NUTRITIONAL STATUS OF 6-59 MONTHS OF CHILDREN IN MECHE COMMUNITY OF JHAPA DISTRICT, NEPAL

by

Modnath Paudyal

Department of Nutrition and Dietetics

Central Campus of Technology

Institute of Science and Technology

Tribhuvan University, Nepal

2017

Nutritional Status of 6-59 Months of Children in Meche Community of Jhapa District, Nepal

A dissertation submitted to the Department of Nutrition and Dietetics, Central Campus of Technology, Tribhuvan University, in the partial fulfillment of the requirements for the degree of B.Sc. Nutrition & Dietetics

by

Modnath Paudyal

Department of Nutrition and Dietetics

Central Campus of Technology

Institute of Science and Technology

Tribhuvan University, Nepal

February, 2017

<div align="center">

Tribhuvan University

Institute of Science and Technology

Department of Nutrition and Dietetics

Central Campus of Technology, Dharan

Approval Letter

</div>

This *dissertation* entitled *Nutritional Status of 6-59 Months of Children in Meche Community of Jhapa District, Nepal* presented by Modnath Paudyal has been accepted as the partial fulfillment of the requirement for the B.Sc. degree in Nutrition and Dietetics

<u>Dissertation Committee</u>

1. Head of the Department   _____

$\qquad\qquad\qquad\qquad\qquad\qquad\quad$ **Mr. Dambar Bahadur Khadka**

2. External Examiner   _____

$\qquad\qquad\qquad\qquad\qquad\qquad\quad$ **Mr.Birendra Kumar Yadav (Asst. Prof)**

3. Supervisor   _____

$\qquad\qquad\qquad\qquad\qquad\qquad\quad$ **Dr. Surendra Bahadur Katwal (Professor)**

4. Internal Examiner   _____

$\qquad\qquad\qquad\qquad\qquad\qquad\quad$ **Mr. Arjun Ghimire (Teaching Assistant)**

February, 2016

Acknowledgement

My heart wells up with deep sense of gratitude to my respected supervisor Professor Dr. Surendra Bahadur Katwal sir for his encouragement and constructive recommendations on doing this research.

I am obliged to Dambar Bahadur Khadka , Department Head of Nutrition and Dietetics and all faculty members of Nutrition and dietetics Department, for valuable suggestions and guidance.I am thankful to Professor Dr. Dhan Bahadur Karki , Campus Chief ,CCT, Hattisar, for his academic support.

I am grateful to Mr. Ashok Ghimire, Mr. Gopal Poudel, Mr. Kalyan Poudel Mr. Amit Prasai, Mr. Suresh thapa, Mr. Dhurba Prasai, Mr. Chandramani Poudel, Mr. Ayush Adikari, Mr. Sapan Dahal for their helping hands and to all my colleagues for their direct and indirect co-operations and suggestions during my research. I also express my sincere thanks to my senior Mr. Aarem Karki, Mr.Arpan Dhakal and Mr.Komal Guragain, teachers, all juniors and staffs of library and laboratory for their direct and indirect co-operations and suggestions.

I express my affectionate thanks to Mr. Bishnu Meche, Leader of jalthal,Mr. Subash Meche and Mr. Santosh Meche All members of Meche Samaj of Jhapa district for their support and provide me valuable information.Finally, With heartfelt, and everlasting gratitude to my respected parents and my family for making me able to stand in this position where I am now.

Date of submission: February 2017

_____

Modnath Paudyal

Abstract

A community based cross-sectional study was conducted to assess the nutritional status of children aged 6 to 59 months in Meche community of Jhapa district. Anthropometric measurements (Weight, Height, and Mid Upper Arm Circumference) of 113 children's were taken. Household survey of 113 house sample with the help of questionnaire was also conducted. This cross-sectional study examined prevalence of the nutritional status of 6-59 month old children i.e. wasting, stunting, underweight. EPI-Info and WHO Anthro were used for analyzing the data.

The result revealed that 23.01 % of children were found to be stunted, 7.97 % were found to be wasted, and 12.38 % of children were found to be underweight. From the findings of this study, it is concluded that malnutrition is still a problem among children aged 6-59 months. It suggests implementing suitable nutrition program to improve the nutritional status of children in study area.

Keywords: Nutritional status, Malnutrition, Wasting, Underweight, Stunting, Meche Community

Contents

List of Tables

List of Figures

List of Abbreviations

Abbreviation	Full form
NDHS	Nepal Demographic Health Survey
PEM	Protein Energy Malnutrition
SPSS	Statistical Package for Social Sciences
MUAC	Mid Upper Arm Circumferences
NCHS	National Center for Health Statistics
WHO	World Health Organizations
UNICEF	United Nations International Children Emergency Fund
WAZ	Weight for Age Z-score
WHZ	Weight for Height Z-score
HAZ	Height for Age Z-score
ARIs	Acute respiratory infections
EBF	Exclusive breast feeding
PEM	Protein energy malnutrition

PART I

Introduction

1.1   Introduction

Malnutrition is one of the most important health problems in Nepal .Nepal Demographic and Health Study (NDHS) reported stunting, wasting and underweight to be 49%, 13% and 39% respectively. Especially high rates of wasting are found in the Terai (17%), mid-and far western hill districts (16%) and in some conflict areas in the Terai (21%).The 2006 NDHS demonstrated that the majority of the children in Nepal were breastfed. Thirty five percent of the children were given breast milk within one hour of birth. The duration of exclusively breastfeeding is inadequate. Similarly (NDHS) 2011 shows that 41%of children under 5 years of age are stunted, and 16% are severely stunted. The survey also shows that 11% of children are wasted and 3% are severely wasted and 29% of children below 5 year of age are underweight and % 8 are severely underweight(MOHP,2012). The survey will be focused in nutritional status of children aged 6 to 59 months of meche community of Jhapa district, Nepal.

Nutritional status refers to the condition of the body in those respects influenced by the diet, the levels of nutrients in the body and the ability of those levels to maintain normal metabolic integrity of under-five year children and to find out the factors associated with childhood malnutrition. Nutritional status of children is a proxy indicator for assessing the entire population health status and one of the major predictors of child survival. Despite the various efforts, malnutrition among children is remaining as a major public health problem in Nepal. This study will be conducted to assess the nutritional status It has been suggested that severe malnutrition in early childhood may interfere with normal physiological development. This means he/she will not be benefited as a normal adult in his/her future (Raja Lakshmi, 1990)

Meche is a minority nationality dwelling in the basins of the Mechi River, the river in the far-eastern border of Nepal. The Meche indigenous people derive their name from the Mechi River. Meches are a tribe who live in small communities in jungles and move from place to place frequently (Sharma, 2052). Meches are also called Bodos in Asam areas. They have nowadays started to live in one place and in urban areas also. This tribe has been living in Jhapa from time immemorial (Timsina, 2057).

According to the mythology of Meches, they are brethren of Rais, Limbus and Kirats, who settled in the Terai as they were left behind in course of their journey. According to the census of 2002 their total population is 3,763 but current data is not known.

1.2   Statement of the problem and rationale

Children especially of age group 6-59 months are very vulnerable as they are in their rapid developmental and growing phase. This is the time period when their brain reaches their maturity, mental growth, teeth formation occurs and also of other physical development.

Meches are a tribe who live in small communities in jungles and move from place to place frequently (Sharma, BS2052). Meches are also called Bodos in Asam areas. They have nowadays started to live in one place and in urban areas also. This tribe has been living in Jhapa from time immemorial (Timsina BS2057). According to the mythology of Meches, they are Rai's and Kirat's brother, who settled in the Terai as they were left behind in course of their journey.

The way of living, costumes, ornaments, rituals and culture of Meches are unique and resemble those of the Bodo tribe of India. Birth pollution is not over until the umbilical of a newborn falls off its body. Their priest, Raja, makes the family purified. Marriage is of different types. The girl is paid money, too. The dead ones are buried and food and local beer are placed on the top of the tomb (Sharma, 2052). Meches observe Chharkela (the worship of Laxmi). They are very much fond of songs and dances. Drums, pipe and bamboo split canes are their musical instruments. They celebrate both the planting and harvesting of crops.They have traditional village councils and the councils have a chief (Bista, 1996). Their Gaunburas (village chiefs) are called Makhal. The vocations of Meches also vary with their thars (Basumatari-Meche, BS2054/55).

In the field of language, Meches and Bodos appear very close to each other. In India Meches are described under the Kachhari community. In the Indian census of 1881, the Kachharis are shown to have 18 groups, including Bodo, Dimasa, Lalung, Madahi, Mech, Rabha, Sarania, Hojai, Garo, Rajbanshi or Koch, Chutiya, Moran, Hajong, Tippera, Mahaliya, Dhimal, Solanimiya and Phulgaria (Singh, 1994). The Meches of Nepal do not have written literature nor has a grammer been prepared. It does have a vocabulary though (Sharma, 2051). This language has been placed in the Tibeto-Burman group (Basumatari-

Meche, 2055). But there is less use of ª (kna), ` (ayan), of (ana), g (na), d (ma) in this language like in other languages of Tibeto-Burman family.

