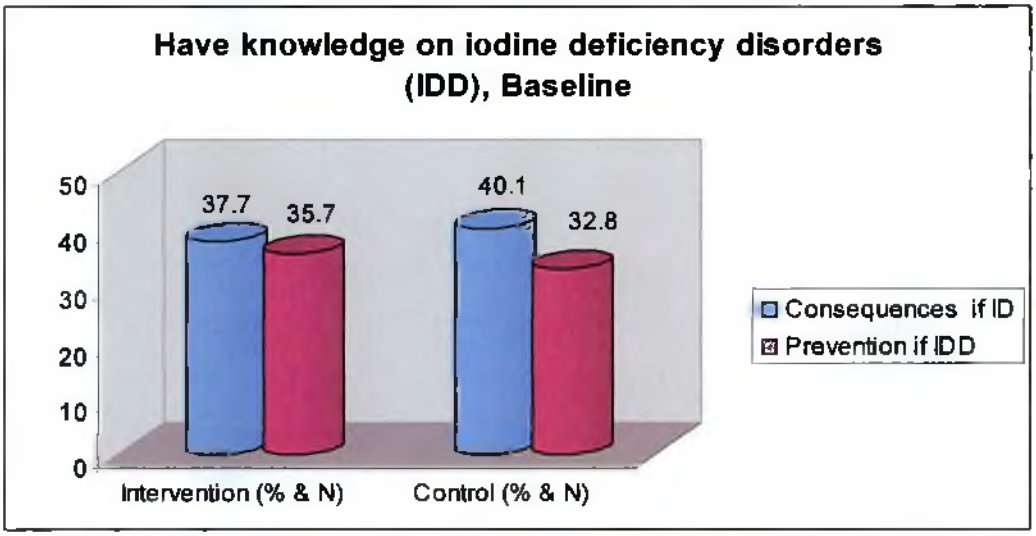


Figure 5 shows the nutritional Status by CED of study mothers The study also showed that at baseline 50% of the respondent mother was normal while after intervention the percentage increased to 65%. But in contrast percentage of normal mother decreased from 63% to 50% during follow-up.

5.9 The KAP on nutritional aspects of the mothers

Figure 6 reveals the percent distribution of respondent mothers according to correct knowledge on micro nutrients (ID). Knowledge on IDD regarding is consequence and prevention was found to increase in the intervention group from baseline to follow up. The knowledge of prevention of IDD among intervention group found to increase from 35.7% in the baseline to 80.6% in the follow-up.

Figure 6: Percent distribution of respondent mothers according to correct knowledge on micro nutrients (ID)



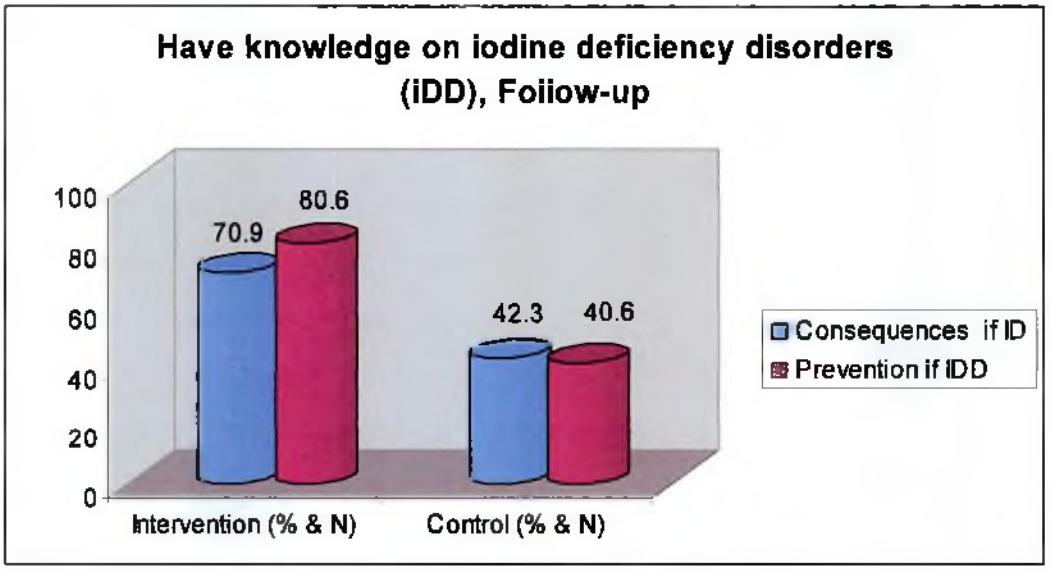
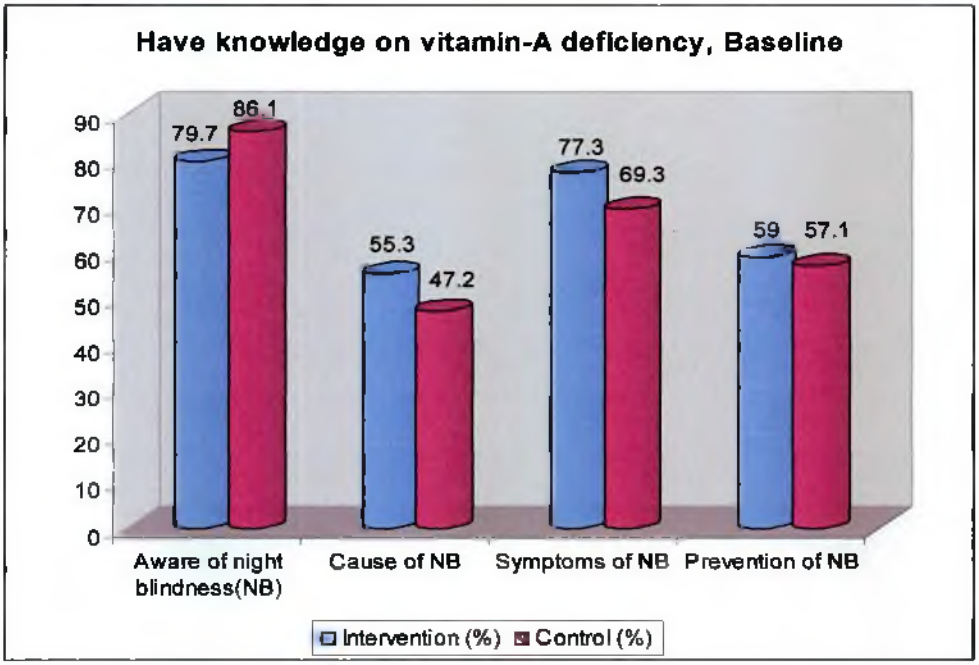


Figure 7: Distribution of respondent mothers by knowledge on micro nutrients (Vitamin-A)



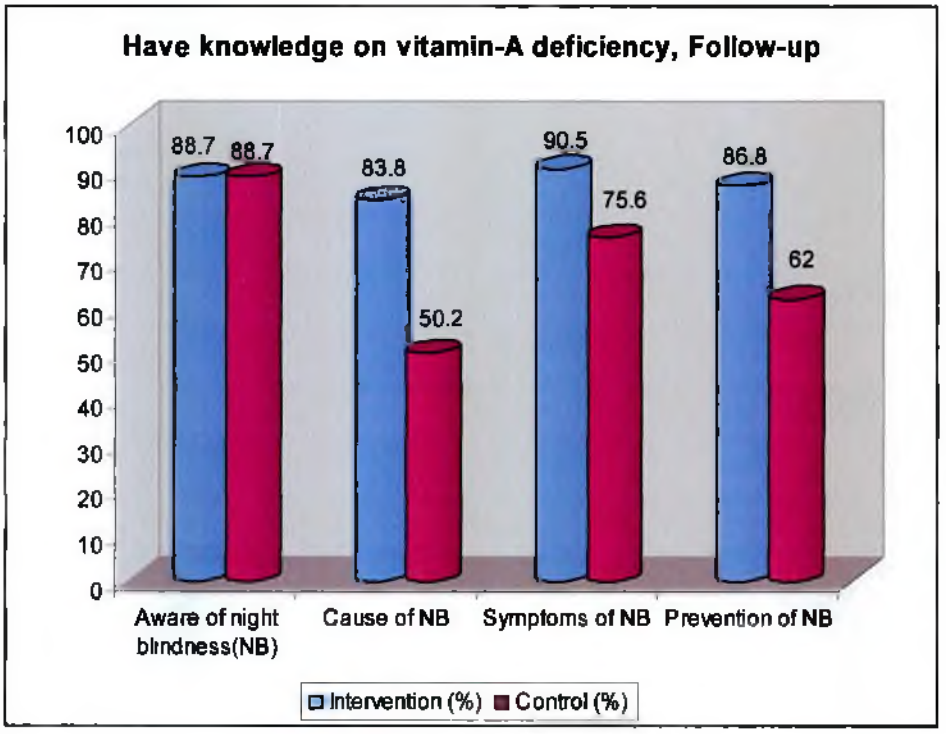
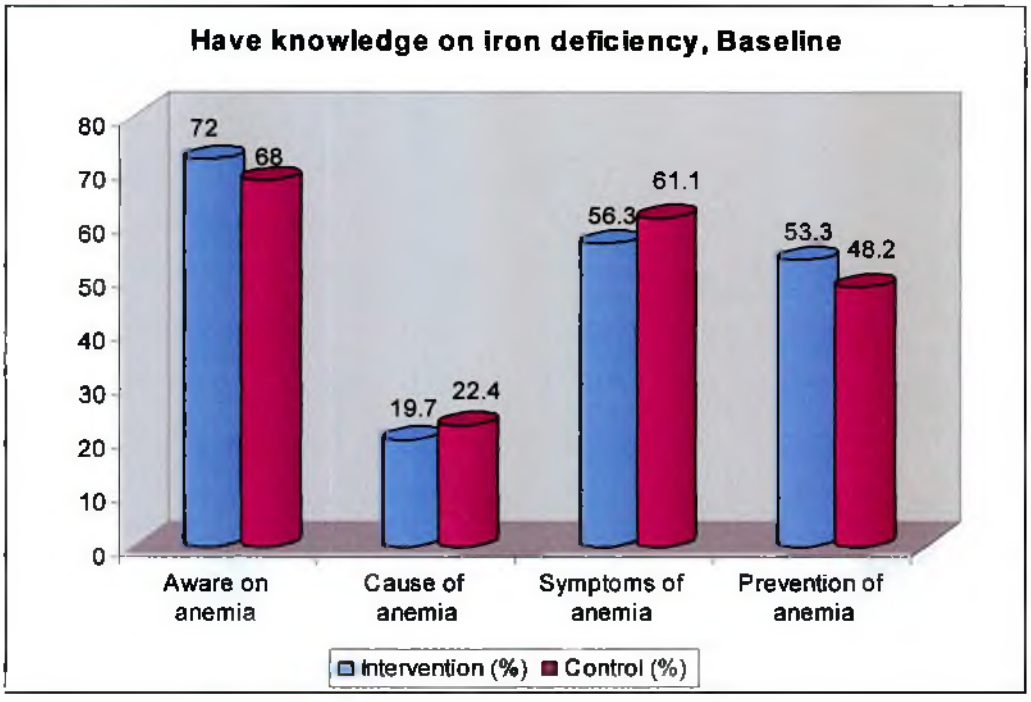


Figure 7 shows that the distribution of respondent mothers by knowledge on micro nutrients (Vitamin-A). The increase of knowledge on vitamin – A deficiency during follow-up form baseline in both intervention and control group. The percentage among the intervention group the control group.

Figure 8: Distribution of respondent mothers by correct knowledge on micro nutrients (Iron)



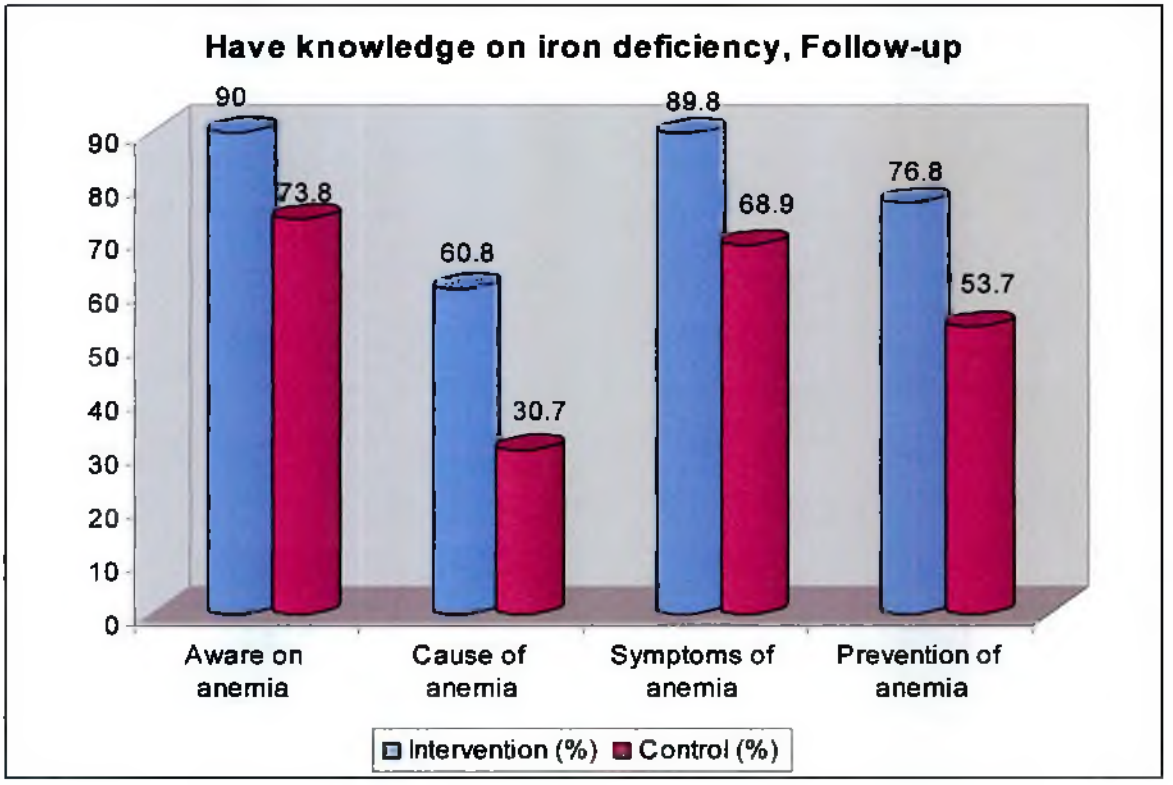
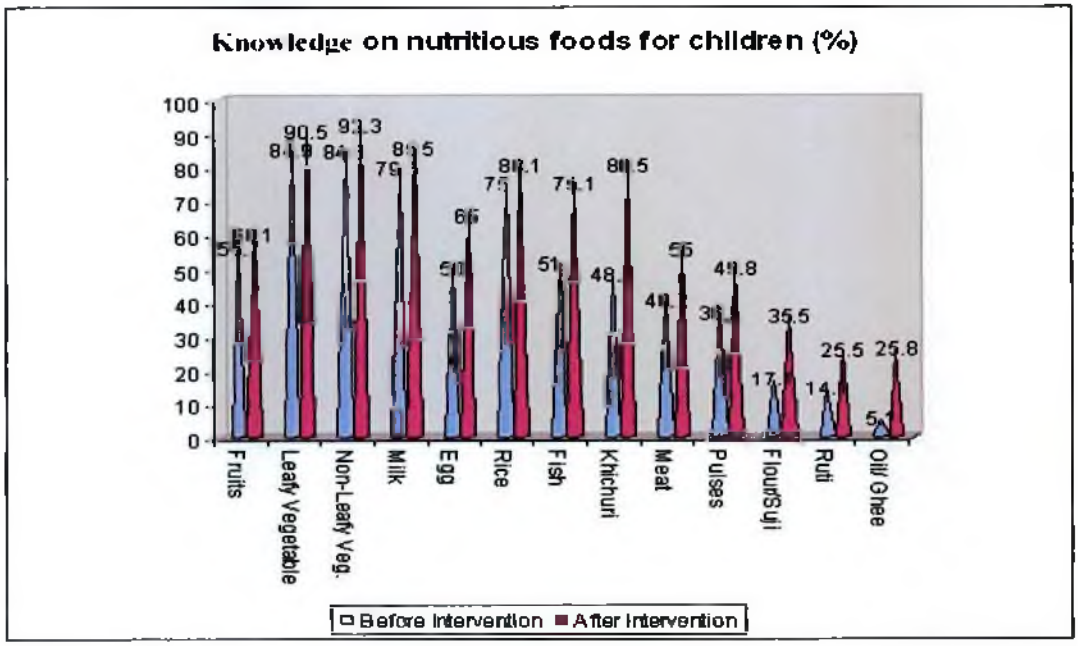


Figure 8 shows the distribution of respondent mothers by correct knowledge on micro nutrients (Iron). During the baseline survey the respondents of intervention and control group did not show any major difference about the knowledge of iron deficiency, but during follow-up knowledge of the intervention group increased then that of the control group. 90% of the respondent of the intervention group at the knowledge about anemia during the follow-up, which was about 74% for the control group. Regarding symptoms of anemia follow-up study showed about 90% of the respondents knew about the symptoms of anemia and it was 69% for the control group.

Figure 9: Distribution of mothers by knowledge on nutritious foods for children



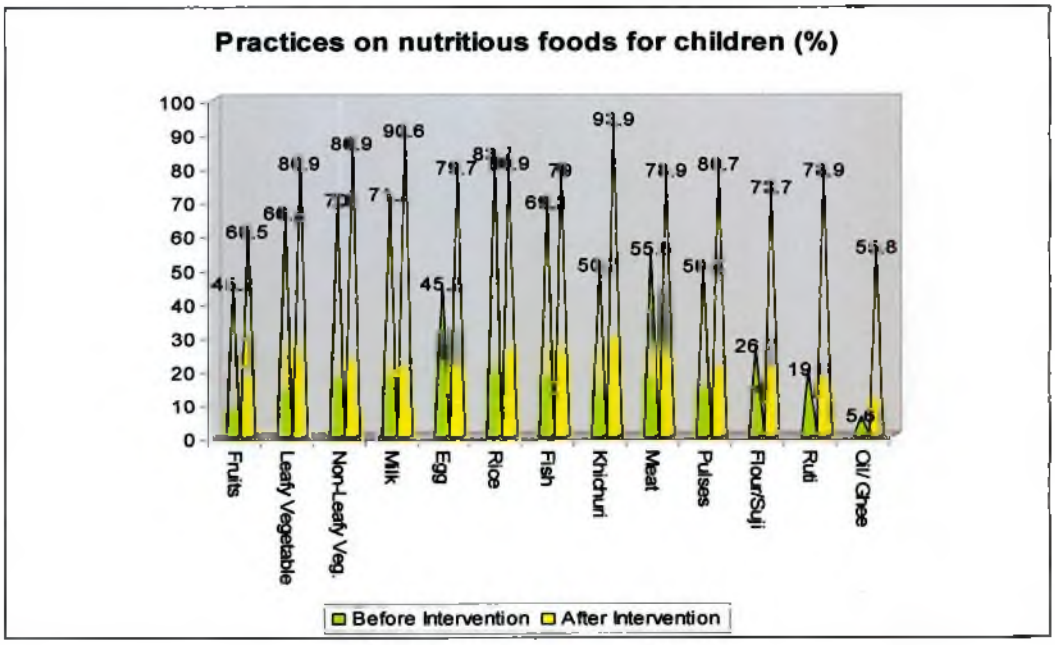


Figure 9 reveals the distribution of mothers by knowledge on nutritious foods for children the knowledge on nutritional food items were recovered to increase after intervention. The increase on the knowledge of animal protein like egg was found 65% from 50% and meat 50% from 40.2%. Knowledge on khechuri which is a nutritious mixed food for the children also increased to 80.5% from 48%. Similarly practice of nutritious food items also increased after the intervention. Consumption of milk rose from 71.7% to 90.6% and the consumption of food increased from 69.3% to 79.0%

5.10 The KAP score of the respondent mothers

Table 8- Showed the questions asked, correct answers and percentage respondents with correct answer .During the follow up percentage of correct answers for all questions increased remarkably in the intervention compared to the control group. The correct ans. for the question no – 1 rose form 49.4% to 92.7% and the difference was statistically significant. Notable improvement were observed among the other important questions like 4 and 5 where correct answers on the benefits of vitamin-A intake was observed to risk from 42.7% to 79% among the control group. Regarding the colostrum feeding correct answer rose form 72.0% to 93.3%. Other answers of the questions like 6, 7, and 8 which are also fundamental for a new born child were also improved in the follow up. The increased percentages 85%, 95% and 88% were observed for question number 6, 7, 8 respectively. The improvement for the question no 10 was observed as 97.7%.

Question no-3 reveals about 30.5% mother of intervention and 30.0% of control group at baseline think that they did not got anemia during and after delivery due to Iron supplements during pregnancy. But after intervention this knowledge increased from 30.5% to 55.7% which in statistically significant (p=0.00)

Question no-4 reveals that there was a statistically significant (p=0.00) improvement (42.9% to 79.2%) was found on the knowledge on the benefit of post-partum vitamin-A supplementation, among intervention group mothers.

Table 8: Questions asked, correct answers and percentage of respondents with correct answer (PCA %)

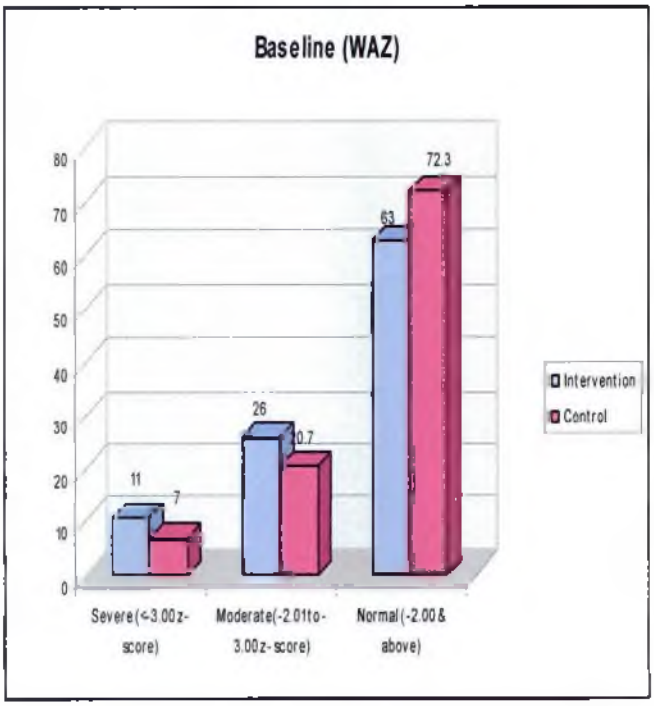
Question (in short form)	Correct answer	Baseline		Follow-up		P-Value
		Int. (% & N)	Cont. (% & N)	Int. (% & N)	Cont. (% & N)	
Knowledge on dietary pattern during last trimester of pregnancy.	Consumes more than normal	49.4 (148)	58.7 (161)	92.7 (271)	61.4 (161)	0.00
Benefit of more food consumption during pregnancy.	More food keeps fetus and mother healthy	76.7 (230)	75.7 (208)	92.6 (270)	82.4 (216)	0.15
Benefit of Iron supplementation during pregnancy.	Mothers doesn't get anemia	30.5 (92)	30.0 (83)	55.7 (163)	35.3 (93)	0.00
Benefit of intake vitamin 'A' after pregnancy.	Child gets more vitamin-A from BF	42.9 (128)	40.5 (111)	79.2 (231)	41.5 (109)	0.00
First feed of a new born baby.	Colostrums/ Shaldud	72.0 (218)	74.0 (203)	93.3 (272)	79.7 (210)	0.01
Initiation of breast feeding to a new born.	Within 1 h (<=1h)	49.7(149)	50.5 (139)	84.8 (248)	56.5 (149)	0.00
Age of a baby should be given breast feeding only.	Right ans (6m)	72.1 (216)	75.0 (206)	95.0 (279)	80.2 (211)	0.003
Age of a baby is given complementary foods along with breast feeding.	At 7 Months	69.0 (207)	27.0 (74)	87.9 (257)	30.9 (81)	0.29
Demerits of introducing other foods before completion of six months of age.	Harmful for children	78.2 (235)	75.2 (207)	95.4 (279)	79.0 (263)	0.03
Every child should continued breast feeding up two years.	Yes	83.1 (249)	76.3 (210)	97.7 (285)	75.9 (200)	0.02
Best food for a child aged 0-2 years.	Breast milk	83.2 (250)	81.7 (225)	97.5 (285)	85.7 (225)	0.11
Frequency of Feeding for 7-11 months children	Right know (3-4 times/day)	55.8 (167)	52.7 (145)	75.3 (220)	53.1 (140)	0.00
Frequency of Feeding 12-16 moth	Right know (4-5 times/day)	38.1 (114)	40.5 (111)	62.0 (181)	42.5 (112)	0.00
Frequency of Feeding 17-23 moth	Right know (4-5 times/day)	35.9 (108)	47.1 (129)	60.2 (176)	48.0 (126)	0.00
Taken iron supplementation at any time.	taken Iron for any duration	62.8 (188)	75.7 (208)	72.0 (210)	74.9 (197)	0.05
Intake of vitamin 'A' supplementation	Yes, taken vit-A	16.3	32.7	39.7	42.6	0.00
Using iodized salt for cooking food	Iodized	73.7 (221)	82.7 (227)	87.3 (255)	89.8 (236)	0.22
Duration of breast \feeding to last born baby.	Within 1 h (<=1h)	59.6 (179)	60.0 (165)	89.3 (261)	61.5 (162)	0.00
Given colostrum to baby after its birth.	yes feed colostrums	72.0 (216)	69.0 (190)	96.3 (281)	73.7 (194)	0.002
Practice for increasing of breast milk.	Ate extra/more food	19.2 (58)	24.7 (68)	84.7 (247)	26.8 (71)	0.00
Demerits of not introducing complementary foods at 7 months.	Harmful for children	77.2 (232)	78.5 (216)	96.9 (283)	82.5 (217)	0.01

5.11 Nutritional status of the infant and young children

There was a bit improve in wasting, stunting and underweight children among intervention group. Figure-10-11 Showed that intervention and control group at baseline of all variable of wasting were noticeable. At follow-up, there was an increased after intervention for sever, moderate condition of respondent children with in group comparison before and after intervention showed that there was a significant (P=0.03) increased in normal group (85% to 92%).

5.11.1 Prevalence of underweight

Figure 10: Distribution of underweight (Z-score)



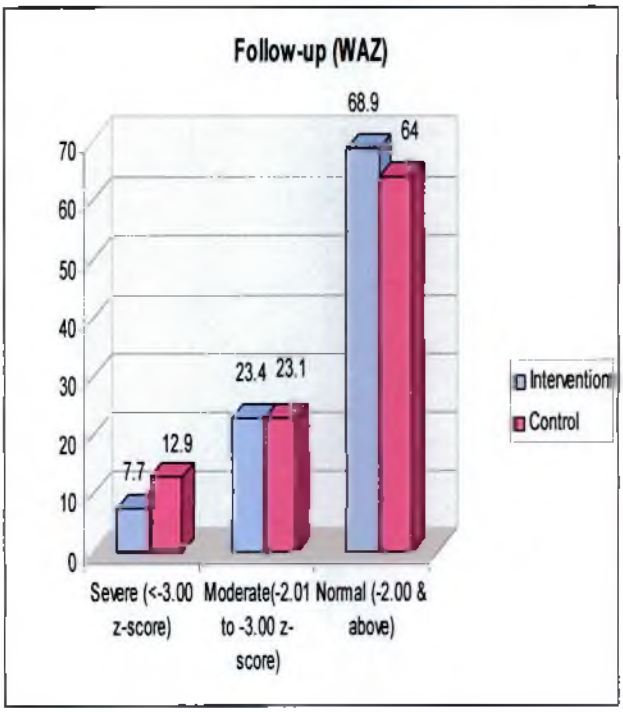


Figure 11 Prevalence of underweight (%)

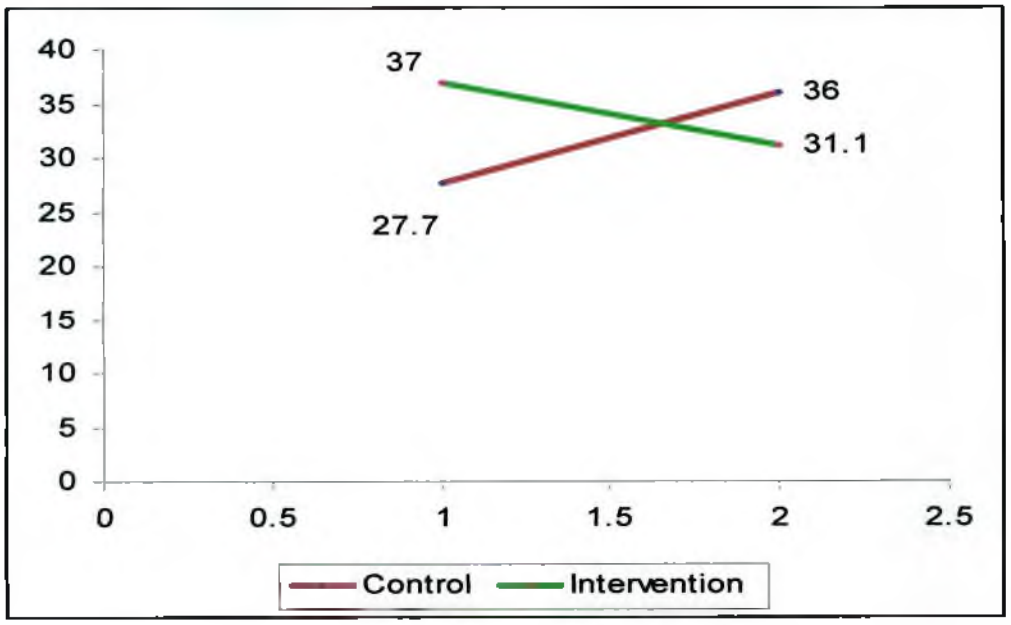


Figure 10-11: showed that the comparison of underweight of the respondent children, after intervention at follow up, there was a good improvement within sever (1.0% to 2.0%) moderate (7.40% to 24.0%) and normal (63.0% to 68.3%).

5.11.2 Prevalence of wasting

The following figures show the prevalence of wasting of the studied children between baseline and follow-up among control and intervention group. After intervention at follow up, there was a good improvement within sever (2.0% to 1.0%) moderate (13.3% to 7.4%) and normal (84.7% to 91.6%).

Figure- 12 Prevalence of wasting (%)

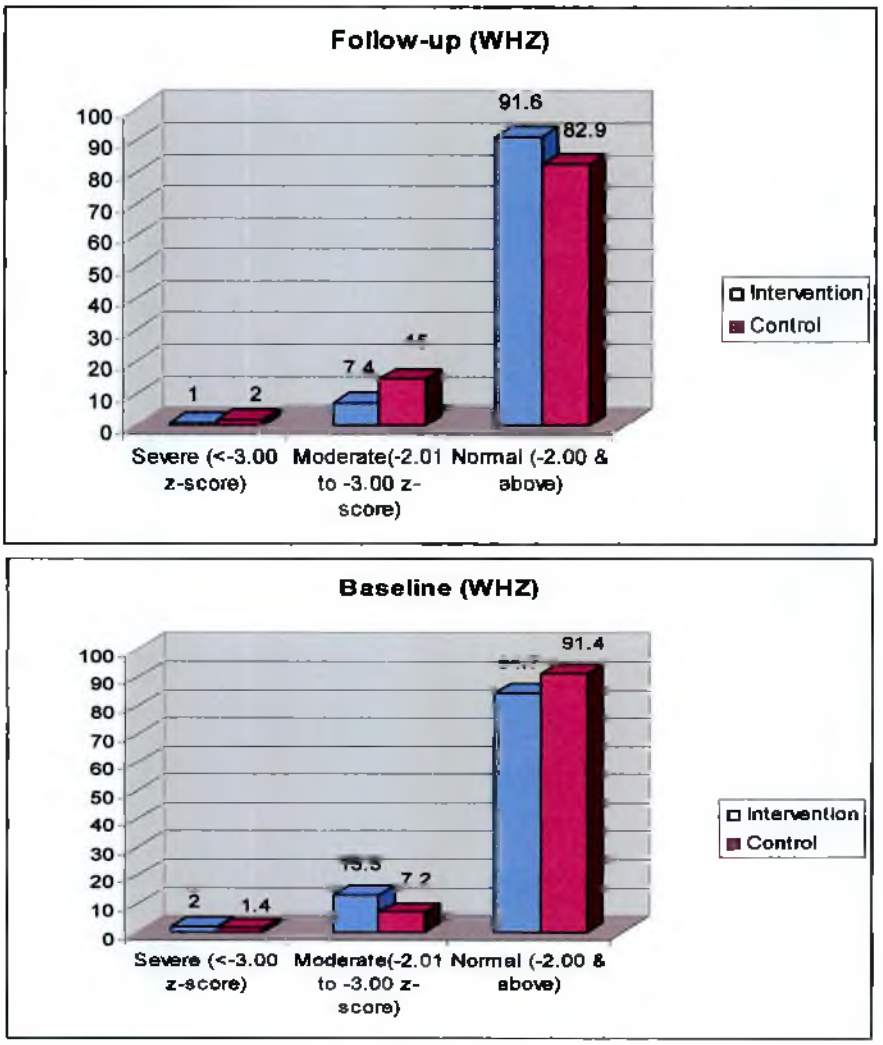
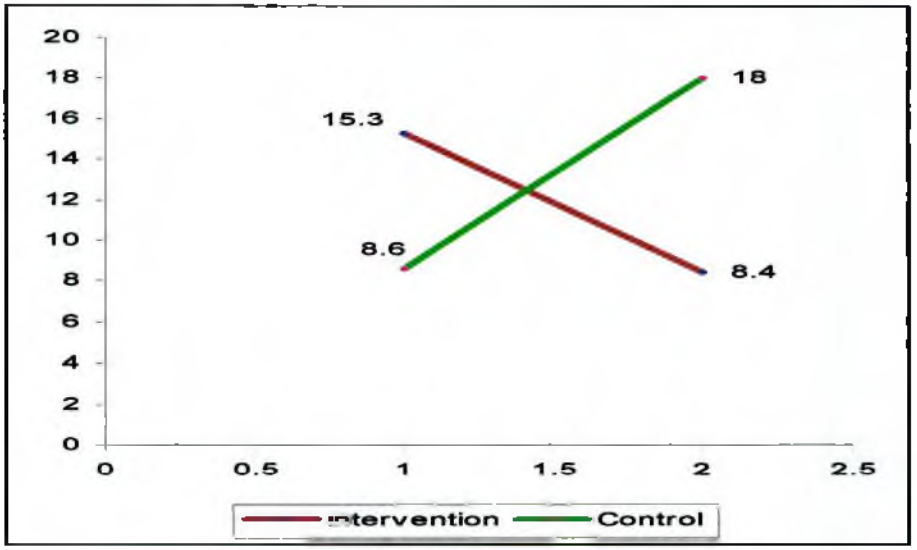