1.3   Research objectives

1.3.1   General objective

The general objective of this work is to assessing the nutritional status of (6-59) months of children in Meche community of jhapa district, Nepal.

1.3.2   Specific objective

a. Determination of the risk group of the children.
b. Survey of the community according to questionnaire.
c. Promote the proper allocation of resources to solve the problem.

1.4   Significance of the study

The findings of the study will have following implications:

1. Provide information to the government as well as voluntary organizations to initiate steps to tackle the problem.
2. Encourage the people for the improvement of their existing nutritional status by improving dietary pattern of the children.
3. Encourage the government and the other concerned authorities such as NGOs and INGOs for the development of an adequate system of nutritional programs.
4. Provide data for concerned agencies.
5. Serve as a helpful guide to make a nutrition program for this area.
6. Reflect sanitary conditions, socio-economic variables, degree of malnutrition and condition of mothers and children to make the people aware of the real situation.

1.5   Limitation of the study

The study had following limitations:

1. Survey is conducted within limited period of time.
2. Due to limited sample it might not meet the national data.

PART II

Literature review

2.1   Nutrition

Nutrition is the study of food in relation to health and the process by which living organism used food for the maintenance of life, growth, normal functioning of the organs and tissues and productivity of energy or the study of various nutrients their functions food resources and their utilization by human body and their effect on human wellbeing (Katwal,1989). In other word, nutrition is the science that deals with absorption, digestion, and metabolism of a food in the body.

2.2   Nutritional status of Nepal

Various surveys conducted in Nepal shows that there is a decreasing trend of malnutrition in past few years. Although there has been a great reduction in malnutrition problems but still the data shows that the prevalence is much higher than that of developed countries. The Nepal Demographic Health Survey (NDHS, 2011) has provided the data on prevalence of malnutrition less than 5 years of child. The percentage of prevalence of malnutrition below 5 years of age is illustrated in Figure 1.
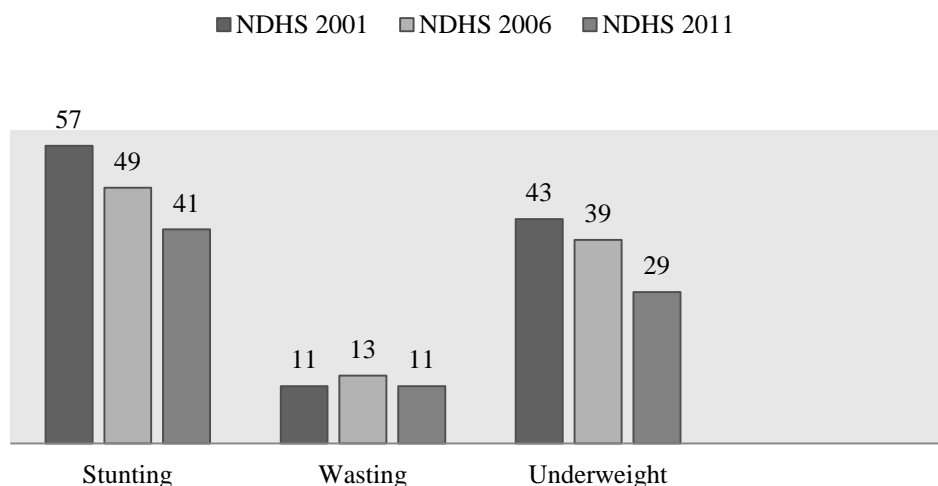
Figure 1: Prevalence of Malnutrition of under-five years aged children in Nepal (MoHP, 2012)

2.3 Conceptual framework

Malnutrition in children under 5 years of age is determined by a combination of immediate, underlying and basic factors and that all these factors affect each other differently according to the particular situation as shown in Figure 1. (UNICEF,1997).
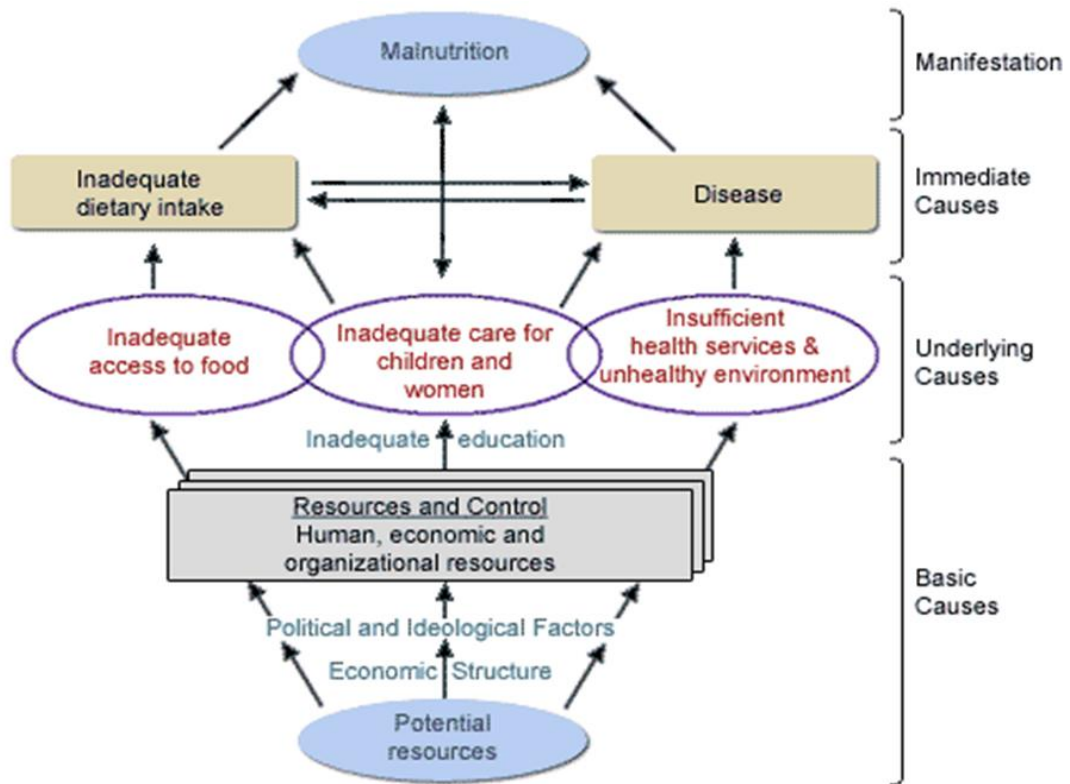
Figure 2: Conceptual framework depicted the cause of poor nutrition outcomes (adapted from UNICEF, 1997

The above figure can be divided into following parts:

Immediate causes of under nutrition: The immediate cause of under nutrition is a result of a lack of dietary intake or disease. This can be caused by consuming too few nutrients and infection which can increase requirements and prevent the body from absorbing the consumed.

This part focuses on the infection under nutrition cycle. In practice, under nutrition and infection often occur at the same time because one can lead to another. This is illustrated in the cycle below:
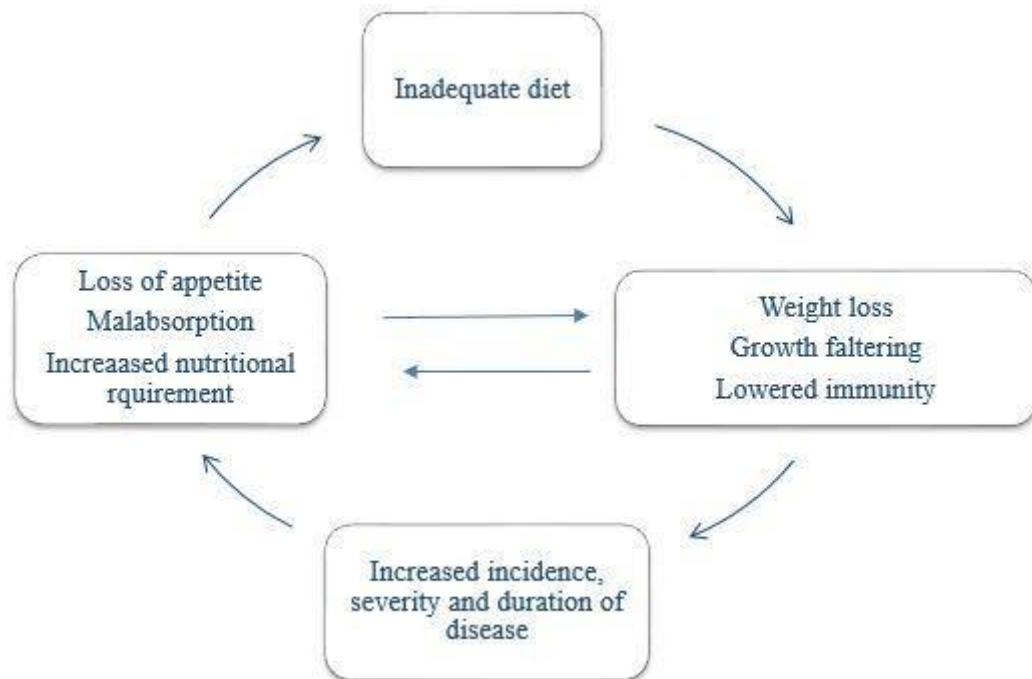
Figure 3 Poverty - Malnutrition Cycle

- The level of interaction depends on the infection and extent of under nutrition but in general, poor nutrition can result into reduced immunity to infection.