Figure- 13
Prevalence of wasting



5.11.3 Prevalence of stunting

Figure- 14: Prevalence of stunting (%)

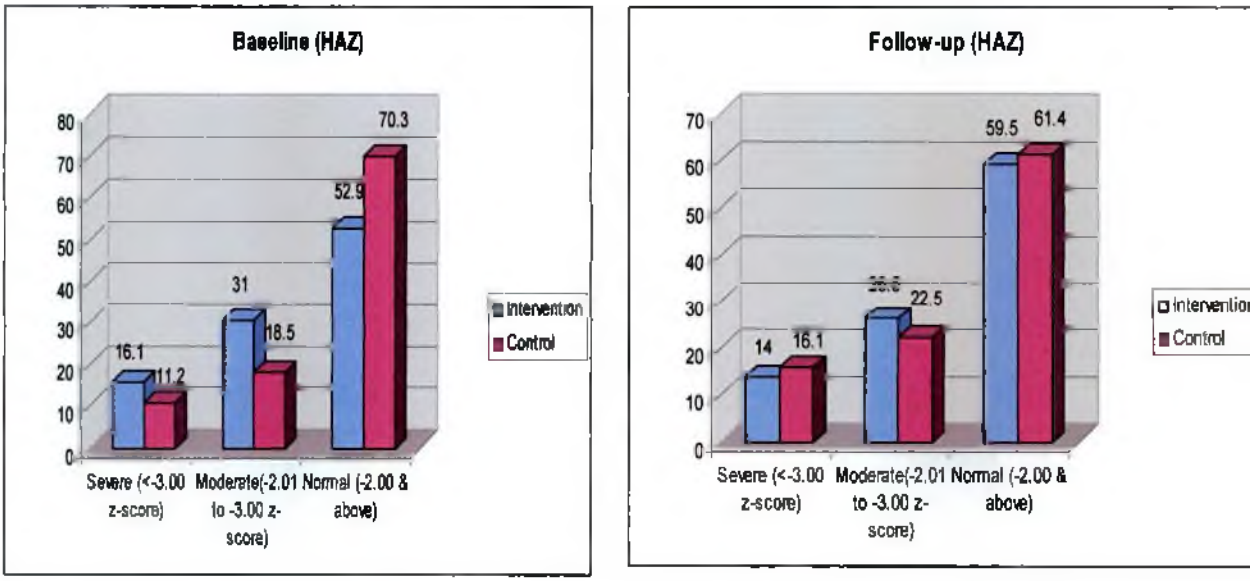


Figure- 15 Prevalence of Stunting

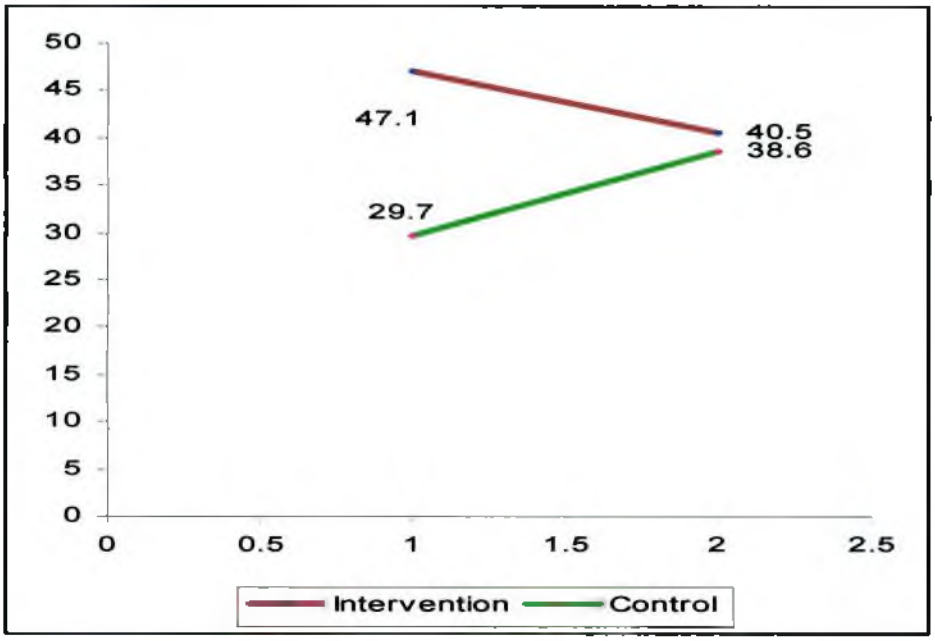


Figure- 14--15 Showed that the comparison of nutritional status (Stunting) of the respondent children. At follow-up of stunting observed that after intervention group had a improvement (47.1% to 40.5%). After intervention at follow up, there was a good improvement within sever (16.1% to 14.0%) moderate (31.0% to 26.5%) and normal (52.9% to 59.5%).

Part III: The Cross-table Analysis of the Data

Nutritional status is a multifactor outcome determined by the complex interrelationship between different factors. Table – 09 Results from the bivariate analysis are present in this table

Stunting rate found to drop from 32.6% to 22.2% those who have homestead but incase of respondents who do not possess any home stead. The percent of stunting increased form 14.3% to 18.1% and the difference was significant (P=0.00).

Percentage of under weight children remarkably decreased in the families who did not have income deficit. Before intervention the percentage of under weight was observed 27.6% which dropped to 17.5% during intervention and it was significant.

Bivariate analysis showed household size, ownership of land economic status all had effect on the nutritional status of the children.

Table-9 Underweight by food Security and insecurity (<3 meals/day by all)

Name of the Variables categories and their value labels	Under weight (<-2SD)					Wasting (<-2SD)					Stunting (<-2SD)				
	Before intervention		After intervention		P-Value	Before intervention		After intervention		P-Value	Before intervention		After intervention		P-Value
	Percent	Number	Percent	Number		Percent	Number	Percent	Number		Percent	Number	Percent	Number	
House Hold size <=3=1	7.6	23	6.8	20	0.75	2.6	8	1.7	5	0.68	11.0	33	10.9	32	1.00
4 and more = 0	29.3	88	24.3	71	00	12.7	38	6.8	20	1.00	36.0	108	29.4	86	0.24
Ownership of homestead Have any = 1	23.6	71	17.1	50	0.39	9.6	29	6.1	18	0.52	32.6	98	22.2	65	0.53
Do not have = 0	13.3	40	14.0	41	0.02	5.7	17	2.4	7	0.20	14.3	43	18.1	53	0.00
Agricultural land owners Have any amount =1	8.7	26	7.2	21	0.98	5.3	16	3.4	10	0.24	14.3	43	11.0	32	0.32
Landless = 0	28.3	85	23.9	70	0.15	10.0	30	5.1	15	0.49	32.6	98	29.4	86	0.35
Perceived Economic Status Non deficit (balance/surplus)=1	27.6	83	17.5	51	0.15	5.6	17	2.4	7	0.41	13.0	40	13.3	39	0.22
Deficit (always/occasional)= 0	9.3	28	13.6	40	0.00	9.7	29	6.1	18	1.0	33.6	101	27.0	79	0.11
Household Food Security Food secured = 1	16.6	44	10.6	31		7.2	22	3.0	9	0.24	38 0	49	42.8	65	0.46
Food in-secured = 0	22.3	67	20.5	60		8.3	25	5.4	16	0.34	49.7	85	42.9		0.26

5.12 Under-nutrition and its association with child's attributes

Table – 10: Results from the bivariate analysis are present in this table. This table shows the distribution of under weight, stunting and wasting by child's attributes. Here depicts the percent of underweight, stunting and wasting by age. Proportion for all the worth indices studied, varied significant by (p = 0.02) and (p = 000) between the age groups. Intervention group at baseline, It was clear from the table that, under in creased as age progressed underweight and stunting in children belong to 12-23 months age group fared worst compared to others.

Exclusive breast feeding had no significant difference between intervention group at baseline and follow-up.

No significant differences observed when the proportions of under-nutrition disaggregated y sex.

Weight at birth in inter venation group at baseline, nutritional status found to be worse in children who had low birth weight (LBW) (<2.5 Kg) as compared to those who were not under weight; 47% were underweight in children had <2.5 kg weight at birth while this was 26.2% in those who were > = 2.5 kg at birth, similarly, 59.4% were stunted in LBW group as compared to 36.1% in non-LBW group. Percentage of was higher (15.6%) in LBW group compared to non-2BW group (8.2%). These differences were statistically significant cant (p = 0.01) the wasting status of children in on the other hand of children in intervention group at Follow-up, was higher than baseline (5.4% to 22.2% in 6 – 9 months) and 8.2 to 20.4% in 12-23 months. It was statistically significant (p= 0.01). We can see that the LBW (<2.5 kg) had an affect on underweight and stunting in intervention group at Follow-up similar to the baseline 55.9% was underweight and 55.9% was stinted. It was statistically significant (p=0.005 and p = 0.02) Immunization status, morbidity status, Breast feeding initiation and

Table- 10 Distribution of underweight, stunting and wasting by child's attribute

Name of the Variables categories and their value labels	Under weight (<-2SD)					Wasting (<-2SD)					Stunting (<-2SD)				
	Before intervention		After intervention		P-Value	Before intervention		After intervention		P-Value	Before intervention		After intervention		P-Value
	Percent	No.	Percent	No.		Percent	No.	Percent	No.		Percent	No.	Percent	No.	
Child's age <6 months =)	11.6	35	4.1	12	0.20	3.3	10	0.7	2	0.73	8.3	25	0.7	2	0.16
6-9 months=1	6.4	19	4.5	13	0.31	1.6	5	1.0	3	0.04	4.9	12	1.0	3	0.20
10-11 months=2	5.0	15	13.0	38	0.03	3.0	9	3.7	11	0.46	6.3	19	3.7	11	0.38
12-23 months=3	14.0	42	4.5	28	0.78	7.4	22	3.0	4	0.01	28.3	85	3.0	4	0.22
Sex Boy=1	20.6	62	17.1	50	0.41	10.0	30	4.85	14	0.02	25.6	77	21.0	61	0.45
Girl=0	16.3	49	14.0	41	0.88	5.3	16	3.8	11	018	21.3	64	19.5	57	0.23
Birth order 1st =2	13.0	39	6.8	20	0.56	4.3	13	3.1	9	0.16	10.3	31	7.9	23	0.03
2nd and 3rd =1	17.7	53	10.6	31	0.05	7.0	21	3.1	9	0.29	14.0	42	15.0	44	0.05
4th and more=0	6.0	19	13.7	80	0.00	4.0	12	2.4	7	0.02	22.7	68	17.5	51	0.64
Birth weight Normal (≥2.5kg)=1	12.0	36	11.9	35	1.00	6.3	19	3.4	10	0.33	14.0	42	15.1	44	0.02
LBW (<2.5kg)=0	25.0	75	19.2	56	0.01	9.0	27	5.1	15	0.33	33.0	99	25.3	74	0.82
Immunization Status Fully immunized=1	16.3	49	10.9	32	0.58	6.6	20	4.1	12	0.73	21.7	65	15.1	44	0.01
Not fully immunized=0	20.6	62	20.2	59	0.10	8.7	26	4.4	13	0.29	25.3	76	25.3	74	0.48
Morbidity Status (7days) Had no illness=1	10.6	32	7.5	22	0.54	4.0	12	3.1	9	0.01	18.7	56	14.7		0.33
Had one or more illness=0	26.3	79	23.6	69	0.18	11.3	34	5.5	16	0.06	28.8	85	25.7	75	1.0
Breastfeeding initiation within 1 hour=1	16.0	48	12.3	36	0.44	6.6	20	3.4	10	0.08	20.0	60	15.4	45	0.26
later than 1 hour=1	21.0	63	18.8	55	0.37	8.7	26	5.1	15	0.86	27.0	81	25.0	73	0.72
Exclusive Breastfeeding Exclusively breastfed=1	14.3	43	12.7	37	0.79	6.0	18	3.8	11	0.73	13.0	39	10.1	30	0.81
Not exclusively breastfed=0	22.7	68	18.5	5.4	0.31	9.3	28	4.8	14	1.0	34.0	102	30.1	88	0.44

Childs age had shown effect on the weight of the children. Only 5% of the children were found under weight before intervention in the age group 9-11 month which rose to 13% after the intervention and the different was significant ($p<0.05$).

Birth order also displayed its effect on the nutritional status, the percentage of under weight children reached 13.7% from 6% during intervention in the birth order 4^{th} and more which was statistically significant. Interestingly stunting rate decreased from 10.3% to 7.9% in the first order and the difference was statistically significant. Stunting rate developed from 21.7% to 15.1% among the fully immunized babies.

5.13 Under-nutrition and its association with maternal attributes

Table – 11: Shows the distribution of underweight, stunting and wasting by maternal attributes. Mothers BMI height and weight exhibited to found effect on child nutritional status Percentage of the under weight children of mothers having normal BMI dropped from 12.7% to 6.8% during intervention and the result was highly significant (P=0.00)

Percent of the under weight children mother having height >145cm were fell to 4.2% during intervention.

On the other similar conditions showed in intervention group at follow-up. Chronic energy deficient mother (<18.5 BMI) influenced underweight wasting conditions in children. (48.0 And 20%) It was statistically ($p = 0.00$) ($P = 0.4$)

Mother BMI, height and weight were also significantly associated with the stunting of the children.

Table -11 Distribution of underweight, stunting and wasting by maternal attributes

Name of the Variables categories and their value labels	Under weight (<-2SD)					Wasting (<-2SD)					Stunting (<-2SD)				
	Before intervention		After intervention		P-Value	Before intervention		After intervention		P-Value	Before intervention		After intervention		P-Value
	Percent	Number	Percent	Number		Percent	Number	Percent	Number		Percent	Number	Percent	Number	
Mother's age >=20 years=1	15.0	45	13.0	38	0.79	6.3	19	2.7	8	1.00	23.3	70	17.5	51	0.07
<=19 years=0	22.0	66	13.0	53	0.20	7.3	22	5.8	17	0.04	23.6	71	22.9	67	0.22
Mother's Education Secondary and above (≥ 6th grade=2	7.0	21	18.1	9	0.41	3.3	10	2.4	7	0.46	10.0	30	7.5	22	0.06
Primary (1-5th grade) =1	14.0	42	3.1	25	0.34	4.7	14	2.7	8	0.83	16.0	50	15.1	44	0.95
No education=0	16.0	48	8.6	57	0.0	7.3	22	3.4	10	0.41	20.3	61	17.8	52	0.51
Mother's Occupation Working (earning)=1	28.0	85	19.5	71	1.00	10.0	30	5.4	16	1.00	26.3	79	24.1	70	0.57
Not working (housewife)=0	8.7	26	24.3	20	0.68	5.3	16	3.1	9	1.0	44.3	62	16.4	48	0.57
Mother's BMI >=18.5=1	12.7	38	6.8	29	0.00	5.3	16	3.4	10	0.14	16.7	50	16.4	48	0.29
<18.5=0	24.3	73	9.9	62	0.04	10.0	30	5.1	15	0.03	30.3	91	23.9	70	0.01
Mother's Height >=145cm=1	13.0	39	4.2	26	0.03	5.3	16	3.1	9	0.20	22.3	67	19.9	58	0.07
<145 cm =0	24.0	72	8.9	65	0.04	10.0	30	5.4	16	0.62	24.7	74	20.5	60	0.00
Mother's Weight >=38 kg=1	13.7	41	22.2	24	0.04	7.3	22	3.1	9	0.45	19.3	58	14.7	43	0.29
< 38 kg =0	23.3	70	8.2	67	0.00	8.0	24	5.4	16	0.01	27.7	83	25.7	75	0.00

5.14 Effect of increased mothers KAP on child's nutritional status

Table-12 reveals the distribution of wasting by total score of KAP was categorized into three categories, 0-8 as poor, 9-15 as good and 16-20 as excellent. Before the intervention about one third of the participant had knowledge of poor category about and two third was in 9-15 group after the intervention increased in knowledge was observed in 9-15 and 16-20 with the remarkable increased in the latter group which was considered as excellent. In the excellent category the percentage of normal children increased remarkably form 1.3% to 29.8%. No – noticeable change was observed in the control group

Table-12 Distribution of wasting by total score of KAP

KAP Score	NS	Intervention				Control				P-value
		Baseline		Follow-up		Baseline		Follow-up		
		%	n	%	n	%	n	%	n	
0-8 Poor	WHZ <-2SD	7.1	21	1.2	4	5.0	14	6.5	17	
	normal	27.0	81	1.5	4	32.1	88	19.7	52	
9-15 Good	WHZ <-2SD	6.2	19	6.5	19	2.6	7	9.5	25	
	normal	56.4	169	60.2	176	56.3	153	54.8	144	
16-20 Excellent	WHZ <-2SD	2.0	6	0.7	2	1.0	3	2.0	5	
	normal	1.3	4	29.8	87	3.0	8	7.5	20	
total		100	300	100	192	100	275	100	263	

Table-13 Distribution of underweight by total score of KAP

KAP	NS	Intervention				Control			
		Baseline		Follow-up		Baseline		Follow-up	
		n	%	n	%	n	%	n	%
0-8 Poor	UWT	41	13.6	4	1.3	39	14.0	42	15.9
	Normal	62	29.5	1	1.4	64	23.1	27	10.3
9-15 Good	UWT	65	21.6	74	25.3	32	11.4	48	18.5
	Normal	123	41.0	121	41.4	129	47.0	121	46.2
16-20 Excellent	UWT	5	1.8	13	4.5	5	1.8	5	2.0
	Normal	4	1.5	76	26.0	6	2.2	20	7.5
total		300	100%	292	100	275	100	263	100

Table-13: reveals the distribution of underweight by total score of KAP. As KAP knowledge increased the number of normal children also had gone up in the intervention group. During the base line only 1.5% of the children was normal in excellent group, which increased to 26%. But incase of control group the number of normal children was 2.2% in the baseline which increased to only 7.5% during follow-up.