- This can increase livelihood of an individual getting an infection or increase its duration or severity.

- Infection can result in the loss of appetite, increased nutrients requirements and decreased absorption of nutrients consumed.

- This triggers further weight loss and reduced resistance to further infection. The vicious cycle needs to be broken by treatment of infection and improved dietary intake.

Underlying causes of under nutrition: Whether or not an individual gets enough food to eat or whether s/he is at risk of infection is mainly the result of factors operating at the household and community level.

Within the UNICEF framework just described these are classified as underlying causes. These can be grouped into three broad categories:

- Household Food Insecurity

- Inadequate Care

- Unhealthy household environment and lack of health services (poor public health).

These often referred to as 'food', 'care' and 'health' factors.

Household food security is defined as sustainable access to safe food of sufficient quality and quantity to ensure adequate intake and healthy life for all members of the family. When members of household do not have access to sufficient quantity and quality of food they can be said food unsecured. Food must not only be in the market but people must be able to afford it. Additionally, for an active and healthy life, people need enough food as well as the right balance of fat, protein, carbohydrate and micronutrients.

Caring practices such as breastfeeding, appropriate complementary feeding, as well as hygiene and health seeking behaviors support good nutrition. These practices can be severely disrupted in an emergency which can lead to poor dietary intake and increased infection, both of which are underlying causes of under nutrition.

The third category of the underlying causes of under nutrition refers to those related to poor public health. This includes factors relating to the health environment, exposure to disease and access to basic health services. The health environment is affected by access to clean, safe water and sanitation, the presence of malarial breeding sites, the quality of shelter and consequent level of cold, stress, overcrowding. Extent to basic health services determines the extent to which infection and disease can be prevented or treated.

Basic Causes: The third levels of factors contributing to under nutrition identified by the conceptual framework are considered basic causes. These refer to what resources are available (human, structural, financial) and how they are used (political, legal and cultural factors). These can be thought of as the real reason behind the underlying causes.

Political, legal and cultural factors may defeat the best efforts of households to attain good nutrition. These include the degree to which the right of women and girls are protected by law and customs; the political and economic system that determines how income and assets are distributed; and the ideologies and policies that govern the social sectors. Overcoming entrenched poverty and under development requires resources and inputs. (UNICEF, 2015)

2.4   Malnutrition

Malnutrition has been defined in different ways some believe that it is a result of an imbalance in the intake of nutrient; whereas other say that it is the result of too little or even too much intake of certain nutrient. There are still other who say it is a clinical syndrome with typical symptoms and signs depending on the type of nutrient responsible for the disease. Nevertheless, both over nutrition and under nutrition are considered malnutrition.   Malnutrition has been defined as a pathological state resulting from a relative or absolute deficiency or excess of one or more of the essential nutrients in the diet (Jellife, 1966). Malnutrition, a widespread problem with devastating consequences, weakens immune systems and worsens, illnesses lower intellectual quotient. Malnutrition reduces the quality of life and financially drains families, communities, and countries. (Kandala *et al*., 2011)

According to the World Health Organization (WHO, 1983), malnutrition has three commonly used comprehensive types named stunting, wasting and underweight measures by height for age, weight for height and weight for age indexes respectively. For girls, chronic under nutrition in early life, either before birth or during early childhood can later lead to their babies being born with low birth weight, which can lead again to under nutrition as these babies grow older. Thus a vicious cycle of under nutrition repeats itself, generation after generation (UNICEF, 2009)

2.5   Types of malnutrition

2.5.1   Protein energy malnutrition (PEM)

PEM is the most common form of malnutrition occurring among infants and young children. Mild PEM manifests itself mainly as poor physical growth, whereas individuals with severe PEM have high case of fatality in different countries of developing world (Muller and Krawinkel, 2005)

WHO defines PEM as, "a range of pathological condition arising out of coincident lack of protein and energy in varying proportion, most frequently seen in infants and young children and usually associated with infection"

PEM is further classified under following names:

2.5.1.1 Kwashiorkor

The term kwashiorkor, means; "The disease which the child gets when the next baby is born" i.e., sickness of the disposal child" Kwashiorkor is characterized by following symptoms such as growth failure, edema, fatty liver, skin and hair changes, muscle wasting, diarrhea, moon face, apathy and peevishness, crazy pavement dermatitis etc. (Swaminathan, 2000). Children above 18 months are usually affected by kwashiorkor (Jelliffe, 1966).

2.5.1.2 Marasmus

This is common form of PEM. It is a child version to starvation. It usually occurs in a second six months of life. The cause is the diet very low in calories and incidentally in protein and other essential nutrients. The symptoms include growth failure and low body weight, severe isting of muscle mass and of subcutaneous fat, shrunken eyeball, depressed cheeks, and ribs becomes prominent, dry and atrophic skin, etc.(Swaminathan, 2000).

2.5.1.3 Marasmic- kwashiorker

When the incidence of PEM is high, a large number of cases shows some of the features of both marasmus and kwashiorker(Swaminathan, 2000).

Similarly, the other types of the malnutrition problems most common in developing countries are

1. Vitamin A deficiency

2. Iron deficiency Anemia

3. Iodine deficiency disorder, etc.

2.6 Methods of assessment of nutritional status

There are basically two methods of assessing the nutritional status. The methods is categorized as, direct and indirect methods.

- Direct method

   This method deals with the individual and measures the objective criteria

- Indirect method

   This method uses community indices that reflect community nutritional status.

2.6.1 Direct methods of nutritional survey

They are summarized as ABCD

2.6.1.1 Anthropometric methods

Nutritional anthropometry is concerned with the measurement of the variations of the physical dimensions and the gross composition of human body at different age levels and degrees of nutrition (Jelliffee D.B 1966). Nutritional Anthropometry has most commonly been conducted on preschool children, the age group in which PEM is usually most prevalent and most severe. The commonly used anthropometric measurements or indicators of nutritional status for pre scholar children are briefly discussed below:

1. **Weight for height**: weight and height of child is measured using standard Seca digital balance and stadiometer respectively and index is expressed in standard deviation units from the median of WHO child growth standards adopted in 2006. Children whose weight-for-height is below minus one standard deviations is considered mildly wasted similarly below minus 2 and 3 standard deviations are considered moderately and severely wasted respectively.

2. **Weight for age**: Children whose weight-for-age is below minus two standard deviations from the median of the reference population are considered underweight. The measure reflects the effects of both acute and chronic under nutrition.

3. **Height for age**: Children whose height-for-age is below minus two standard deviations from the median of the reference population are considered stunted or short for their age. Stunting is the outcome of failure to receive adequate nutrition over an extended period and is also affected by recurrent or chronic illness.

4. **Mid upper arm circumference**: children whose mid upper arm circumference is below 12.5cm are considered malnourished. Hence it is significant during the diagnosis of protein energy malnutrition. Measurement should be taken by flexible, non-stretch tape made of fiber glass or steel.

5. **Edema**: Accumulation of fluid in interstitial cells is called as oedema it also reflects PEM.

6. **Head and chest circumference**: Measurement of head circumference is important because it is closely related to brain size. It is often used with other measurements to detect pathological conditions too.(Gibson RS,1993)

2.6.1.2 Biochemical or laboratory methods

Biochemical test is used primarily to detect subclinical deficiency states or to confirm a clinical diagnosis. Some of its examples are hemoglobin estimation, serum protein, urine creatinine, serum retinol etc.

2.6.1.3 Clinical methods

We can also assess one's nutritional status by observing certain signs and symptoms which are associated with various nutrient deficiencies in various organs of body like skin, hair, mouth, tongue etc.

2.6.2 Indirect methods of nutritional survey

Dietary evaluation methods

Dietary assessment protocol is designed to assess nutrient intakes after implying questionnaire, records and recall methods.

- **Vital statistics**:- A variety of vital statistics such as maternal, infant and childhood mortality rates, prevalence rates have been considered as indirect indicators of nutritional status of community.
- **Ecological Information**:- The nutritional status of an individual or community is affected by socioeconomic and ecological factors. Therefore these parameters are likely to serve useful indirect indicators. (RajaLakhsmi ,1987)

2.7 Nutritional Status

Nutritional status is defined as the condition of the body resulting from the intake, absorption and utilization of food. The nutritional status of the people of the developing countries is very poor. Malnutrition, under nutrition and various forms of nutritional deficiencies are wide spread and mostly prevalent in rural area of the developing countries (Neuman etal., 2004). Early childhood health and nutrition is a true reflection of countries' level of development. These health indicators are directly linked through existing policies, plans and programs to countries' investment in early childhood and respect for children's rights (Molina, 2012).