5.15 Impact of increased mothers KAP on HH food security and insecurity

Figure 16: Distribution of food security by total score of KAP

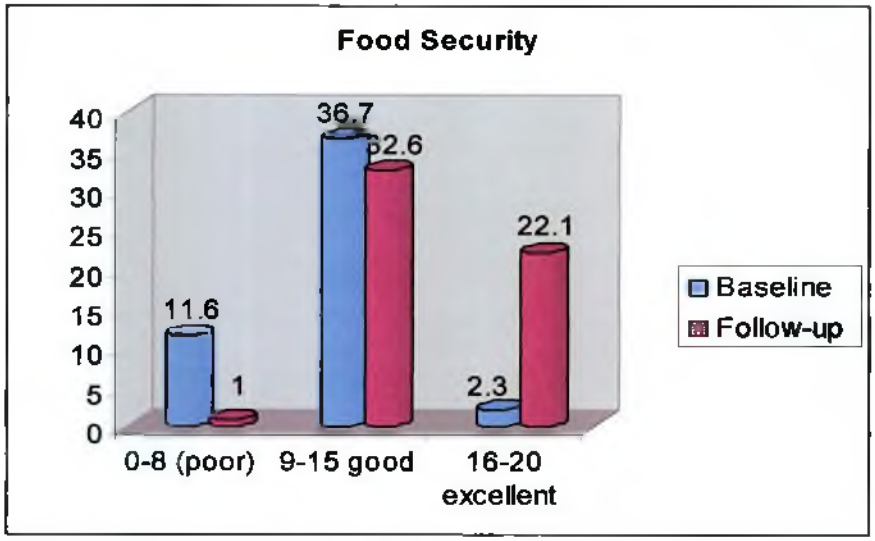


Figure 17: Distribution of food insecurity by total score of KAP

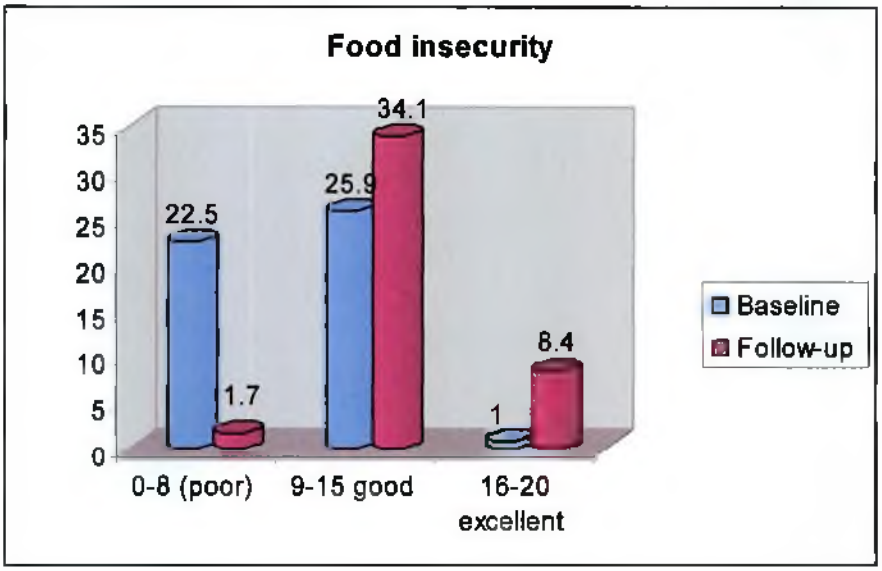


Figure: 16-17 shows the increase of KAP score was higher in the food secured group. In the food secured group percentage of respondents in the excellent score category rose form 2.3% to 22.1% but incase of insecure group it rose form 1% to 8.4% in the same knowledge category.

5.16 Effect of food security and insecurity on the nutritional status of the child

Table-14 Underweight by food security and insecurity (<3 meals/day by all)

NS	Food Security		Food insecurity		P-value
	Baseline	Follow-up	Baseline	Follow-up	
WAZ (<-2SD)	44 (14.6)	31 (10.6)	67 (22.3)	60 (20.5)	
Normal (>-2.0 SD)	108 (36.0)	132 (45.2)	81 (27.1)	69 (23.6)	
Total	152 (50.6)	163 (55.8)	148 (49.4)	129 (44.1)	

Table- 15 Wasting by food security and insecurity (<3 meals/day by all)

NS	Food Security		Food insecurity		P-value
	Baseline	Follow-up	Baseline	Follow-up	
WHZ (<2SD)	22 7.2	9 3.0	25 8.3	16 5.4	
Normal (>-2.0 SD)	130 43.4	154 52.8	123 41.1	113 38.7	
Total	152 50.6	163 55.8	148 49.4	129 44.1	

Table: 14 shows the underweight by food security and insecurity (<3 meals/day by all). Increase of normal children was higher in the food secured group. In the food secured group percentage of respondents rose forms 36.0% to 45.2% but incase of insecure group it was decreased form 27.1% to 23.6%.

Table- 15 reveals the wasting of children by food security and insecurity (<3 meals/day by all). There was a improvement of wasting in the food secured group than in the food insecure group

5.17 Predictors of underweight in under-two children

Table: 16 shows the results of the logistic regression for underweight as the dependent variable on a number of selected variables. Intervention group at baseline age of children, birth weight, BMI of mothers were identified as the risk factors of under weight. Older children (aged 12-23 month) and children with low birth weight have the higher risk for becoming underweight. Mother's BMI, less than 18.5 were found to be significantly associated with the increased risk of having underweight children. Low birth weight of children identified as the main risk factor of under weight children in intervention group at follow-up. This result is statistically significant ($p<0.05$).

Table- 16 Predictors of underweight in under-two children

Independent Variable		Dependent Variable	B	S.E	df	P- value	Exp (B)	95.0% C.I
Age of Child	Baseline							
<6m =0 6-9m =1 10-11 m =2 12.-23 m =3#			.243	.071	1	.001	1.267	1.110-1.466
Age of Child	Follow-up							
<6m =0 6-9m =1 10-11 m =2 12.-23 m =3#			-.688	.525	1	.190	.503	.179-1.407
Birth weight	Baseline							
≥2.5kg = 1# <2.5 kg =0			-2.082	.467	1	.000	.125	.050-311
Birth weight	Follow-up							
≥2.5kg = 1# <2.5 kg =0			1.354	.469	1	.004	3.873	1.543-9.718
BMI of Mother	Baseline							
≥18.5 = 1# <18.5= 0			-.730	.212	1	.001	.482	.318-.730
BMI of Mother	Follow-up							
≥18.5 = 1# <18.5= 0			.597	.435	1	.170	1.817	.774 - 4.262

5.18 Predictors of stunting in under-two children

Table – 17: Logistic regression has identified number of independent variables as the influence of stunting in under-two children. Like many other studies (Rayhan I and khan Sh 2006, Smith LC and Haddat L 2000, Bairagi R and MK chowdhury 1994). Islam MA and etal . (1994). The risk of stunting was found to be decreased in house holds that used iodize salts and this relationship was statistically significant (p=0.004) in intervention group at baseline. Better sanitation practice reduces risk of stunting. Children weight at birth had significant (p=0.01) association with stunting. Respondent Mothers whose height and BMI are above the cut-off level, have lower risk of having stunted children than those who have height or BMI below the critical cut-off points.

Table 17 Predictors of stunting in under-two children

Independent Variable		Dependent Variable	B	S.E	df	P- value	Exp (B)	95.0% C.I
BMI of Mother ≥18.5=1# <18.5=0	Baseline							
			-.434	.205	1	.034	.648	.434-968
BMI of Mother ≥18.5=1# <18.5=0	Follow-up							
			- .007	.278	1	.979	.993	.576 - 1.710
Height of Mother ≥145cm=1# <145cm=0	Baseline							
			-.958	.266	1	.000	.384	.228-646
Height of Mother ≥145cm=1# <145cm=0	Follow-up							
			- .1.781	.489	1	.000	.169	6.463 - .439
Birth Weight of Child ≥2.5 kg=1# <2.5kg=0	Baseline							
			-1.655	.505	1	.001	.191	.071-514
Birth Weight of Child ≥2.5 kg=1# <2.5kg=0	Follow-up							
			- .723	.378	1	.055	.485	.231 - 1.017

5.19 Predictors of wasting in under-two children

Table-18: shows the results of the logistic regression with presence of wasting as the dependent variable. This table shows that both and baseline and follow up mother's BMI was main risk factor of wasting of respondent children

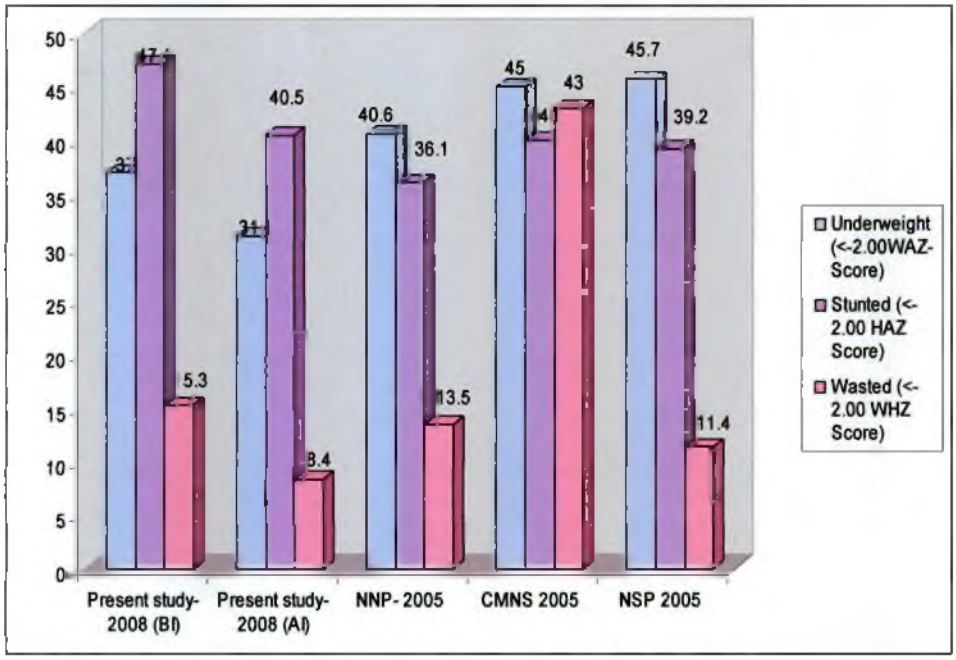
Table -18 Predictors of wasting in under-two children

Independent Variable		Dependent Variable	B	S.E	df	P- value	Exp (B)	95.0% C.I
BMI of Mother	Baseline							
Male=1# Female =0			-.695	.3460	1	.045	.499	.253-.985
BMI of Mother	Follow-up							
Male=1# Female =0			1.878	.817	1	.021	6.544	1.320 - 32.444
Birth Weight of Child	Baseline							
≥2.5 kg=1# <2.5 kg=0			-2.103	.922	1	.023	.122	.020-.743
Birth Weight of Child	Follow-up							
≥2.5 kg=1# <2.5 kg=0			- .414	.667	1	.535	.661	.179 - 2.443
Child's Morbidity	Baseline							
No =1# Yes=0			-1.729	.772	1	.025	.178	.039- .0806
Child's Morbidity	Follow-up							
No =1# Yes=0			1.177	.820	1	.151	3.244	.650 - 16.186

Part IV: Comparison of Study Findings with Others

Comparisons of the study findings (Nutritional Status) With National Data

Figure- 18: Under nutrition (%) among the study children as compared with other National data



.Figure- 18 reveals the percentage of stunting, wasting and underweight was found to be 44.6%, 15.3%, 39.3% respectively in the intervention. After nutrition education package the stunting fall a little bit (43.2%) with the grater fall was observed interims of wasting and underweight which was 10% and 31.7% respectively.

Overall improvement was observed in case of underweight (31.7%) which was 40.6%, 45% and 45.7% in NNP-2003.

Figure- 19: Weight for age (<-2SD) (%) among the study children as compared with other National data

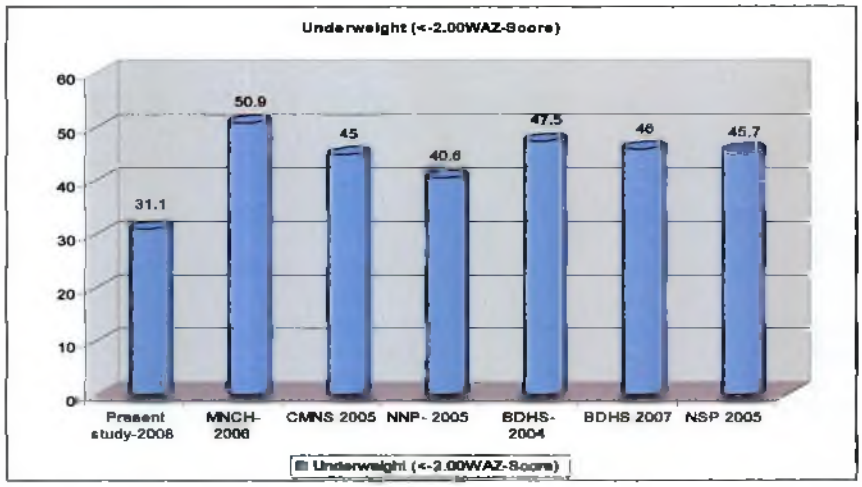


Figure- 19 shows that percentage of underweight (<-2SD) was found 31.1% after intervention which is remarkably low than the other successive studies of MNCH 2006, CMNS 2005, NNP 2005,

Figure- 20: Height for age (<-2SD) (%) among the study children as compared with other National data

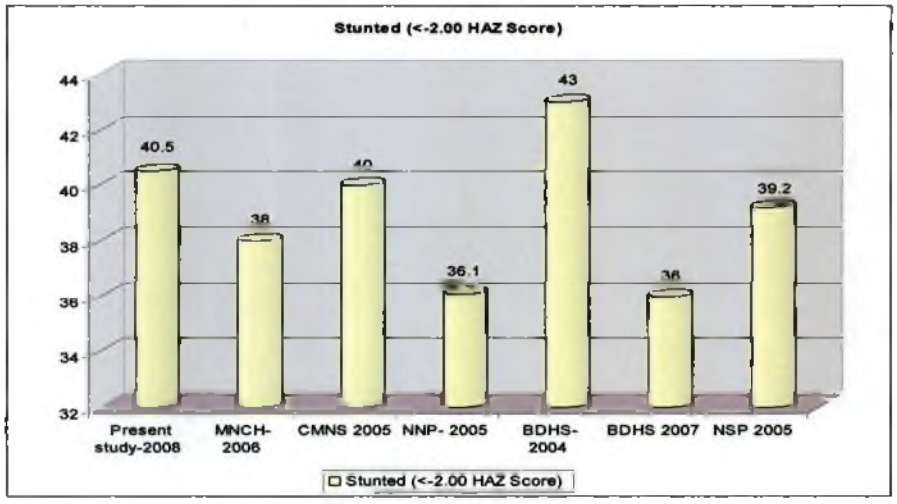


Figure- 20, It appears from the figure the rate of stunting (40.5%) is almost similar with the studies of CMNS-2005, BDS 2004, NSP 2005 but is little bit higher than the studies of MNCH 2006, NNP 2005, BDHS-2007.