The Nutritional status cannot be measured directly as various factor such as Poverty, poor feeding practices, lack of land, insufficient food production, Ignorance of parent on child care, food losses, Exploitation, diarrhea, potable water, high price of fertilizer, drought, measles, high number of children, credit too expensive, availability of Health care too facilities has been reported to contribute for malnutrition (Beghin et al., 1988). Bothe direct and indirect method can be helpful in the details assessment of nutritional condition particular community or groups.

2.8 Breast Feeding and Complementary Feeding

Optimal infant and young child feeding entails the initiation of breastfeeding within one hour of birth; exclusive breastfeeding for the first six months of the child's life; and continued breastfeeding for two years or more, together with safe, age-appropriate feeding of solid, semi-solid and soft foods starting at 6 months of age. While infant feeding practices need to be strengthened overall, increasing the rates of early initiation of breastfeeding and of exclusive breastfeeding is critical to improving child survival and development. (UNICEF, 2009)

It has been postulated that 13% of the current under five mortality rate could be averted by promoting proper breastfeeding practices, which is seemingly the single most cost effective intervention to reduce child mortality in resource constrained settings such as in Nepal. The importance of EBF (Exclusive Breast Feeding) for optimal growth and development, irrespective of country of residence, is also reflected in the recent WHO growth standard for children. Introduction of foods other than breast milk before six months of life is not only undesirable, but could also be harmful. These foods not only displace nutritious mother's milk, but also serve as a vehicle for infectious pathogens that can lead to severe illness. Despite well-established guidelines for promotion of EBF, the adherence to EBF is quite low in many settings. Childhood malnutrition and growth faltering affects more than half of children under five in developing countries, and usually starts during infancy, possibly due to improper breastfeeding and mixed feeding practices. The mean total duration of breastfeeding in Nepal, like most other low and middle income countries, is long and usually more than two years, but data on EBF up to six months of age as well as descriptions of mixed feeding practices are scarce. Information on breastfeeding practices and the factors influencing them is important for successful campaigns. (Ulak *et al*., 2012)

2.8.1   Definition of Breastfeeding Categories

Breastfeeding can be categorized into three groups; exclusive, predominant and partial breastfeeding.

- Exclusive Breastfeeding: The infant had received only breast milk from his/her mother or a wet nurse, or expressed breast milk and no other liquids or solids with the exception of drops of syrup consisting of vitamins, mineral supplements or medicines.

- Predominant Breastfeeding: The infant's predominant source of nourishment had been breast milk. However, the infant may also have received water and water-based drinks like tea and local herbal drops.

- Partial Breastfeeding: When infant's feeding included non-breast milk foods such as animal/powdered/condensed milk and/or solid/ semi-solid food (i.e. cereals, vegetables, fruits, lentils or meat). (WHO, 2007)

2.9   The Z- Score or standard deviation classification system

There are three different systems by which a child or a group of children can be compared to the reference population: Z-scores (standard deviation scores), percentiles, and percent of median. For population-based assessment—including surveys and nutritional surveillance—the Z-score is widely recognized as the best system for analysis and presentation of anthropometric data because of its advantages compared to the other methods. At the individual level, however, although there is substantial recognition that Z-score is the most appropriate descriptor of malnutrition, health and nutrition centers (e.g. supplementary feeding programs in refugee camps) have been in practice reluctant to adopt its use for individual assessment.

In this database, weight-for-height, height-for-age and weight-for-age are interpreted by using the Z-score classification system. The Z-score system expresses the anthropometric value as a number of standard deviations or Z-scores below or above the reference mean or median value. A fixed Z-score interval implies a fixed height or weight difference for children of a given age. For population-based uses, a major advantage is that a group of Z-scores can be subjected to summary statistics such as the mean and standard deviation.

The formula for calculating the Z-score is:

Z-score (or SD-score) = (observed value - median value of the reference population) / standard deviation value of reference population.

Interpreting the results in terms of Z-scores has several advantages as follows:

➢ The Z-score scale is linear and therefore a fixed interval of Z-scores has a fixed height difference in cm, or weight difference in kg, for all children of the same age. For example, on the height-for-age distribution for a 36-month-old boy, the distance from a Z-score of -2 to a Z-score of -1 is 3.8 cm. The same difference is found between a Z-score of 0 and a Z-score of +1 on the same distribution. In other words, Z-scores have the same statistical relation to the distribution of the reference around the mean at all ages, which makes results comparable across age groups and indicators.

➢ Z-scores are also sex-independent, thus permitting the evaluation of children's growth status by combining sex and age groups.

➢ These characteristics of Z-scores allow further computation of summary statistics such as means, standard deviations, and standard error to classify a population's growth status. (WHO, http://www.who.int/, 2015)

2.9.1 Cut-off points and summary statistics.

For population-based assessment, there are two ways of expressing child growth survey results using Z-scores. One is the commonly used cut-off-based prevalence; the other includes the summary statistics of the Z-scores: mean, standard deviation, standard error, and frequency distribution.

2.9.2 Prevalence based Reporting.

For consistency with clinical screening, prevalence-based data are commonlyreportedusingacut-offvalue,often<-2and>+2Z-scores.Therationale for this is the statistical definition of the central 95% of a distribution as the "normal" range, which is not necessarily based on the optimal point for predicting functional outcomes.

The WHO Global Database on Child Growth and Malnutrition uses a Z- score cut-off point of <-2 SD to classify low weight-for-age, low height-for-age and low weight-for-height as moderate under nutrition, <-3 SD to define severe under nutrition and <-1 SD to

define mild under nutrition. The cut-off point of >+2 SD classifies high weight-for-height as overweight in children.

2.9.3 Summary statistics of the Z-scores

A major advantage of the Z-score system is that a group of Z-scores can be subjected to summary statistics such as the mean and standard deviation. The mean Z-score, though less commonly used, has the advantage of describing the nutritional status of the entire population directly without resorting to a subset of individuals below a set cut-off. A mean Z-score significantly lower than zero—the expected value for the reference distribution—usually means that the entire distribution has shifted downward, suggesting that most, if not all, individuals have been affected. Using the mean Z-score as an index of severity for health and nutrition problems results in increased awareness, if a condition is severe, an intervention is required for the entire community, not just those who are classified as "malnourished" by the cut-off criteria. (WHO, http://www.who.int/, 2015)

PART III

Materials and methods

3.1 Materials / Survey Equipment

Equipment needed for performing the survey are;

1. Child weighing machines (Seca scale):- Child weighing machines having capacity of 100kg (1 piece).
2. Height measuring stand (Stadiometer):- The height measuring tape of 5ft capacity (2 pieces).
3. Questionnaire: - A well designed set of questionnaire to collect information on household characteristics, food availability and its consumption, health facility etc.

3.2 Method

3.2.1 Height Measurement

The height of an individual is made up of the sum of four components; Legs, pelvis, spine and skull. While, for detailed studies of body proportions, all of these measurements are required, in field nutritional anthropometry usually only the total height (or length) is measured. (Jelliffe, 1966)

Equipment and Technique: According to WHO guideline, children of 6-59 months age are measured using the vertical measuring scale. So all the children in this study was measured using vertical stadiometer provided by the college. The measuring scale was put on the flat surface where it was fixed and did not move according to child's movements. Then the child was guided to stand on the stadiometer without the shoes or slippers. The child was guided to stand parallel to the stadiometer with heels, buttocks, shoulders and back of head touching the board. Head was held comfortably erect with its line of sight vertically perpendicular to the surface of board. The hand was let hanging in natural manner.

Then the headpiece, made off wooden piece, was gently lowered, crushing the hair, and making contact with the top of the head. Any object like clips and bands on the hair was removed before the measurements and also the thick hair was taken into account. These processes was carried out by two of us, one for the child's setting on the board and other to

keep note on the form. The measurement was taken nearest to 0.1 cm. The measurement was taken by triplicate measurement and the mode value was used for the analysis.

3.2.2 Weight Measurement

Weight is the anthropometric measurement most in use. Its potential value, especially for children, is appreciated not only by health personnel, by often by less educated parents, for whom it is useful as a source of health education.

In developing regions, the prevalence of protein-calorie malnutrition appears to be best indicated by weight deficiency in all age-groups and by growth failure in children. Weighing is the key anthropometric measurement.

Weight estimations can be made on isolated occasions, as in many surveys, or repeated at intervals under special conditions, as at child-welfare clinics, schools, parental clinics, or in longitudinal studies. These serial measurements give a better index of actual growth or growth failure. (Jelliffe, 1966)

Equipment and Technique: The type of the weighing scale used was spring balance machine. The child was subjected to the machine with the minimum number of cloths so that we could reach nearer to actual value. The child was guided to stand straight and erect and look straight forward not downward or upward. The measurement was noted as indicated by the machine.

Child's weight was measured to the nearest 100 gm on a weighing scale. The machine was checked regularly for accuracy using standard weight (1 kg weight used in shop).The measurement was taken by triplicate measurement and the mode was used for analysis.

3.2.3 Mid upper arm circumference

Measurements of the mid upper arm circumference appears to be most useful in practice. This region is easily accessible, even with a young child sitting in front of the examiner on his mother's lap. Also, in kwashiorkor the upper arm is not usually clinically edematous, while it has been shown that the mid upper arm is markedly wasted in his condition. (Jelliffe, 1966)

Equipment and technique: For the measurement of mid upper arm circumference we used non-stretchable and flexible fiber-glass tape. The measurement was taken at the mid-point of acromion process of the scapula and the olecranon process of the ulna. After the

detection of the mid-point child was freed to hang his/her hand. We used left hand for the right handed child and right hand for the left handed child for the measurement by placing firmly around the limb to avoid compression of the soft tissues. One of us took the measurement while other one noted the measurement.

The measurement is taken by triplicate measurement and the mode was used for analysis.

3.2.4 Edema Checkup

Usually first appears over the ankles and feet, it may extend to other areas of the extremities. It may involve the genitals, face and hands. It is commonly seen in kwashiorkor (Jelliffe, 1966).

Technique: We applied firm pressure for three seconds with one digit on the lower portion of the median surface of the tibia. The sign was taken as positive if there was a visible and palpable pit that persists after the pressure is removed. And recorded only if present bilaterally.

3.3 Study variables

Dependent variable: -

Malnutrition indicated by stunting, wasting and underweight.

Independent variable:-

1. Socio-economic and demographic variables:- head of household, family size, income, occupation, education
2. Child characteristics:- Age, sex, breastfeeding status and morbidity status
3. Child care practices:- Feeding, hygiene
4. Maternal characteristics:- age, no. of children born
5. Environmental health condition:-water supply, sanitation and housing condition.

3.4 Type of study

A cross-sectional study is conduct. Study Units is select randomly from the list of total number of 12-59 month of children from the Meche community of Jhapa.

3.5 Study site and its justification

Jhapa district lies in the eastern terai region of Nepal that covers the area approximately 1606 km. The area falls under tropical climate and vegetation are predominantly of mixed broad-leaved wet monsoons deciduous type. A Mongolian people residing in Mechi river (eastern boarder of country) locality of this district are known as Meche. They are also called Bodo, who mainly inhibit in Jalthal and Dhaijan VDCs. Their total population is 3673 (Rai and Dhungana 2002).

Therefore Jalthal and Dhaijan VDCs is the main study site of this work.

3.6 Study population

Measurement is taken of 6- 59 months old children of Meche community and interview is taken from caretakers (specially mother but in the absence of mother other will be interviewed)

3.7 Sampling method and technique

3.7.1 Sample size

The sample size is determined by using a single proportional formula assuming the prevalence rate of malnutrition to be 25% in the survey of terai area, 95% confidence interval (CI), 8% margin of error (d).

Calculation of sample size for infinite population:-

Sample size (n0) = $Z^2 \times p \, (1-p)/d^2$

Where z= confidence interval at 95% (standard value of 1.96)

P= estimated prevalence of malnutrition (25%)

d= margin of error (8%)

Now $N0 = 1.96^2 \times 0.25 \times (1-0.25)/ (0.08)^2$ = 112.54 ≈ 113

3.7.2 Criteria for sample selection

Inclusion criteria:-

Children who are 12-59 month year old and belong to Meche community are selected for the sample. Questionnaire is asked to the mother of the selected child. If mother is unreachable, person responsible for the caring of child is selected for the questionnaire.

Exclusion criteria:-

The study participants who are seriously ill or who are not available at household during the time of survey will not be included in the study.

3.8 Data collection tools

The heads of households were taken into confidence and after obtaining informed, written consent data is collected. They were assured of confidentiality of the data. A community based descriptive cross-sectional study will be conducted in Jhapa district of Nepal. Meche community of Nepal.

1. Household survey with the help of questionnaire: - A set of questionnaires that have directly or indirectly influence in the nutrition status will be asked to the parents of the children who are to be studied. The questions asked to the respondent give the both qualitative and quantitative data.

2. Anthropometric measurements of 6-59 month age children:-
   The following indices will be used
   i. Weight-for-age
   ii. Height-for-age
   iii. Weight-for-height
   iv. Arm circumference

3. Edema check for protein energy malnutrition (PEM)

4. 24 hour recall method

   In this method, the respondent is asked in detail about the type and quantity of foods consumed during the previous 24 hours and activities during the day which provide the valuable information in estimating the level of activity and energy expenditure. The values of these measurements are converted into grams or milliliters. The amounts of various nutrients are then calculated using the food composition tables and/or nutrition computer packages designed for this particular nutritional assessment method.

3.9   Pre-testing and data collection tools

The study will be pre- tested among school children from a school selected under sampling procedure. The pre- testing will be conducted to establish accuracy of questions and clarity and to check for consistency in the interpretation of questions and to identify ambiguous items. After review of instruments all suggested revisions will be made before being administered in the actual study.

3.10   Validity and reliability of the study tools

To ascertain the degree to which the data collection instruments will measure what they purposed to measure, the instruments will be validated by a group of professionals from Central Campus of Technology, Department of Nutrition and Dietetics. The aspects tested in the questionnaire will also be drawn from the available literature in nutrition education for primary schools. The questionnaire will also be pre-tested prior to data collection to ascertain content and face validity.

Reliability refers to quality control measure of data collected. Before data collection the research assistants will be intensively trained on the objectives of the study and on data collection techniques. The process of data collection will involve the principal researcher and two research assistants. Questionnaire will be checked daily for completeness, consistency and clarity as mentioned earlier. In addition, the academic supervisors may also visit the research site periodically to monitor the process of data collection.

PART IV

Results and Discussions

4.1 Nutritional status

4.1.1 Weight for height: Weight and height of child is measured using standard Seca digital balance and stadiometer respectively and index is expressed in standard deviation units from the median of WHO child growth standards adopted in 2006. Children whose weight-for-height is below minus one standard deviations is considered mildly wasted similarly below minus 2 and 3 standard deviations are considered moderately and severely wasted respectively.
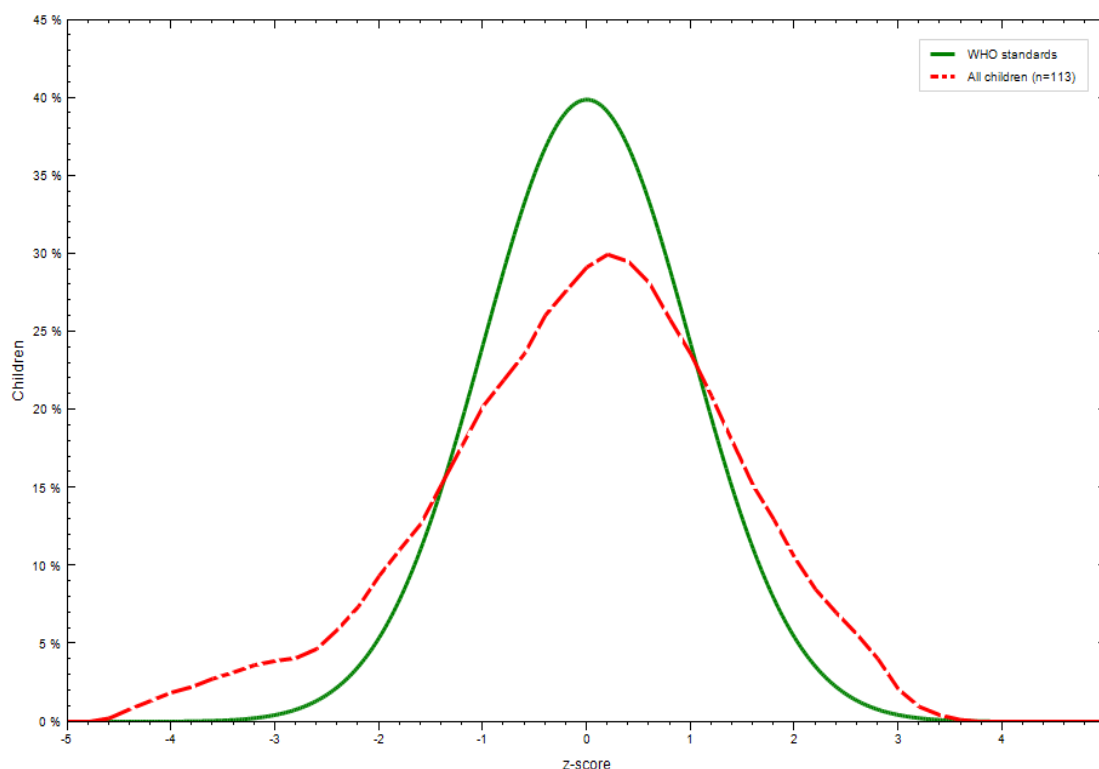
Figure 4: Distribution of weight-for-height Z-score curve comparing with WHO standards

The WHZ distribution curve obtained from the children is different than that of WHO standard curve. The median value of children is slightly shifted to the right indicating that some of the children in the population, and not only those below a given cut-off, were affected as shown in figure. The median value of WHZ was 0.15.