Figure- 21: Weight for height (<-2SD) (%) among the study children as compared with other National data

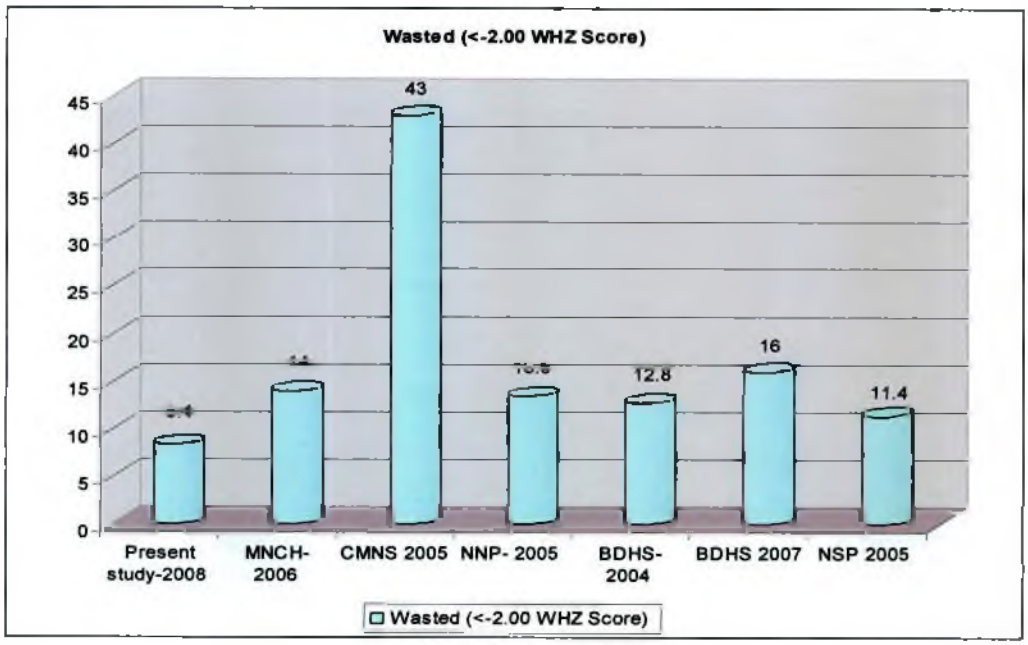


Figure- 21 reveals that the weight for height (<-2SD) (%) among the study children as compared with other National data.

Percentage of wasting (<-2SD) was found 8.4% after intervention which is remarkably low than the other successive studies of MNCH 2006, CMNS 2005, NNP 2005,

Sources Data:

a. Present study 2008, (intervention GP).
b. Maternal, Neonatal and Child Health Programme, 2006, RED-BRAC (intervention GP)
c. Child and mother Nutrition Survey, Bangladesh Bureau of Statistics (BBS), 2005
d. National Nutrition programme Baseline Survey Report 2005, icddrb, IPHN, NIPORT
e. Bangladesh Demographic and Health Survey , 2004,BBS
f. Bangladesh Demographic and Health Survey-2007, BBS
g. Bangladesh in Facts And Figures. Annual Report of the Nutritional Surveillance project (NSP), 2005

CHAPTER-6
DISCUSSION

6. Introduction

The effectiveness of nutrition education tools to combat malnutrition is always in question. But countries like Bangladesh where illiteracy is still very high, nutrition education to rural people specially the mothers could be an effective approach to reduce malnutrition of infants and young children.

The present study examined this possibility by a prospective cohort study conducted in six Unions of Nilfamari districts of Bangladesh. The findings of this study are elaborated and discussed in the following sections with probable explanations.

6.1 Demographic and socio-economic features

Although sampling areas in both groups for the baseline and follow-up surveys were same, some differences were observed in the household socio economic conditions. From the study (Table-2) it was observed that, the family size was 5±2 for both intervention and control group that is consistent with National Nutrition Survey of 1995-96 (average family size of the rural household was 5.97). The selected HHs were moderately food secure. Severe food insecurity was not observed among them (50.6% of the intervened and 47.7% of control group HHS were food secured).

The mean age of the selected mothers was 23 ± 5 years in both groups (Table-2), nearly a third of the mothers were illiterate (31.1% and 39.3%), and another one third (34.9% to 30.0%) had up to primary level of education, majority (90%) of the respondent mothers were house wife. House wives can take care of their children properly because they are at home and can look after their children throughout the day.

These conditions of the HHs were found suitable to expose the mothers with a NEP in order to improve the KAP of nutritional aspects of the mothers. This nutrition know-how was believed to be trickled down to the improvement of the nutritional status of their children.

6.2 Personal hygienic practice by mothers

Personal hygienic practice by mothers found to improve among intervene mothers. Hygiene practices especially by mothers, is very important since this reflects in health and nutrition well being of their infants and young children. Personal hygiene practices on some important issues by the study mothers were investigated. After intervention, there was a significant improvement in proper hand washing, before feeding child and hand washing before own eating among intervention group mothers (from 39.5% to 69.9% and 9.0% to 45.5% respectively). For this hygiene practices the percentage of diarrhoea declined from 14.1 to 4.0%.

6.3 Characteristics of study children

Children under two years old were included in the study and over all mean age were 11± 6.6 months in both groups. All though children were selected randomly, proportions of male and female children were 49.4% and 50.6% in intervention group and 54.3% and 45.7% of control group. The age limitation of the study children of intervention group was 54.8% in infant (<12m (0-11 months) and the young children (>12 m (12.0-23.0 months) was 41.1% which was consistent. This age group is particularly very important for the children as they experienced rapid growth during this time. A child attains his weight double at the age of six months from his birth weight and triple at the end of one year and his weight is four times of the birth weight after two years.

Mean birth weight (kg) of the children of both intervention and control group at baseline, it is observed that mean weight of the children of the intervention group was 7.33 ± 1.99 (kg) where as control group, it was 7.06 ± 1.94. So it can be said that the children of both groups are matched (same) in term of mean body weight. However, proportion of low birth weight (LBW) children before intervention and control group at baseline did not have much different between them.

6.4 Nutritional status of infant and young children

The incidence of malnutrition in Bangladesh still remains the highest in the world and also in South Asia, with nine out of ten children are malnourished to some degree. In Bangladesh 50% of newborn babies have LBW due to the malnutrition of pregnant mothers.

There were no significant changes in the proportion of underweight and stunting among the study children. However, proportion of wasting known as acute or short term under nutrition increased by 7 percentage points (from 8 to 15%). This could be explained by fact of high food price experienced during this period that led to household food insecurity. This was also evident in another study conducted by BRAC in August 2008 (RED-BRAC 2009).

6.5 Nutritional status of study mothers

Striking observation was that, proportion of mothers with chronic energy deficiency (CED) increased dramatically ($P<0.01$) from 35% in baseline (February 2008) to 50% in the follow-up (October 2008). Deterioration in mothers' nutritional status could also have resulted from the impact of food price hike during 2007-2008. Control group also had similar deterioration in maternal as well as acute child under nutrition. In the baseline study, mothers were short and thin. In both groups, 12 to 15% mothers were found to have height less than 145 cm critical stature considered as risk factor for low birth weight babies and a similar proportion also had weight less than 38 kg which is also considered critically low for giving birth to normal weight (>2.65 kg) babies. More than one third of the mothers (35%vs 37%) observed with BMI less than 18.5 which is used as cut-off level for chronic energy deficiency (CED), and a cut-off used in National Nutrition Programme (NNP) for selecting women for food supplementation.

This feature was almost similar to those reported in the BDHS (2004), where in 16% mothers at the national level are falling below the cut-off of 145 Cm in height 34% have BMI less than 18.5. Mothers' nutritional status also seemed not to be changed from the MNCH baseline (2006) status where in 34 and 36% mothers were found chronically energy deficient in intervention and control group respectively

6.6 KAP of the mothers and their child growth

Food consumption, Iron supplements during pregnancy and postpartum vitamin A supplements are the important components would be focused in MNI intervention. Therefore, the knowledge base was assessed on these issues. It was inspiring to see that, a great majority 86% and 94% of intervention and control group respectively at baseline aware on more food requirement during pregnancy compared to usual period and most of them knew on its importance (97 VS 99%). But in case of knowledge on the benefit of iron supplements particularly during pregnancy, a little more than one third (40% VS 36%) were only aware of it.

However, from the responses against open ended question, it was seen that, 70 and 89% in intervention and control group respectively did know it was nutrient that keeps baby and mother healthy. It would be worth mentioning here that, at the MNCH baseline survey (2006), 44% mothers only knew about anemia, majority (87%) of whom had knowledge on its preventive measures. Similarly, in the present study 25 and 59% in intervention and control group respectively knew on the benefit of vitamin A supplements specific to postpartum period. At the MNCH baseline survey (2006) 85% mothers were found to be aware on night blindness and 81% of these mothers knew that certain foods and or vitamin A supplements can prevent night blindness. It may seem contradictory that, mothers who knew about night blindness and its prevention could not necessarily relate when it came to vitamin A supplements during postpartum period. But this could be due to the fact that, through NID campaign or other sources, they are aware of vitamin A supplements for children but was not really educated on why mothers need to take this supplement as well. Nutrition education should be focused and targeted.

Mother's knowledge on maternal nutrition, infant nutrition, and infant and young child feeding (IYCF) was found to have increased in both intervention and control group. Though always the intervene group were ahead. Percentage of KAP score in the excellent category had gone high from 3.3% in the base line to 62.5% in the follow-up after the intervention but in case of control group no noticeable change

were observe in this category. The improvement in KAP of the respondents was found profound effect of the nutritional status of their children.

It was inspiring to see that, a majority (table - question no-1,2) 92.7% and 61.4% of intervention and control group respectively at follow-up aware on more food requirement during last trimester of pregnancy compared to usual period, which was 49.4% and 58.7% of both groups at baseline. Knowledge of mothers on benefit of more food was similar (92.6%) at follow-up of intervene group.

Higher number of underweight children achieved normal body weight gain after the intervention. The number of normal children was only 1.5% at baseline in the excellent KAP score category, which rose to 26% in the follow-up.

6.7 Factors associated with the nutritional status of under two children

Nutritional status is a multi-factorial outcome determined by the complex interrelationship between different factors. Variables included in the present study, were stratified based on certain socio economic and demographic background of the selected households mothers characteristics including nutrition knowledge and practices, Childs characteristic including their feeding status to examine their association with the nutritional status. The main outcome variables were the proportion of underweight, stunting, and wasting. Bivariate analysis show that, number of variables are significantly associated with the nutritional status of the under two children in the rural community. place of residence i.e., selected villages, religious background, use of iodized salt at the house hold cooking, Childs age, birth weight, mother's height weight or BMI were identified as the factors significantly associated with both underweight and stunting of the selected children. Households ownership of agricultural land found to influence only chronic or long term malnourishment like stunting in under two children while current illness (in last 7 days) is likely to affect acute malnutrition like wasting. Literature has shown that infants small for gestational age (SGA) are lighter and shorter than those appropriate for gestational age (AGA) on the other hand, low birth weight survivors likely to be

more malnourished during infancy than their counterpart born with normal weight, have lower growth attainment and continues to be lighter and shorter at adolescence than their same age peers Gurt brod et al. 2000; saigal et al. 2001; Hack et al 2003). Childs attributes like age and birth weight as the strong predicators of underweight and stunting also identified in other community studies (Nmyepi 2007, Mickey 2003). Multivariate analysis shows that, Muslims have more risk of becoming under weight than non Muslims. Risk for having underweight children is decreased in households using iodized salt. Young children (aged 12-23 month) and children with low birth weigh have higher risk for underweight. The literature on child malnutrition identifies the age of mother as a significant risk factor in her children's nutritional status, malnutrition is more among children born to mothers in teens (<14 years) .

In the present study, mother's age being 19 years or below height less than 145 Cm and less than 18.5BMI were found to be significantly associated with the increased risk of having underweight children. Non deficit balanced or surplus economic condition in the HH have the lower risk for underweight children, mother higher education secondary or above also associated with the lower risk for underweight hike under weight, risk of stunting is also decreased in households use iodized salt in daily cooking. Better sanitation practice also identified with the decreased risk of stunting.

Children born with low birth weight have the greater risk for becoming stunted and children suffered one or more episode of illness in 7 days also tended to have higher risk for stunting. Risk of having stunted children is lower in mother has right knowledge on the postpartum vitamin- A supplements. Mothers having height and BMI above the cut off level have significantly lower risk for having stunted children than those who have height or bril below the critical cut off points male headed households have significantly lower ($p<0.01$) risk for wasting. Hike stunting, increased risk of wasting observed in children with low birth weight, morbidity in last 7 days and mothers having low stature or BMI have the greater risk having wasted children. On the other hand respondent mothers practice on colostrums feeding was high (94.3% after intervention) more than the knowledge of mothers on breast feeding initiation within 1 hour of birth (71.0% after intervention).

This study reveals that the extent of malnutrition (stunted 42.9%, and wasted 15.7%) among rural area of Nilfamari district is high, which is also supported by all previous

reports on nutritional status in Bangladesh. While under weight among 31.7% of respondent children was less than other national data which is MNCH-2006(50.9%), CMNS-2005(40.6%), BDHS-2004(47.5%), BDHS-2007(46.0%), and NSP-2005 (45.7%).

Impact of nutrition education showed that economic status of households, birth weight, BMI of mothers were significantly ($p<0.05$) associated with underweight and stunting. The study showed that improvement of mothers knowledge on food consumption during pregnancy(87.6%),benefit of post-partum vitamin-A supplementation (91.7%)were satisfactory, but practices of food consumption(62.7% of after intervention),intake of vitamin-A supplement after delivery(39.7% of after intervention group) were found to be not adequate as per knowledge and practice findings.

6.8 Summary of findings and conclusion

The baseline information served as control while the results obtained after nutrition education intervention in terms of nutritional status (Anthropometric measurements) showed impact of nutrition education sessions.

This particular NEP was found effective to reduce malnutrition of children of the intervene group, thus emphasizes that nutrition education programs are still effective in situations where food insecurity is not severe.

In conclusion we can say that the reasons for malnutrition of under two years children prevailing in Bangladesh are not only poverty and non availability of adequate food alone, but also a large extent ignorance of nutritional information as well as nutritionally undesirable practices and beliefs about certain foods are also responsible for such a condition.

Therefore dissemination of necessary nutritional knowledge to the mothers, particularly to the rural and slum mothers are of utmost important. Emphasis should

also be given on bringing them into practice which is the ultimate goal of nutrition education intervention.

In conclusion it can be said that, whatever the economic condition of the mothers might be, of their feeding practice and knowledge on material and child health care be proper, then the rate of malnutrition can be decreased. Proper sanitation of the mothers can decrease the contaminated diseases like, ARI, diarrhea, dysentery is why nutrition education intervention programme is more important.

6.9 Limitations of the study

The longer of the conduct of nutrition education sessions would definitely show better results. Only extensive use of nutrition education sessions was the main intervention and its impact was assessed thoroughly. There are some Issues to address the limitation of the study.

1. While collecting age of infants the interview had some difficulties as they had no birth records and most of the mother could not remembered the date of birth. So to get their actual age the interviewer had to use some indirect evidences.

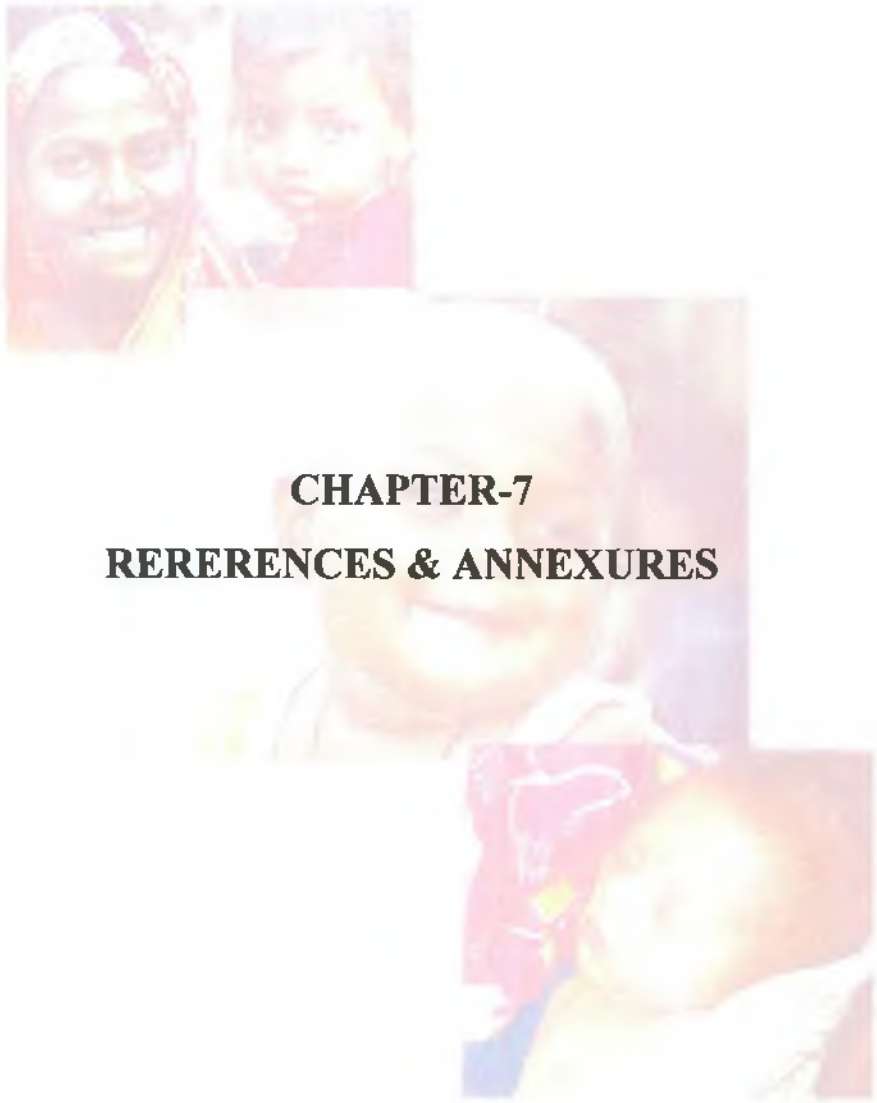
2. Bangladesh experienced very high food price during 2007 – 2008. Which went up to its pick during 1st and quarter of 2008 and this period was co-incited exactly in-between the period of the baseline and the follow-up surveys.

3. It should be mentioned here that this study was of small-scale conducted among limited number of respondents. However, longer duration of time based nutrition education sessions could provide better results which need further investigation.

6.10 Recommendation

The following recommendations are placed in order to further improve the nutrition education intervention programme to mass population at the grass root level.

1. Nutrition knowledge should be given to the mothers and every aged woman also by personal contact of the field workers.
2. Nutrition knowledge should be materialized through practice.
3. They should be provided safe water and sanitary toilet.
4. Nutrition education on micronutrient supplements should be emphasized that the beneficiaries are fully motivated to take these when they are in need and recommended for.
5. Pregnant and lactating mothers should be given extra care and extra food.
6. Children must be immunized through practice.



CHAPTER-7

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7.2 Annexures

7.2.1 Annexure-I

Box-5 Variables use for the study

Dependent Variables

Outcome/Manifestation: Underweight, Stunting, Wasting

Independent Variables

Temporal Predictors:

Mother's Nutritional Status

1. Mother's BMI
2. Mother's Weight
3. Mother's Height

Fetal Growth

1. Birth Weight of the child

Immediate Predictors

Food/Nutrient Intakes

1. Mother's food consumption during pregnancy
2. Mothers took Iron Supplements during pregnancy
3. Mother took Vitamin A supplements after delivery 9
4. Use iodized salt in household cooking

Diseases

1. Morbidity Status of child

Underlying Predictors

Food Security

1. Household Food Security Status

Health and Sanitation

1. Immunization Coverage for child
2. Sanitary Habits of the household (type to toilet facilities used)
3. Personal Hygienic Practices by Mother

a. Washing hand before feeding the child

b. Washing hand after using toilet

Maternal and child Care

1. Breastfeeding imitation time for the child

Exclusive Breastfeeding Status

2. Mothers knowledge on Infant Feeding

a. Breastfeeding Initiation time

b. Duration of Exclusive Breastfeeding

c. Complementary feeding Initiation time

3. Mothers knowledge on Maternal Nutrition

a. Food consumption during pregnancy

b. Iron Supplements during pregnancy

c. Vitamin A supplements after delivery

Basic Predictors:

Socio-economic and Demographic Profile

1. Household Size
2. Head of the household
3. Ownership of Homestead
4. Ownership of Agricultural Land
5. Perceived Economic Condition of the household
6. Mother's Education
7. Mother's Occupation

Individual Attributes (mother and Child)

1. Age of the Mother
2. Age at first Marriage of the mother
3. Age of the child
4. Sex of the child
5. Birth Order of the child

Source: Roger S and Young out K, 2003 and UNICEF, 1990

7.2.2 Annexure-II

Flow Sheet of Activities

Activities	Duration
Recruitment & Training of study personnel	01/02/2008 to 15/02/2008
Questionnaire Preparation	16/02/2008 to 28/02/2008
Pre-testing, modification and finalization of questionnaire	01/03/2008 to 20/03/2008
Baseline survey and laboratory examination of the collected blood & stool sample	21/03/2008 to 22/04/2008
Implementation of nutrition education sessions	23/04/2008 to 25/08/2008
Follow up survey	26/08/2008 to 26/09/2008
Data analysis & report writing	27/09/2008 to.....

7.2.3 Annexure-III

Baseline & Follow - up Survey 2008

আইডি নংঃ | | | | |

তারিখ

দিন		মাস		বছর	
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উত্তর দাত্রীর নাম :..... স্বামীর / পিতার নাম :.....

খানা প্রধানের নাম :..... বাড়ীর নাম :.....

খানা নং | | | | | | | |

পাড়া ..... | |

গ্রাম ..... | | |

ইউনিয়ন ..... | | |

থানা ..... | |

জেলা ..... | |

উত্তরদাত্রীঃ ০-২৩ মাস বয়সী শিশুর মা [1]

মা ছাড়া অন্য কেউ [2]

গ্রুপ | |

ইউনিয়নের-1 কন্ট্রোল=2

INFORMED CONSENT

আসসালামু আলাইকুম/ আদাব,

আমার নাম .....। আপনারা জানেন, বাংলাদেশে মা, নবজাতক ও শিশুমৃত্যের হার পৃথিবীর অন্যান্য দেশের তুলনায় অনেক বেশী। এই মৃত্যুর হারগুলি কমানোর জন্য আপনাদের এলাকায় একটি কর্মসূচী নেয়ার পরিকল্পনা নিয়েছে। সেইজন্য এই এলাকার মা ও শিশু স্বাস্থ্য সম্পর্কে আমাদের কিছু তথ্যের প্রয়োজন। আমি এখন আপনাকে আপনার এবং আপনার বাচ্চার স্বাস্থ্য সম্পর্কে কিছু প্রশ্ন জিজ্ঞাসা করবো এবং শারীরিক মাপ নিবো। আপনাকে আশ্বাস দিচ্ছি যে আপনি যা বলবেন তা গোপন রাখা হবে। আপনার অংশগ্রহন সম্পূর্ণভাবে আপনার ইচ্ছাধীন, আপনি ইচ্ছা করলে যে কোন প্রশ্নের উত্তর নাও দিতে পারেন,

আপনি কি আমাদের জরিপ সম্পর্কে কিছু জানতে চান? এখন কি আমি সাক্ষাৎকার শুরু করতে পারি?

উত্তর দিতে রাজী হয়েছে [1] **উত্তর দিতে রাজী হয়নি** [2]

মন্তব্য .....

তথ্য সংগ্রহকারীর নাম: ..... | |

তারিখ :

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১. **খানা সংক্রান্ত তথ্যঃ**

Sl. No	Questions	Answer
১	গত ৬ মাসে আপনার খানায় কত জন নিয়মিত সদস্য ছিল	
২	আপনার খানায় মোট ৫ বছরের নিচের শিশুর সংখ্যা	ক) ০-১১ মাস বয়সের খ) ১২-৫৯ মাস বয়সের

৩	আপনার খানা প্রধান :	তথ্যদাতা নিজে = ১, অন্য কোন মহিলা=২ পুরুষ=৩
৪	আপনার/ খানা প্রধানের শিক্ষাগত যোগ্যতা কি?	নাম সই করতে পারে না= ৩৩ শুধু নাম সই করতে পারে = ৪৪ সর্বোচ্চ কোন শ্রেণী পাশ করেছে: ১ম শ্রেণীর কম = ০০; ১ম শ্রেণী= ০১; ২য় শ্রেণী = ০২; ৩য় শ্রেণী = ০৩ ..... ৯ম শ্রেণী = ০৯; এস এস সি/ দাখিল =১০; এইচ এস সি/ আলিম=১১; বিএ/বিএসসি/বি কম/ ফাজিল=১২; এম এ/ এম এস সি/এম কম/ কামিল=১৩; ডিপ্লোমা/ কারিগরি = ১৪ হাফেজ = ১৫
৫	আপনার খানার ধর্ম কি?	ইসলাম =১ হিন্দু = ২ খ্রীষ্টান = ৩ বৌদ্ধ = ৪ অন্যান্য = ৫
৬	আপনার খানার নিচের ক্ষেত্র গুলিতে ব্যবহারের জন্য পানির প্রধান উৎস কি? খাবার পানি রান্নার পানি তৈজসত্র ধোয়ার পানি গোসালের পানি অন্যান্য.....	মিউনিসপ্যালটি সাপ্লাই=১ নিজস্ব ব্যবস্থায় প্লাষ্টিক পাইপ=২ টিউবওয়েল = ৩ কুয়া =৪ নদী/পুকুর =৫ অন্যান্য =৬
৭	আপনার খানায় কি ধরনের ল্যাট্রিন/ টয়লেট ব্যবহার করা হয়?	সেপ্টি ট্যাঙ্ক/ আধুনিক ল্যাট্রিন=১ স্লাব লেট্রিন (ওয়াটার সীলসহ) = ২ স্লাব লেট্রিন (ওয়াটার সীল ছাড়া) = ৩ পিট লেট্রিন=৪ জুলন্ত লেট্রিন = ৫ খোলা লেট্রিন = ৬ মাঠে/ খোল জায়গায় = ৭ অন্যান্য = ৪ (.....)
৮	এই ল্যাট্রিন/ টয়লেট কিভাবে ব্যবহার করেন?	১= নিজস্ব এবং কারো সাথে শেয়ার করেন না ২ = নিজস্ব এবং অন্যের সাথে শেয়ার করেন ৩ = অন্যের কিন্তু নিজে শেয়ার করেন
৯	আপনি কি নিজের ক্ষেত্র গুলোতে হাত পরিস্কার করেন? ক্ষেত্র সমূহ | পরিষ্কার | পরিষ্কার | ধরন | পানির	**পরিষ্কার করেণ:** হ্যা =১; না = ২

		করেন কিনা			উৎস	**পরিষ্কার :** না = ০, পানি=১, মাটি=২, ছাই=৩ সাবান=৪, অন্যান্য =৫ ধরণ : না= ০, বাম হাত = ১, ডান=২, উভয়=৩ **পানির উৎস:** মিউনিসিপ্যালিটি সাপ্লাই=১, নিজস্ব ব্যবস্থাপনায় প্লাস্টিক পাইপের মাধ্যমে =২, টিউবওয়েল = ৩, কুপ=৪, নদী/ পুকুর/ খাল ইত্যাদির পানি=৫, অন্যান্য=৬
	ক) শিশুকে খাওয়ানো					
	খ) নিজের খাওয়া					
	গ) শিশু মল ত্যাগের পর তাকে ধোয়ানোর পর					
	ঘ) নিজে টয়লেট ব্যবহারের পর					
১০	আপনার পরিবারের বাসযোগ্য ঘরের সংখ্যা কয়টি?					
১১	খানার প্রধান ঘর কি দিয়ে তৈরী					
	জিনিসপত্র	ছাদ	দেয়াল	মেঝে		
	পাতা/খড়/প্লাস্টিক/বস্তা	১	১			
	কাদামাটি		২	২		
	বাঁশ/ কাঠ	৩	৩	৩		
	টিন	৪	৪			
	পাকা/সিমেন্ট/টাইলস	৫	৫	৫		
১২	আপনার খানার কি নিজের বাড়ী আছে?					হ্যাঁ = ১; না = ২
১৩	খানায় চাষযোগ্য জমির পরিমাণ কত?					শতাংশ কোন জমি নেই = ০০০০
১৪	আপনি/ আপনার খানার কেউ কি কোন সমিতির সদস্য?					হ্যাঁ = ১; না = ২
১৫	আপনার খানার কেউ কি এই সমিতি থেকে ঋণ নিয়েছে?					হ্যাঁ = ১; না = ২; প্রযোজ্য নয়= ৯
১৬	আপনি বা আপনার শিশু কি জাতীয় পুষ্টি প্রকল্প পরিচালিত বা অন্য কোন প্রোগ্রামে অংশ গ্রহণ করেছেন?					হ্যা = ১; না = ২;
১৭	আপনার খানার গত এক বছর আয়-ব্যয়ের অবস্থা কেমন ছিল?					সব সময় ঘাটতি=১ মাঝে মাঝে ঘাটতি=২ সমান সমান =৩ উদ্বৃত্ত= ৪
১৮	কোন কোন খানার এমন হয় যে, সব সদস্যরা বছরের সবসময় দৈনিক ৩ বেলা খেতে পায় না, আপনার খানায় কি গত এক বছরে (১২ মাস) এম হয়েছে যে, সব সদস্য দৈনিক ৩ বেলা খেতে পায় নি?					হ্যাঁ = ১; না = ২
১৯	যদি হ্যাঁ হয় তবে গত ১ বছরে কত মাস আপনার খানার সব সদস্যদের প্রতিনি ৩ বেলা খাবার জোটাতে পারেননি?					মাস : প্রযোজ্য নয়= ৯৯
২০	আপনার খানায় আজকের রান্নার জন্য কি লবন ব্যবহার হয়েছে?					প্যাকেটজাত (আয়োডিনযুক্ত) = ১ প্যাকেটজাত নয় (আয়োডিনযুক্ত নয়) = ২

২. মায়ের তথ্য :

২১	বয়স (বৎসরে)	
২২	বৈবাহিক অবস্থা	বর্তমানে বিবাহিত =১; তালাক প্রাপ্ত =২ বিধবা = ৩; বিচ্ছিন্ন/ পরিত্যক্ত =৪
২৩	প্রথম বিবাহের সময় বয়স	বৎসর :
২৪	আপনার শিক্ষাগত যোগ্যতা কি?	নাম সই করতে পারে না = ৩৩ শুধু নাম সই করতে পারে = ৪৪ সর্বোচ্চ কোন শ্রেণী পাশ করেছে : ১ম শ্রেণীর কম = ০০; ১ম শ্রেণী =০১; ২য় শ্রেণী = ০২; ৩য় শ্রেণী = ০৩;৯ম শ্রেণী =০৯ এস এস সি/দাখিল = ১০; এইচএসসি/আলিম =১১; বিএ/বি এস সি/বিকম/ফাজিল =১২; এম এ/ এম এস সি/ এম কম/ কামিল = ১৩; ডিপ্লোমা/ কারিগরি = ১৪; হাফেজ = ১৫
২৫	বর্তমানে আপনার মূল পেশা কি? (১) ঘর সংসার দেখাশুনা করা (২) কৃষিকাজ (৩) কৃষি দিনমজুর (অন্যের মাঠে) (৪) অকৃষি দিনমজুর (যেমন: রাস্তা মেরামত, নির্মান শ্রমিক) (৫) কারখানা শ্রমিক (যেমন: গার্মেন্টস) (৬) পশুপালন (৭) হাঁস/ মুরগীর খামার (৮) সব্জী/নার্সারীর (৯) জেলে/মাছ চাষ (১০) অন্যের বাড়ীতে কাজ / চাকর (১১) বিক্রির জন্য খাবার প্রক্রিয়াজাত করা (যেমন: মুড়ি ভাজা, খই ভাজা, ধান ভানা) (১২) সেলাইয়ের কাজ/ কুটির শিল্প/ হাতের কাজ (অর্থের বিনিময়ে) (১৩) রিক্সা/ ভ্যান/ ট্রাক/ বাস ড্রাইভার (১৪) হকার/ ফেরীওয়ালা (১৫) বাড়ীতে বসে বিভিন্ন ব্যবসা, (১৬) দোকান/ হোটেল এর মালিক / কর্মচারী (১৭) বড় ব্যবসা (পাইকারী ব্যবসা, কারখানা) (১৮) দক্ষ মজুর (কাঠমিস্ত্রি, কামার, কুমার, স্বর্ণকার, মেকানিক (১৯) কমিউনিটি স্বাস্থ্যকর্মী (দাই, স্বাস্থ্য সেবিকা (২০) শিক্ষক, (২১) পেশাজীবী (ডাক্তার/ নার্স/ ইঞ্জিনিয়ার/ উকিল) (২২) বেসরকারী/এনজিও অফিসার (২৩) সরকারী অফিসার (২৪) বেসরকারী/ এনজিও কর্মচারী (২৫) সরকারী কর্মচারী (২৬) রাজনৈতিক (ওয়ার্ড মেম্বার/ চেয়ারম্যান (২৭) ইমাম/ পুরোহিত (২৮) ছাত্র/ ছাত্রী (২৯) ভিক্ষুক (৩০) বেকার, কাজ খুজছে (৩১) কাজ করতে অক্ষম/ অবসরপ্রাপ্ত কাজ খুজছে না (৩২) জমি বর্গা/ ভাড়া (৩৩) সম্পদ (জমি বাদে) ভাড়া দেয় (যেমন দোকান, ট্রাক্টার)	
২৬	এ পর্যন্ত আপনি মো কতবার গর্ভধারণ করেছেন ? (বর্তমান গর্ভধারনসহ)	
২৭	গর্ভের ফলাফল:	ক) মৃত খ) জীবিত গ) গর্ভপাত
২৮	বর্তমানে মোট জীবিত সন্তানের সংখ্যা	
২৯	আপনার সর্বশেষ সন্তানের জন্মওজন কত ছিল?	গ্রাম :
৩০	ঐ সন্তান কতদিনের গর্ভাবস্থায় জন্ম নিয়েছিল?	৩৭ সপ্তাহের পূর্বে =১; ৩৮-৪০ সপ্তাহ = ২; ৪০ সপ্তাহের পর = ৩

৩. শিশুর তথ্য :