Table 4.1 Z-score for weight for height

WHZ	Frequency	Percent
<-3	4	3.54
<-2	5	4.43
-2 - <-1	17	15.05
-1 - <0	27	23.89
0-<1	36	31.86
1 - <2	17	15.04
2- <3	7	6.19
>3	0	0
Total	113	100%

According to weight-for-height Z-score, 3.54% were below -3SD i.e. severly wasted, 4.43% were below -2SD i.e. moderetly wasted, 15.05% were below -1SD to -2SD, 23.89% were below 0 to -1SD, 31.86% were below 1SD to 0, 15.05% were below 2SD to 1SD, and 6.19% below 3SD to 2SD as shown in table 4.1

Regarding the weight for height index, the overall prevalence of wasting in children was 7.97 %. The result for weight for height measurement in this study is low as compared to NDHD data i.e. 11 % (NDHS, 2011).

As compared to (NDHS, 2011) wasting prevalence rate was low which may be due to proper dietary intake lowering the wasting rate. Meche people mostly prefer pig and buffalo meat. Therefore due to protein intake Meche community has low prevalence of wasting in comparison to (NDHS, 2011). As we know that protein is the major source of body building which in fact enhance the child's growth and weight.

4.1.2 Weight for age

Children whose weight-for-age is below minus two standard deviations from the median of the reference population are considered underweight. The measure reflects the effects of both acute and chronic under nutrition.
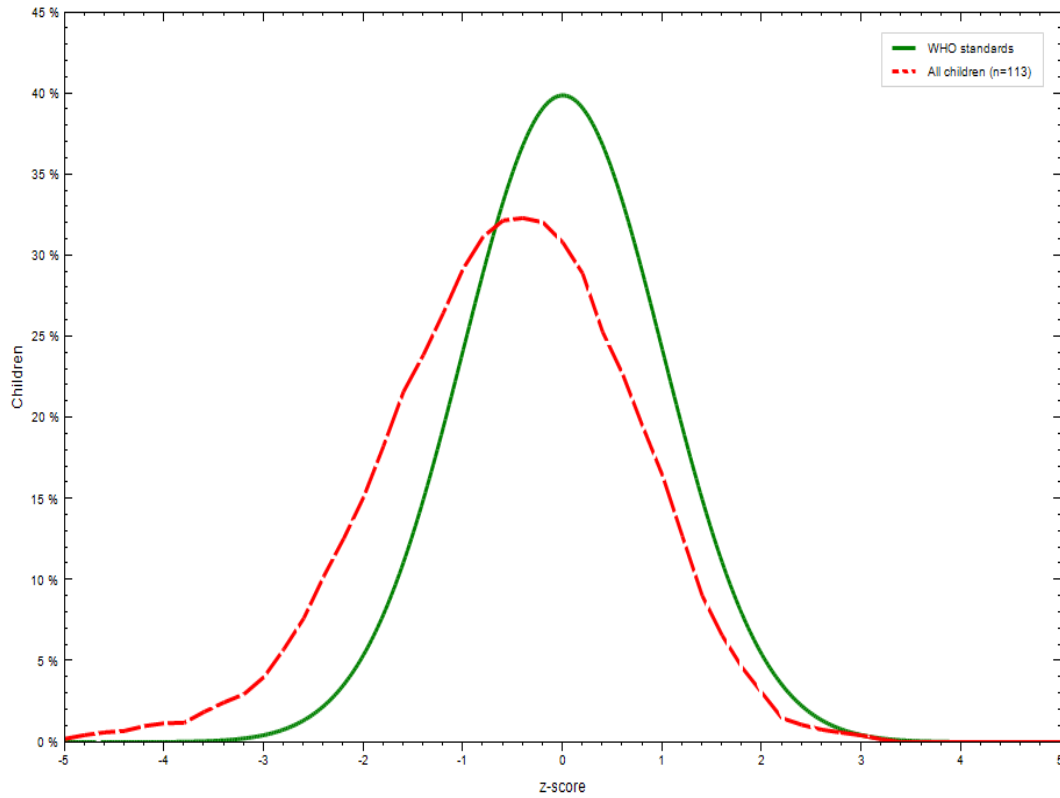
Figure 5: Distribution of weight-for-age Z-score curve comparing with WHO standards

The WAZ distribution curve obtained from the children is different than that of WHO standard curve. The median value of children is slightly shifted to the left indicating that most of the children in the population, and not only those below a given cut-off, were affected as shown in Figure The median value of WAZ was -0.51.

Table 4.2 Z-score for weight for Age

WAZ	Frequency	Percent
<-3	3	2.65
-3 - <-2	11	9.73
-2 - <-1	23	20.36
-1 - <0	39	34.51
0-<1	27	23.89
1 - <2	8	7.08
>2	1	0.89
>3	1	0.89
Total	113	100%

According to weight-for-age Z-score, 2.65% were below -3SD, 9.73% were below -2SD to -3SD, 20.36% were below -1SD to -2SD, 34.51% were below 0 to -1SD, 23.89% were below 1SD to 0SD, 7.08% were below 2SD to 1SD, 0.89% were more than 2SD, 0.89 were more than 3SD as shown in table 4.2.

The result for weight for age measurement in this study 12.38% is underweight (in which 9.73 % moderately underweight and 2.65 % severly underweight is low as compared to NDHS data i.e. 29% (NDHS, 2011).

4.1.3 Height for age

Children whose height-for-age is below minus two standard deviations from the median of the reference population are considered stunted or short for their age. Stunting is the outcome of failure to receive adequate nutrition over an extended period and is also affected by recurrent or chronic illness.
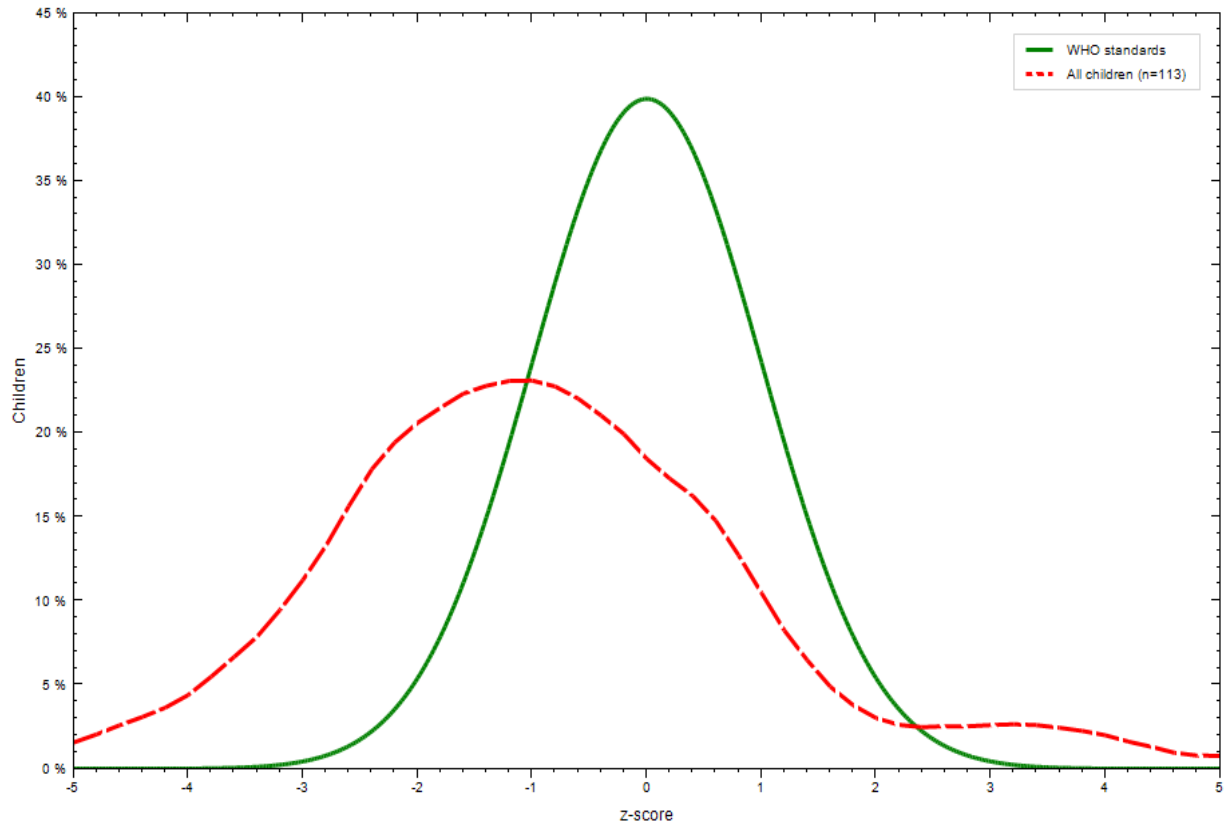
**Figure 6:** Distribution of Height-for-age Z-score curve comparing with WHO standards

The HAZ distribution curve obtained from the children is different than that of WHO standard curve. The median value of children is shifted to the left indicating that most of the children in the population, and not only those below a given cut-off, were affected as shown in Figure. The median value of HAZ was -1.20

Table 4.3 Z-score for height for age

HAZ	Frequency	Percent
<-3	9	7.96
-3- <-2	17	15.05
-2 - <-1	35	30.97
-1 - <0	20	17.69
0-<1	22	20.36
1 - <2	2	1.77
2- <3	0	0
>3	7	6.19
Total	113	100%

According to height-for-age Z-score, 7.96% were below -3SD i.e. severely stunted, 15.05% were below -2SD to -3SD i.e. moderately stunted, and 30.97% were below -1SD to -2SD, 17.69% were below 0SD to -1SD, 20.36 were below 1SD to 0SD, 1.77% was below 2SD to 1SD, and 6.19% were above 3SD shown in table 4.3.