৩১	শিশুর নাম	
৩২	শিশুর বর্তমান বয়স (মাস)	
৩৩	শিশু কি ছেলে না মেয়ে ?	ছেলে = ১; মেয়ে = ২
৩৪	শিশুর জন্মক্রম	
৩৫	শিশুর ভ্যাকসিনেশন সম্পর্কিত তথ্য দো হলে 'হ্যাঁ' এবং না হলে 'না' কোন করুন)	হ্যাঁ = ১, না = ২ ক) বিসিজি ☐ খ) পোলিও ০ ☐ গ) পোলিও ১ ☐ ঘ) পোলিও ২ ☐ ঙ) পোলিও ৩ ☐ চ) ডিপিটি ১ ☐ ছ) ডিপিটি ২ ☐ জ) ডিপিটি ৩ ☐ ঝ) বসন্ত ☐
৩৬	উপরিউক্ত তথ্য সমূহ কি হীপআই কার্ড দেখে নিশ্চিত করা হয়েছে?	হ্যাঁ =১; না = ২
৩৭	আপনার শিশু কি গত সাত দিনের মধ্যে কোন অসুস্থতায় (রোগের লক্ষণ) ভুগেছে?	জ্বর/ কাশি/ চাঁড়া = A ডায়রিয়া = B ডিসেন্ট্রি/ আমাশয় = C নিউমোনিয়া = D কানের ইনফেকশন = E চোখের ইনফেকশন = F চর্ম রোগ = G অন্যান্য রোগ = H কোন অসুখ ছিল না = I

৪. মায়ের পুষ্টি সম্পর্কিত জ্ঞান :

৩৮	গর্ভকালীন সময়ে খাবারের ধরন কেমন হওয়া উচিত?	স্বাভাবিকের চেয়ে বেশি = ১ Reason ..... স্বাভাবিকের মতোই = ২ Reason ..... স্বাভাবিকের চেয়ে কম =৩

		Reason .....
৩৯	গর্ভকালীন সময়ে স্বাভাবিকের চেয়ে বেশি খাবার খেলে কি হয়?	গর্ভের শিশু ভালভাবে বেড়ে উঠে =১ মায়ের স্বাস্থ্য ভাল থাকে = ২ মা ও শিশু উভয়ের জন্য ভাল =৩ বাচ্চা বড় হয় যাতে প্রসবে সমস্যা হয় =৪ তেমন কোন সুবিধা/ অসুবিধা নেই = ৫ অন্যান্য (উল্লেখ করুন) = ৬
৪০	গর্ভকালীন সময়ে আয়রন বড়ি খাওয়ার উপকারিতা কি?	মায়ের রক্তশূন্যতা হয় না = ১ জন্মের সময় এবং পরবর্তিতে বাচ্চার রক্তস্বল্পতা হয় না =২ গর্ভের শিশুর মনজ/বুদ্ধি বৃদ্ধি হয় = ৩ প্রয়োজন নেই = ৪ জানি না/ অন্যান্য = ৫
৪১	প্রসবের পরে ভিটামিন 'এ' খাওয়ার উপকারিতা কি?	মায়ের শরীর সুস্থ্য ও ভাল থাকে = ১ শিশু বুকের দুধ থেকে বেশি পরিমাণ ভিটামিন এ এর যোগান পায় =২ প্রয়োজন নেই = ৩ জানিনা / অন্যান্য = ৪

৫. মায়ের পুষ্টি অভ্যাসের অবস্থা :

৪২	সর্বশেষ গর্ভকালীন সময়ে আপনি কি পরিমান খাবার খেয়েছিলেন?	স্বাভাবিকের চেয়ে বেশি = ১ স্বাভাবিকের মতোই = ২ স্বাভাবিকের চেয়ে কম = ৩ মনে নেই = ৪
৪৩	গর্ভকালীন সময়ে আয়রন বড়ি খেয়ে থাকলে কতমাস খেয়েছেন? (না খেলে বা ১ মাসের কম খেলে ০০ বসান)	মাস : □□
৪৪	কত নিয়মিত এই আয়রন বড়ি খেয়েছেন (দিন/মাস)	প্রতিদিন (৩০ দিন) = ১ প্রায় প্রতিদিনই (> ২০ দিন) = ২ নিয়মিত খায়নি (<২০ দিন) = ৩ প্রযোজ্য নয় = ৯
৪৫	প্রসবের পর ৪২ দিনের মধ্যে কোন উচ্চমাত্রায় ভিটামিন-এ খেয়েছিলেন কি?	হ্যাঁ = ১ না = ২

৬. ছোট শিশুর খাবার সম্পর্কিত মায়ের জ্ঞান

৪৬	জন্মের পর শিশুকে কি খাওয়ানো উচিত?	কলষ্ট্রাম/ শাল দুধ = ১ পানি = ২ মধু/ চিনির পানি = ৩ অন্যান্য = ৪
৪৭	জন্মের পর কত সময়ের মধ্যে শিশুকে মায়ের দুধ খাওয়ানো শুরু করা	এক ঘন্টার মধ্যে (all response< 1) 1

	উচিত?	২৪ ঘন্টার (১ দিন) মধ্যে = ২ ১দিন (২৪ ঘন্টা) পর = ৩ ৩ দিন বা তার বেশী সময় পরে =৪ কোন নিয়ম নেই = ৫ জানিনা =৬
৪৮	কত মাস পর্যন্ত শিশুকে শুদুমাত্র মায়ের দুধ খাওয়ানো উচিত (এমনকি পানি পর্যন্ত না)	জানিনা = ৯৮ মাস = □□
৪৯	কত মাস বয়স থেকে শিশুকে মায়ের দুধের পাশাপাশি অন্য তরল / নরম খাবার দেয়া উচিত?	জানিনা = ৯৮ মাস : □□
৫০	৬ মাস বয়সের আগে শিশুকে অন্য খাবার খাওয়ানো শুরু করা হলে কি হবে?	শিশুর ক্ষতি হয় = ১ কোন সবিধা/ অসুবিধা নেই = ২ অন্যান্য (উল্লেখ করুন) = ৩ জানিনা = ৪ প্রযোজ্য নয় = ৯
৫১	৬ মাস বয়সের পর মায়ের দুধের পাশাপাশি শিশুকে অন্য খাবার না দিলে কি হবে?	শিশুর ক্ষতি হবে =১ কোন সবিধা/ অসুবিধা নেই = ২ অন্যান্য (উল্লেখ করুন) =৩ জানিনা = ৪ প্রযোজ্য নয় = ৯
৫২	শিশুর ৬ মাস বয়সের পর শিশুকে দিনে কত বার খাওয়াতে হয়?	৭-১১ মাস বয়স Times/ Day ১২-১৬ মাস বয়স ১৭-২৩ মাস বয়স জানিনা/ বলতে পারে না= ৯৮
৫৩	আপনার শিশুর পুষ্টির জন্য আপনি শিশুকে কি ধরনের খাবার খাওয়ানো উচিত বলে মনে করেন?	হ্যা = ১ ; না= ২ ক) ভাত খ) রুটি গ) শাক গ) সব্জি ঘ) ডাল ঙ) মাছ চ) মাংস ছ) ডিম জ) দুধ ঞ) ফলমূল ট) তেল/ ঘি ঠ) সুজি/ চালের গুড়া ড) খিচুড়ী (চাল, ডাল, শাক-সবজি সহ)

৭. ছোট শিশুর খাদ্যভ্যাসের ধরণ

৫৪	আপনার সর্বশেষ শিশুর জন্মের পর কত সময়ের মধ্যে বুকের দুধ দেয়া শুরু করেছিলেন?	এক ঘন্টার মধ্যে = ১ ২৪ ঘন্টা (১ দিন) মধ্যে = ২ ১দিন (২৪ ঘন্টা) পর = ৩ ৩ দিন বা তার বেশী সময় পরে = ৪ জানিনা/ মনে নাই = ৫
৫৫	আপনার শিশুকে কি জন্মের পর শালদুধ খাইয়েছিলেন?	হ্যাঁ = ১; না = ২;
৫৬	আপনার শিশুকে কি এখন পর্যন্ত বুকের দুধ খাওয়াচ্ছেন?	হ্যাঁ = ১; না = ২;
৫৭	যদি হ্যা হয়, আপনি কি এখন পর্যন্ত আপনার শিশুকে শুধু মাত্র বুকের দুধ খাওয়াচ্ছেন? মানে বুকের দুধ ছাড়া পানি বা মধু বা অন্য কোন দুধ বা চালের গুরা ইত্যাদি কিছুই খাওয়াচ্ছেন না (শিশুর বয়স ৬ মাস বা তার কম হলে) Use 24-h recall method (WHO)	হ্যা = ১; না = ২; প্রযোজ্য নয়/ এখন বর্তমানে বুকের দুধ খায় না= ৯
৫৮	যদি বর্তমানে আপনার শিশু বুকের দুধ না খায় তবে কত দিন বয়সে বুকের দুধ খাওয়া বন্ধ করেছে?	দিন:□ □ □ প্রযোজ্য নয়/ এখনও বন্ধ হয়নি= ৯৯৯
৫৯	যদি বর্তমানে বুকের দুধ না খায় তবে কেন খাওয়া বন্ধ করেছে?	বন্ধ করার সময় হয়েছে তা বিজ্ঞ করেছি =১ শিশুর অসুস্থতার জন্য =২ মায়ের অসুস্থতার জন্য = ৩ শিশু বুকের দুধ পায় না =৪ অন্যান্য = ৫ প্রযোজ্য নয়/ এখনও বন্ধ হয়নি = ৬
৬০	বুকের দুধের পরিমাণ বাড়ার জন্য আপনি কি করেন/ করেছেন	কোন কিছুই করিনি = ১ অতিরিক্ত খাদ্য খেতাম = ২ অতিরিক্ত তরল খাদ্য খেতাম = ৩ অন্যান্য = ৪
৬১	১কোন বয়সে আপনার শিশুকে বুকের দুধের পাশাপাশি অন্য খাবার দেয়া শুরু করেছেন?	মনে নেই= ৯৯৯ দিন :□□□ এখনও শুরু হয়নি = ৯৯৮;
৬২	আপনার শিশুর অসুস্থ অবস্থায় কি তাকে বুকের দুধ খাওয়াতেন/ খাওয়ান না হলে কারণ উল্লেখ করুন.....	হ্যাঁ -১; না = ২
৬৩	আপনার অসুস্থ অবস্থায় কি শিশুকে বুকের দুধ দিতেন/ দেন না হলে কারণ উল্লেখ করুন	হ্যাঁ -১; না = ২
৬৪	আপনার শিশুকে দিনে কত বার খাওয়ান (বুকের দুধ ছাড়া)? (শিশুর বয়স ৬ মাসের বেশি হলে)	শুধু মাত্র বুকের দুধ খাওয়ান/ এখনও অন্য খাবার শুরু করেনি = ৯৯
৬৫	আপনার শিশুর কোন বয়সে (দিনে) প্রথম ফল, নরম, সুপ বা ডাল জাতীয় খাবার দিয়েছেন?	
৬৬	আপনার শিশুর কোন বয়সে (দিনে) প্রথম ভাত, আটা ময়দা তৈরির	

	খাবার, মাংস, মাছ বা ডিম দিয়েছেন?	
৬৭	আপনার শিশুর পুষ্টির জন্য শিশুকে কি ধরনের খাবার খাওয়ান/ খাওয়াবেন?	হ্যাঁ = ১ ; না= ২ ক) ভাত খ) রুটি গ) শাক গ) সব্জি ঘ) ডাল ঙ) মাছ চ) মাংস ছ) ডিম জ) দুধ ঞ) ফলমূল ট) তেল/ ঘি ঠ) সুজি/ চালের গুড়া ড) খিচুড়ী (চাল, ডাল, শাক-সবজি, মাছ/মাংস/ডিম ইত্যাদি সহ)

৮. শারীরিক পরিমাপ :

৬৮	মায়ের ওজন	
৬৯	মায়ের উচ্চতা	CM
৭০	শিশুর ওজন	Kg
৭১	শিশুর দৈর্ঘ্য	CM
৭২	শিশুর জন্ম তারিখ	D M Y

7.2.4 Annexure-iv

Table-1 Percent distributions of respondent mothers' knowledge on dietary pattern during last trimester of pregnancy.

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
Consumes more than normal	49.4 (148)	58.7 (161)	92.7 (271)	61.4 (161)
Normal	18.3 (55)	23.7 (65)	7.3 (21)	20.8 (55)
Less than normal	32.4 (97)	17.7 (49)	0.0 (0)	70.8 (47)

Table-2 Percent distributions of respondent mothers on proper knowledge on the benefit of post-partum vit1min A supplementation.

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
***Child gets more vit-A from BF	42.9 (128)	40.5 (111)	79.2 (231)	41.5 (109)
Does not get night blindness	20.1 (60)	25.3 (69)	20.8 (61)	23.7 (62)
Gives eye power	17.4 (52)	20.7 (56)	0.0 (0)	22.5 (59)
gives energy and keeps healthy	20.0 (60)	10.0 (27)	0 0 (0)	12.0 (32)
makes blood good	0.0 (00)	3.5 (10)	0.0 (0)	0.3 (1)

*** Keeps mother healthy and child get benefited through more vitamin- A from Breast feeding.

Table -3 Percent distributions of respondent mothers according to knowledge on the benefit of Iron supplementation.

** Mother and child do not develop anemia at birth and later, and helps in connotative development of the fetus

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
**Mothers doesn't get anemia	30.5 (92)	30.0 (83)	55.7 (163)	35 3 (93)
After delivery baby doesn't get anemia	20.7 (62)	18.7 (51)	39.0 (114)	16.9 (44)
Keeps mother / baby healthy	13.5 (40)	13.5 (37)	3.0 (9)	16.6 (43)
Others	35.3 (106)	37.8 (104)	2.3 (6)	31.2 (83)

Table-4 Percent distribution of respondent mothers according to correct knowledge of duration for exclusive breast feeding (up to 6 months) and complementary feeding (up to 7 months).

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
Exclusive breast feeding (Right knowledge) % Right ans (6m)	72.1 (216)	75.0 (206)	95.7 (279)	80.2 (211)
Complementary feeding (Right Knowledge) % Right ans (7m)	69.0 (207)	27.0 (74)	87.9 (257)	30.9 (81)

Table-5 Percent distribution of respondent mothers according to the knowledge on breast feeding initiation (Within 1 hour of birth)

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
Within 1 h (<=1h)	49.7 (149)	50.5 (139)	84.8 (248)	56.5 (149)
Within 24h (1day)	28.7 (86)	29.0 (80)	13.2 (38)	26.5 (69)
After 24 h but (<3 day)	15.3 (46)	13.5 (37)	2.0 (6)	11.7 (31)
Can't remember/Don't know	6.3 (19)	7.0 (19)	.0 (0)	5.3 (14).

Table-6 Percent distribution of mothers' knowledge on the first food of new born (infant feeding).

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
Colostrums/ Shaldud	72.0 (218)	74.0 (203)	93.3 (272)	79.7 (210)
Water	0.7 (2)	0.0 (0)	0.6 (2)	0.3 (1)
Honey/Sugar water	15.2(46)	13.0 (36)	4.1 (12)	12.3 (32)
Others	5.3 (16)	7.3 (20)	0.6 (2)	3.3 (8)
Cow's milk	5.0 (15)	5.7 (16)	0.4 (1)	3.4 (9)
Don't Know	1.0 (3)	0.0 (0)	1.0 (3)	1.0 (3)

Table-7 Percent distribution of respondent mothers according to knowledge about breast feeding

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
Best food for a child aged (0-2 years)				
Cow's milk	13.8 (41)	15.3 (42)	2.0 (6)	10.3 (27)
Breast milk	83.2 (250)	81.7 (225)	97.5 (285)	85.7(225)
Powder milk	1.1 (3)	1.8 (5)	0.5 (1)	2.9(8)
Don't know	1.9 (6)	1.2 (3)	0.0 (0)	1.1 (3)
Every child should continued breast feeding up two years.				
Yes	83.1 (249)	76.3 (210)	97.7 (285)	75 9 (200)
No	16.9 (51)	23.7 (65)	2..3 (7)	24.1 (63)

Table-8 Percent distribution of respondent mothers' according to knowledge on the frequencies of Complementary Feeding

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
Frequency of Feeding for 7-11 month children				
Right know (3-4 times/day)	55.8 (167)	52.7 (145)	75.3 (220)	53.1 (140)
Wrong knowledge	31.7 (95)	32.3 (89)	1.7 (5)	30.2 (79)
Don't know	12.5 (47)	15.0 (41)	9.0 (26)	16.7 (44)
Frequency of Feeding 12-16 moth				
Right know (4-5 times/day)	38.1 (114)	40.5 (111)	62.0 (181)	42.5 (112)
Wrong knowledge	49.7 (149)	43 5 (120)	30.5 (89)	44.5 (117)
Don't know	12.2 (37)	16.0 (44)	7.5 (22)	13.0 (34)
Frequency of Feeding 17-23 moth				
Right know (4-5 times/day)	35.9 (108)	47.1 (129)	60.2 (176)	48.0 (126)
Wrong knowledge	50.3 (151)	45.8 (126)	30.1 (88)	46.5 (122)
Don't know	13.8 (41)	7.1 (20)	09.7 (28)	5.5 (14)

Table-9 Percent distribution of respondent mothers' practice of intake vitamin A (high dose), Iron supplement and Iodized salt use for cooking (N=292)

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
Yes, taken vit-A	16.3 (49)	32.7 (90)	39.7 (116)	42.6 (112)
No, did not take	83.7 (251)	67.3 (185)	60.3 (176)	57.4 (151)
Iodized	73.7 (221)	82.7 (227)	87.3 (255)	89.8 (236)
Non Iodized	26.3 (79)	17.3 (47)	12.7 (37)	10.2 (27)
No Taken Iron Supplement	37.2 (112)	24.3 (67)	28.0 (82)	25.1 (66)
Taken Iron for any duration	62.8 (188)	75.7 (208)	72.0 (210)	74.9 (197)

Table-10 Percent distribution of respondent mothers on Practice of colostrum feeding (given or not) (N=292)

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
yes feed colostrums	72.0 (216)	69.0 (190)	96.3 (281)	73.7 (194)
no, not fed colostrums	28.0 (84)	31.0 (85)	3.7 (11)	26.3 (69)

Table-11 Percent distribution of the respondents' practice of early initiation of breast feeding.

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
Within 1 h (<=1h)	59.6 (179)	60.0 (165)	89.3 (261)	61.5 (162)
Within 24h (1day)	24.4 (73)	27.7 (76)	8.7 (25)	26.0 (68)
After 24 h but (<3 day)	1.6 (5)	2.3 (6)	2.0 (6)	1.2 (3)
Can't remember/Don't know	14.4 (43)	10 0 (28)	0.0 (0)	11.3 (30)

Tabl-12 Mothers' Practice on the complementary feeding frequency (times/day)

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
% Fed 3-4 times/ day to 7-11 m old children Total (n)	49 3 65	48.3 58	75 8 63	50.2 57
% Fed 4-5 times/ day (including 1-2 snack) to 12-16 m old children Total (n)	18.5 81	26.9 78	45.7 73	30.5 75
% Fed 3-4 times/ day (including 1-2 snack) to 17-23 m old children Total (n)	29 4 48	41.0 61	35.4 45	45.2 60

Table-13 Distribution of Practice of mothers for increasing Breast milk (N=292)

	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
Did not do anything	76.9 (231)	71.3 (196)	6.3 (18)	68.9 (181)
Ate extra/more food	19.2 (58)	24.7 (68)	84.7 (247)	26 8 (71)
Drunk more liquid/others	3 8 (11)	4.0 (11)	9.0 (27)	4.3 (11)

Table-14 Demerits of introducing other foods before completion of 6 months.

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
Harmful for children	78.2 (235)	75.2 (207)	95.4 (279)	79.0 (263)
Makes no difference/don't know	21.8 (65)	24.8 (68)	4.6 (13)	21.0 (55)
Total	100% 300	100% 275	100% 292	100% 263

Table 15 Demerits of not introducing complementary food at 7 months

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
Harmful for children	77.2 (232)	78.5 (216)	96.9 (283)	82.5 (217)
Makes no difference/don't know	22.8 (68)	21.5 (59)	3.1 (9)	17.5 (46)
Total	100% 300	100% 275	100% 292	100% 263

Table 16 Mothers Practice on the complementary feeding

Variable	Baseline		Follow-up	
	Intervention (% & n)	Control (% & n)	Intervention (% & n)	Control (% & n)
CF initiated at <6 months of age	56.2 (123)	55.6 (116)	12.6 (22)	33.7 (63)
CF initiated at 6 months of age	30.0 (66)	22.0 (46)	18.4 (32)	28.0 (52)
CF initiated at >6 months of age	13.8 (30)	22.4 (46)	69.0 (120)	38.3 (72)
Total	219	208	174	187

Table-17 Percent distribution of respondent mothers according to correct knowledge on micro nutrients

Variable	Baseline		Follow-up	
	Intervention (% & N)	Control (% & N)	Intervention(% & N)	Control(% & N)
Have knowledge on Iodine deficiency disorders (IDD)				
Consequences if ID	37.7 (111)	40.1 (110)	70.9 (207)	42.3 (111)
Prevention if IDD	35.7 (105)	32.8 (90)	80.6 (235)	40.6 (107)
ave knowledge on vitamin-A deficiency				
Aware of night blindness(NB)	79.7 (232)	86.1 (237)	88.7 (259)	88.7 (223)
Cause of NB	55.3 (163)	47.2 (130)	83.8 (245)	50.2 (132)
Symptoms of NB	77.3 (228)	69.3 (190)	90.5 (264)	75.6 (199)
Prevention of NB	59.0 (174)	57.1 (157)	86.8 (458)	62.0 (163)
Have knowledge on Iron deficiency				
Aware on anemia (IDA)	72.0 (212)	68.0 (187)	90.0 (253)	73.8 (194)
Cause of IDA	19.7 (58)	22.4 (62)	60.8 (263)	30.7(81)
Symptoms of IDA	56.3 (166)	61.1 (168)	89.8 (178)	68.9 (181)
Prevention of IDA	53.3 (157)	48.2 (132)	76.8 (262)	53.7 (141)

Table 18 Total Score of respondent's knowledge and attitude practice (KAP) (Right Knowledge)

Total Score (KAP)	Intervention group		Control group	
	Baseline	Follow-up	Baseline	Follow-up
Excellent (16-20)	10 (3.3%)	183 (62.5%)	11 (4.0%)	25 (9.5%)
Good (9-15)	188 (62.6%)	195 (34.8%)	162 (58.9%)	169 (64.3%)
Poor (0-8)	102 (34.1%)	8 (2.7%)	102 (37.1%)	69 (26.2%)
Total	300 (100%)	292 (100%)	275 (100%)	263 (100%)

Table 19 Distribution of food security and insecurity by total score of KAP.

KAP Score	Food Security		Food insecurity	
	Baseline	Follow-up	Baseline	Follow-up
0-8 (poor)	35 11.6	3 1.0	67 22.5	5 1.7
9-15 good	110 36.7	95 32.6	78 25.9	99 34.1
16-20 excellent	07 2.3	65 22.1	3 1.0	25 8.4
Total	152 50.6	163 55.7	148 49.4	129 44.1

Table 20 Distribution of frequency of complementary feeding.

Variable	Baseline		Follow-up		
	Before Intervention	Control	After Intervention	Control	P-Value
Freq of CF for 711m) wrong	44.2	19.3	39.3	45.5	.25
right ans. (3-4 time/ day	55.8	80.7	60.7	54.5	
(For 12-16m) wrong	61.9	41.3	40.7	48.6	.00
right (4-5 time/ day)	38.1	58.7	59.3	56.4	
For (17-23)m Wrong	64.1	39.0	45.0	50.8	.00
right (4-5 time/ day)	35.9	61.0	55.0	49.2	

Table-21 Percent distribution of Mothers' Knowledge and practice on nutritious foods for children.

Variable	Knowledge				Practices			
	Before Intervention		After Intervention		Before Intervention		After Intervention	
	Percent (%)	Number (total)	Percent (%)	Number (total)	Percent (%)	Number (total)	Percent (%)	Number (total)
Fruits	55.7	162	60.1	175	45.2		60.5	
Leafy Vegetable	84.9	248	90.5	264	66.3		80.9	
Non-Leafy Veg.	84.6	247	92.3	270	70.0		86.9	
Milk	79.5	232	85.5	250	71.7		90.6	
Egg	50.0	146	65.0	190	45.2		79.7	
Rice	75.1	219	80.1	234	83.7		80.9	
Fish	51.3	150	75.1	219	69.3		79.0	
Khichuri	48.1	140	80.5	235	50.7		93.9	
Meat	40.2	117	55.0	161	55.6		78.9	
Pulses	36.5	107	49.8	145	50.4		80.7	
Flour/Suji	17.1	50	35.5	100	26.7		73.7	
Ruti	14.1	41	25.5	74	19.6		78.9	
Oil/ Ghee	5.1	15	25.8	75	5.6		55.8	

Table- 22 Distribution of the respondents Knowledge and attitnde practices with respeet to questions

Question	Ans.	Baseline		Follow-up	
		Intervention. (% & N)	Control (% & N)	Intervention. (% & N)	Control (% & N)
1. Which dietary pattern we should follow during last trimester of pregnancy?	Consumes more than normal	49.4 (148)	58.7 (161)	92.7 (271)	61.4 (161)
	Normal	18 3 (55)	23.7 (65)	7.3 (21)	20.8 (55)
	Less than normal	32.4 (97)	17.7 (49)	0.0 (0)	70.8 (47)
2. What is the benefit of more food consumption during pregnancy?	More food keeps fetus and mother	76.7 (230)	75.7 (208)	92.6 (270)	82.4 (216)
	healthy	8.1 (24)	7.3 (20)	1.0 (3)	7.4 (19)
	baby gets bigger	3.3 (10)	3.3 (9)	1.3 (4)	5.6 (15)
	Less food does not cause difficult	2.6 (8)	1.4 (4)	0.7 (2)	0.0 (0)
	delivery	3.8 (11)	7.3 (20)	1.0 (3)	1.2 (3)
	giving smaller baby	1.3 (4)	1.3 (4)	0.0 (0)	1.3 (3)
	More food gives uneasy feeling	0.0 (0)	1.3 (3)	0.0 (0)	1.1 (3)
	More food may cause high blood	4.2 (13)	1.4 (7)	3.4 (10)	1.6 (4)
	pressure				
	More food stoops Fetus's movement				
	More food makes baby intelligent				
3. What is the benefit of taking Iron tablet during pregnancy?	Mothers doesn't get anemia	30.5 (92)	30.0 (83)	55.7 (163)	35.3 (93)
	After delivery baby doesn't get	20.7 (62)	18.7 (51)	39.0 (114)	16.9 (44)

	anemia	13.5 (40)	13.5 (37)	3.0 (9)	16.6 (43)
	Keeps mother / baby healthy	35.3 (106)	37.8 (104)	2 3 (6)	31.2 (83)
	Others				
4. What is the benefit of taking vitamin 'A' after pregnancy?	Child gets more vitamin-A from BF	42.9 (128)	40.5 (111)	79.2 (231)	41.5 (109)
	Does not get night blindness	20.1 (60)	25.3 (69)	20.8 (61)	23.7 (62)
	Gives eye power	17.4 (52)	20.7 (56)	0.0 (0)	22.5 (59)
	gives energy and keeps healthy	20.0 (60)	10.0 (27)	0.0 (0)	12.0 (32)
	makes blood good	0.0 (00)	3.5 (10)	0.0 (0)	0.3 (1)
5. What should we feed a new born baby?	Colostrums/ Shaldud	72.0 (218)	74.0 (203)	93.3 (272)	79.7 (210)
	Water	0.7 (2)	0.0 (0)	0.6 (2)	0.3 (1)
	Honey/Sugar water	15.2(46)	13.0 (36)	4.1 (12)	12.3 (32)
	Others	5.3 (16)	7.3 (20)	0.6 (2)	3.3 (8)
	Cow's milk	5.0 (15)	5.7 (16)	0.4 (1)	3.4 (9)
	Don't Know	1.0 (3)	0.0 (0)	1.0 (3)	1.0 (3)
6. When should we start breast feeding to a new born baby?	Within 1 h (<=1h)	49.7 (149)	50.5 (139)	84.8 (248)	56.5 (149)
	Within 24h (1day)	28.7 (86)	29.0 (80)	13.2 (38)	26.5 (69)
	After 24 h but (<3 day)	15.3 (46)	13.5 (37)	2.0 (6)	11.7 (31)
	Can't remember/Don't know	6.3 (19)	7.0 (19)	.0 (0)	5.3 (14)
7. Up to which age a baby should be given breast feeding (exclusive breast feeding) only?	Right ans (6m)	72.1 (216)	75.0 (206)	95.7 (279)	80.2 (211)
8. From what age should a baby be given complementary foods along with breast feeding?	<6 months 6 months 7 months	69.0 (207)	27.0 (74)	87.9 (257)	30.9 (81)

	Don't know				
9. What will happen if a baby is given other food then breast feeding before six month of age	Harmful for children	78.2 (235)	75.2 (207)	95.4 (279)	79.0 (263)
	Makes no difference/don't know	21.8 (65)	24.8 (68)	4.6 (13)	21.0 (55)
11. Should a baby be given breast feeding up to two years of age?	**Yes**	83.1 (249)	76.3 (210)	97.7 (285)	75.9 (200)
	No	16.9 (51)	23.7 (65)	2..3 (7)	24.1 (63)
12. Which one is best food for a child aged 0-2 years?	Cow's milk	13.8 (41)	15.3 (42)	2.0 (6)	10.3 (27)
	Breast milk	83.2 (250)	81.7 (225)	97.5 (285)	85.7(225)
	Powder milk	1.1 (3)	1.8 (5)	0.5 (1)	2.9(8)
	Don't know	1.9 (6)	1.2 (3)	0.0 (0)	1.1 (3)
13. How many times a day does you feed your baby?					
Frequency of Feeding for 7-11 month children	Right know (3-4 times/day)	55.8 (167)	52.7 (145)	75.3 (220)	53.1 (140)
	Wrong knowledge	31.7 (95)	32.3 (89)	1.7 (5)	30.2 (79)
Frequency of Feeding 12-16 moth	Don't know	12.5 (47)	15.0 (41)	9.0 (26)	16.7 (44)
		38.1 (114)	40.5 (111)	62.0 (181)	42.5 (112)
Frequency of Feeding 17-23 moth	Right know (4-5 times/day)	49.7 (149)	43.5 (120)	30.5 (89)	44.5 (117)
	Wrong knowledge	12.2 (37)	16.0 (44)	7.5 (22)	13.0 (34)
	Don't know				
		35.9 (108)	47.1 (129)	60.2 (176)	48.0 (126)
	Right know (4-5 times/day)	50.3 (151)	45.8 (126)	30.1 (88)	46.5 (122)
	Wrong knowledge	13.8 (41)	7.1 (20)	09.7 (28)	5.5 (14)

	Don't know				
14. Do you take iron tablet at any time?	No Taken Iron Supplement	37.2 (112)	24.3 (67)	28.0 (82)	25.1 (66)
	Taken Iron for any duration	62.8 (188)	75.7 (208)	72.0 (210)	74.9 (197)
15. Do you take vitamin 'A' tablet?	Yes, taken vit-A	16.3 (49)	32.7 (90)	39.7 (116)	42 6 (112)
	No, did not take	83.7 (251)	67.3 (185)	60.3 (176)	57.4 (151)
16. Do you use iodized salt for cooking food?	Iodized	73.7 (221)	82.7 (227)	87.3 (255)	89.8 (236)
	Non Iodized	26.3 (79)	17.3 (47)	12.7 (37)	10.2 (27)
17. When did you start breast \feeding to your last born baby?	Within 1 h (<=1h)	59.6 (179)	60.0 (165)	89.3 (261)	61.5 (162)
	Within 24h (1day)	24.4 (73)	27.7 (76)	8.7 (25)	26.0 (68)
	After 24 h but (<3 day)	1.6 (5)	2.3 (6)	2.0 (6)	1.2 (3)
	Can't remember/Don't know	14.4 (43)	10.0 (28)	0.0 (0)	11.3 (30)
18. Did you give colostrum to your baby after its birth?	yes feed colostrums	72.0 (216)	69.0 (190)	96.3 (281)	73.7 (194)
	no, not fed colostrums	28.0 (84)	31.0 (85)	3.7 (11)	26.3 (69)
19. What are you doing for increasing of breast milk?	Did not do anything	76.9 (231)	71.3 (196)	6.3 (18)	68.9 (181)
	Ate extra/more food	19.2 (58)	24.7 (68)	84.7 (247)	26.8 (71)
	Drunk more liquid/others	3.8 (11)	4.0 (11)	9.0 (27)	4.3 (11)
20.What is the demerits of not introducing complementary food at 7 months	Harmful for children	77.2 (232)	78.5 (216)	96.9 (283)	82.5 (217)
	Makes no difference/don't know	22.8 (68)	21.5 (59)	3.1 (9)	17.5 (46)

Table 23 Prevalence of Under Weight

Variable	Baseline		Follow-up	
	Intervention	Control	Intervention	Control
Severe (<-3.00 z-score)	11.0	7.0	7.7	12.9
Moderate(-2.01 to -3.00 z-score)	26.0	20.7	23.4	23.1
Normal (-2.00 & above)	63.0	72.3	68.9	64.0

Table 24 Prevalence of Wasting

Variable	Baseline		Follow-up	
	Intervention	Control	Intervention	Control
Severe (<-3.00 z-score)	2.0	1.4	1.0	2.0
Moderate (-2.01 to -3.00 z- score)	13.3	7.2	7.4	15.0
Normal (-2.00 & above)	84.7	91.4	91.6	82.9

Table 25 Prevalence of Stunting

Variable	Baseline		Follow-up	
	Intervention	Control	Intervention	Control
Severe (<-3.00 z-score)	16.1	11.2	14.0	16.1
Moderate (-2.01 to -3.00 z- score)	31.0	18.5	26.5	22.5
Normal (-2.00 & above)	52.9	70.3	59.5	61.4

Table-26 Percent distribution of respondent mothers according to their anthropometric information of

Variable	Baseline		Follow-up	
	Intervention	Control	Intervention	Control
Mother Mean Weight (kg)	44.1 ±5.9	43.7 ±5.5	43.4 ±7.0	42.4 ± 5.9
Mothers mean height (CM)	150.68 ±5.7	150.66 ±5.2	150.6.8 ±5.5	150.33 ±4.4
Mothers BMI (Wt(kg)/ht (cm)	19.4 ± 2.3	19.2 ± 2.1	19.0 ± 2.5	18.8 ± 2.3

Table-27 Distribution of study samples by intervention (Baseline) and control (Baseline) group status

Distribution of study samples by intervention (Baseline) and control (Baseline) group status					
	Intervention		Control		Total
	Baseline	Follow-up	Baseline	Follow-up	
Total HH Surveyed	306	306	306	306	612
No of total study sample of respondents	306	306	306	306	612
Sample meeting selection criteria	300	300	300	300	600
No of sample after data cleaning	300	292	275	263	B=575 F=555