4.2 MUAC (Mid upper arm circumference)

Two children had MUAC less than 124 mm and all children had MUAC more than 124 mm.

4.3 Edema

No cases with nutritional edema were found.

4.4 Family details

49.55% of family livings in separate manner and 50.45% of family living in combine manner. The minimum number of family member was 4 and the maximum number of family member was 12.

4.5   Mother's education

Most of the mothers were educated. There are 51.33% of mother who completed secondary level, 26.55% primary level, and 17.70% higher secondary or above and only 4.42 % of mothers were illiterate.

4.6   Occupation

Most (45.13%) of family's members were involved in agricultural work. Similarly 38.05 % were outside of country as abroad labor, 7.08% involved in services, 6.20% involved in business and 3.54% involved in labor

Table 4.4 Occupation of the household's

Occupation	Percent
Agriculture	45.13
Foreign employment	38.05%
Service	7.08%
Business	6.20%
Labor	3.54%

4.7   Water supply, Sanitation and Hygiene

15.93% of people used tap water as water sources 11.50% used spring water and remainng 72.57% were used hand pump water. There was hand pump at every house and tap at near to the house. 70.80%   of household were found purifying water for drinking purpose (47.79% by filtration and 23.01% boiling method) where as 29.20% were not purifying for consumption. All the people were found washing hand before meal, after toilet, after cleaning baby's stool, after the use of dirt but 64.60% of mothers were not hand wash before the preparation of meal. To wash the hands, 82.30% of people used soap water, 17.70% by water only and respectively.

4.8   Toilet facilities and waste disposal

All of the houses had toilet facilities. 88.50% household had modern toilet and remaining 11.50% had traditional toilet. In terms of waste disposal, 34.52% of households use to pit to bury of wastes, 38.05% of house used incinerated waste product, 18.58%   households

were not use any waste disposal method of waste disposal or throw haphazardly and 8.85% of household use container van of municipality to disposed waste product.

4.9   Source of fuel

Firewood was used by 91.15 % of houses and 8.85% were used cylinder gas as a source of fuel.

4.10   Diseases, its knowledge and others concepts

19.47% of children were found having health problem in previous two weeks before survey and 80.53% of children were not found not having any health related problem. 9.73% of children suffering from common cold (rugha khoki), 3.54% had fever, 1.77% had pneumonia , 1.77% had diarrhea, 0.89% had jaundice and 1.77% had some others problem as shown in table.

Table 4.5 Child disease

Diseases	Percent
Common cold	9.73%
Fever	3.54%
Pneumonia	1.77%
Diarrhoea	1.77%
Jaundice	0.89%
Others	1.77%

There were only 72.56% of people had knowledge of causes of disease. 68.14% of people thought that disease causes due to the lack of hygiene and sanitation and 44.25% of people thought due to germs or dirt as main cause of diseases. Similarly 14.16% of people said disease also causes from lack of balance diet, 2.65% believed on due to curse of god and also 0.89% believed on ghost.

Table 4.6 Concept about occurrence of disease

How disease occur	Percent
Lack of hygiene and sanitation	68.14%
Germs or dirt	44.25%
Lack of balance diet	14.16%
Curse of god	2.65%
Ghost	0.89%

There were 80.53% of people thought that disease can be prevented by cleanliness and 14.16% by balance diet,8.85% by immunization and 2.66% of people believed that disease can be prevented by pleasing of god.

Table 4.7 Method of prevention of disease

Method of prevention of disease	Percent
Cleanliness	80.53%
Balance diet	14.16%
Immunization	8.85%
Pleasing of god	2.66%

61.95% people went to health post or hospital and 38.05% of people treatment from traditional healers.

Table 4.8 Place to go after disease

Place to go after disease	Percent
Health post or hospital	61.95%
Traditional healer	38.05%

64.60% of children were intake of more fluid than normal intake. Similarly, 33.63% were intake as usual and 1.77% consumed less than normal intake as shown in table.

Table 4.9 Drinking liquid during diarrhoea

Drinking liquid during diarrhoea	Percent
More than usual	64.60%
As usual	33.63%
Less than usual	1.77%

4.11 Breastfeeding practices and child nutrition

100% of mother breast fed their child during the time of lactation but only 65.48% of mothers were breastfed her child within one hour after birth. Similarly, 24.78% of mothers feed her breast milk after one hour and 9.73% of women reported as they did not know exactly the time of breastfeeding after birth.

The percentage of women were exclusive breastfeeding their child 55.75% completely and 44.25% partially.97.30% of mother continue feeding her breast milk at the age of 2 years or more than 2 years.

All women introduced complementary feeding at the age of 5-6 months of children.

Table 4.10 Breastfeeding and its practices

Breastfeeding	Percent
Early initiation (within 1 hour)	65.48%
Exclusive (breast milk up to 6 months)	55.75%
Extended (continue up to 2 years or more)	46.90%

Child having weight less than 2.5 kg was 9.74%, more than 2.5 kg was 71.68% and 18.58% of mother reported as they did not know to exact weight of children during the birth as shown in table.

Table 4.11 Weight of child at birth

Weight of child at birth	Percent
Less than 2.5 kg	9.74%
More than 2.25 kg	71.68%
Don't know	18.58%

97.34% of children were received vitamin A and albendazole where as 2.66% of children were unable to receive it. Main reason about that was mother did not about intake of vitamin A and de worming tablet. Similarly 99.11% of children were immunized properly and remaining 0.89% of children were not.

4.12 Mother's education on malnutrition

Only 22.12% of mothers were known about the balance diet and most (77.88%) of the women did not know about the cause of malnutrition.

4.13 Salt

From this study, we found that 96.46% of house used iodized salt and remaining 3.54% were used non-iodized salt.

Most of the mother 76.10% did not know importance of iodized salt. 11.50% of people thought that it helps to prevent from goiter. Similarly 10.62% used it for the physical development and 1.76% for the purpose of mental development.

Table 4.12 Concept about importance of iodized salt

Why iodized salt is required?	Percent
Goiter	11.50%
Physical development	10.62%
Mental development	1.76%
Don't know	76.10%

4.14 Junk food consumption

93.81% children of meche community used to consume junk food. 77.00% used to consume daily and 16.18% consume sometimes only. 6.19% children didn't consume junk food.

4.15 Types of Birth

78.76% of children had natural birth where as 21.24% of children had birth by surgery.

4.16 Nutrition of mother

68.14% of female were marriage after the age of 20 years and 31.86% got early marriage or before 20.

Percentage of women consuming IFA during pregnancy was found to be 92.03% and rest 7.97% of women were found that they did not consume IFA during pregnancy.

When we asked to the women if pregnant and lactating mother need extra food, among them 65.49% of women consumed additional foods whereas 34.51% women did not consumed additional foods during pregnant and lactation period. Extra additional foods like Fruits, meat and meat products, green leafy vegetable, milk, legumes and grains.

Consumption of alcohol and smoking during pregnancy was found to be 6.20% and 4.42% respectively.

4.17 Mortality

The under-five child mortality due to disease or malnutrition was not found on that community in past 1 year.

4.18 24 hour recall

Same pattern of eating habit was found among all surveyed children of that community. Following dietary pattern has been found while observing 1 week recall.

Breakfast

Tea or milk with biscuits or rice or rice flakes or noodles biscuits was given.

Lunch

Rice, daal and vegetable but usually did not use green leafy vegetable like Rayo and Lafa. They used to consume meat, mostly pork.

<u>Tea time</u>

Tea with biscuits, Rice, roti, rice flakes and School children usually used fast food or junk food

<u>Dinner</u>

Same pattern as lunch

Discussion

Malnutrition is a major problem among under five in Nepal, contributing to significant morbidity and mortality in this group. Our data from Jhapa reveals that the prevalence of moderate malnutrition among under-five is less than that reported in all of Nepal.

The Nepal Health Demography Health Survey 2011 report estimated that 41% were stunting, 11% were wasting and 29% of children were underweight. In the current study, the prevalence of stunting, wasting and underweight in the surveyed was found to be 23.01%, 7.97% and 12.38% respectively. The prevalence of stunting is (23.01%) which is indicator of chronic malnutrition has been found to be less than the national data. Similarly, wasting which is indicator of acute malnutrition has been found to be 7.97% which is also less than the national prevalence whereas, underweight which is indicator of both chronic and acute malnutrition was found to be 12.38% which is also found to be less than national prevalence.

The data shows that prevalence of stunting, wasting and underweight was found to be less than the national data. Although, prevalence exists in under-five children of Meche community which may be occur due to non-exclusive breastfeeding, inappropriate complementary feeding, long term exposure of malnutrition and disease starting before the birth.

Most of the families were involved in agricultural work and senior male family member was outside of country as abroad labor in gulf country. Economic status of some family was poor i.e. they had low income. This ultimately can create the vicious cycle of poverty and malnutrition. Better educational status and economic status help to break the malnutrition cycle.

19.47% of children were found having health problem like fever, diarrhea, common cold, jaundice etc. Parent's education is positively related to the better nutritional status of children. There were 72.56% of people had knowledge of causes of disease. 68.14% of people thought that disease causes due to the lack of hygiene and sanitation and 44.25% of people thought due to germs or dirt as main cause of diseases. Similarly 14.16 % of people said disease also causes from lack of balance diet, 0.89% believed on ghost and also

2.65 % believed on due to curse of god. Many studies have shown that mother's education had significant relation with malnutrition. Mother's level of education generally has inverse relationship with stunting, underweight and wasting level (MOHP, 2012).Educational status of mothers was good but most (83.19%) of the women did not know about the causes and prevention of malnutrition and about balance diet which may be one of the major causes of malnutrition among children.

Hand pump water was used as main source of water and most of the family (70.80%) was used purified water for drinking purpose. There was no problem regarding the water source. The entire household had access to the good water source. The vast majority of households in Nepal (88.5%) have access to good source of drinking water. A study in Ethiopia found that those children whose family used drinking water from unprotected source were 3 times more likely to have malnutrition as compared to those children whose family use drinking water from protected source (Bantamen *et. al*., 2014). Meche children were safe from the water borne diseases and water was not the major factor that was causing malnutrition in children.

Disposal of waste product was found good but still 18.58% of household were not use any method of waste disposal or thrown haphazardly around the house which contains many germs and causes the different types of disease and personal hygiene of village site children were poor. Poor hygiene and sanitation was one of the factors of malnutrition among the children.

100% of mother breast fed their child during the time of lactation. Similar pattern was seen on National survey (MOHP, 2012) but only 65.48% of mothers were breastfed her child within one hour after birth. Similarly 55.75% percentage of women were exclusive breastfeeding their child and 97.03sss% of mother continue feeding her breast milk at the age of 2 years or more than 2 years. Lack of appropriate breastfeeding and complementary feeding practices are main causes of under nutrition. Inappropriate breastfeeding and complementary feeding practices can also initiate the problem of overweight and obesity that may only become most apparent in children beyond the age of 2 years. So this factor was also major factor of malnutrition.

PART V

Conclusion and recommendations

5.1   Conclusion

The aims of this study were to assess the nutritional status of children aged 6-59 months in, meche community of Jhapa district. The results of this study indicate that under nutrition is an important problem among under-five children in meche community. Following points can be concluded from the study.

1. The prevalence rate of stunting, wasting and underweight were 23.01%, 7.97% and 12.38% respectively. Among these prevalence of stunting is higher than underweight and wasting.
2. The factors that affect the stunting may be the nutritional status of mother and the diseases like common cold and fever occurring frequently among some children and among the children whose family had lower income.
3. The results of present study will be useful for policy makers in their endeavor to formulate various development and health care programs.
4. This study point out the need of making a comprehensive, integrated and multi – sectorial plan for addressing the problem of malnutrition in long term

5.2   Recommendation

1. More than 80% brain development will be in golden 1000 days i.e. within 2 years; early initiation breastfeeding and exclusive breastfeeding rate were still poor. So to improve the nutritional status, child should be breastfeed properly.
2. Health and nutrition education should be done by using different media i.e. radio, leaflets, mass media etc. It is helped these activities could lead to a good health and nutrition condition of the children.
3. Stunting rate was found in high percentage than underweight and wasting. So programs improve the women's nutritional status are required.
4. Most of the parents were found giving their children junk food and other less nutritious food. Instant of that they should be encouraged to provide nutritious and balance diet to their children.

5. Education level of mothers against the nutrition and disease was very poor. Education and poverty cause the vicious cycle of malnutrition. To beak this cycle this generation children should be educated properly.

6. Some of the women believed on traditional healer to treatment of many dieses. Malnutrition and other related dieses are can't by prevented by this so illness child should be checked in nearest health post or hospital.

7. There is the need for intervening nutritional and health education to the parents as educated parents are most likely to provide better care in terms of healthy eating behavior and thus good nutrition and better hygiene practices which in turn improve the nutritional status of their children

8. To improve the nutritional status proper nutritional education, improved the maternal nutritional status, maintained proper hygiene and sanitation should be done. proper balance diet should be provided during pregnant and lactating mother as well as to the children.

Part VI

Summary

The current study was a cross-sectional study undertaken to assess the nutritional status of under five aged children of Meche community in Jhapa district. 113 children were selected from random sampling. Anthropometric measurements were performed and a semi-structured questionnaire was used to collect the necessary information. WHO Anthro 3.2.2 version and SPSS 20 version were used for data collection.

According to the WHO z-score classification of malnutrition, the prevalence of stunting, wasting and underweight were 23.01 %, 7.97% and 12.38 % respectively where stunting is higher and other two are low compared to the national prevalence rate of Nepal according to NDHS 2011. The factors determining the nutritional status like family details, mother's education, occupation, water supply, sanitation and hygiene , toilet facilities and waste disposal, source of fuel, diseases and its occurrences, prevention, breastfeeding practices, malnutrition, feeding pattern were studied.

49.45% of family lives in nuclear family and 50.55% of family living in combine manner. Most of the mothers were educated. 1.77% were literate, 51.33 % had completed secondary level, 26.55% primary level, 17.7% higher secondary or above and only 2.65% of mothers were illiterate. Most (45.13%) of family's members were involved in agriculture. Similarly 38.05% were outside country as foreign employment, 7.08% involved in services, 6.2% were involved in business and 3.54% involved in labor.

15.93% of people used tap water as water sources, 11.50% used spring water and 72.57% were used hand pump water. 70.80% of household were used to found purifying water for drinking purpose (23.01% by boiling and 47.79% by filtration) where as 29.20% were not purifying for consumption. All the people were found washing hand before meal, after toilet, after cleaning baby's stool, after the use of dirt and before the preparation of meal. To wash the hands, 82.30% of people used soap water, 17.70% by water only.

All of the houses had toilet facilities. 88.50 % household had modern toilet where as 11.50% had traditional toilet. In terms of waste disposal, 34.52% of households used pit to bury wastes, 38.05% of house incinerated waste product, 8.85% of household use container van of municipality to dispose waste product and 18.58% threw hapazardly. 72.56% of

people had knowledge of causes of disease.64.14% of people thought that disease causes due to the lack of hygiene and sanitation also 44.25% of people thought due to germs or dirt as main cause of diseases. Similarly 14.16% of people said disease also causes from lack of balance diet. 2.65% believed on due to curse of god and 0.89 % believed on ghost.

100% of mother breast fed their child during the time of lactation but only 65.48% of mothers were breastfed her child within one hour after birth. Similarly, 24.78% of breast fed after one hour and 9.73% of women reported as they did not know exactly the time of breastfeeding after birth.78.76% children's had natural birth, 21.24% had birth by surgery. Junk food consumption was high, 77.00% used to consume regularly, 16.81% consume sometimes where as 6.19% told that they did not consume junk food.

Thus the result obtained from this dissertation can be used by the government as well as other organizations for eradicating the malnutrition problem and motivate the people residing there to try to improve their existing poor nutritional status which can be done by improving dietary pattern of the under-five children.

References

Beghin, I., Cap, M., & Dujardin, B. (1988). "A Guide to Nutritional Assessment". Geneva. World Health Organization. p. 63

Blakely, T., Hales, S., & Woodward, A. (2004). Poverty: assessing the distribution of health risks by socioeconomic position at national and local levels. (Vol. No. 10). Geneva: World Health Organization: vii.

Gibson, Rosalind S. Nutritional assessment : a laboratory manual

Jelliffe, D. B. (1996). The Assessment of Nutritional Status of community. Geneva: WHO monograph expert committee on Nutrition

Kandala N. B., Madungu, T. P., Emina, J. B. O., Nzita, K. P. D. and Cappuccio, F. P. Malnutrition among children under the age of five in the democratic republic of Congo [Report]. - [s.l.] : BMC Public Health, 2011. - pp. 1-15.
Katawal S.B. Nutritional status of children in Nepal [Report]. - 1995.

MoHP, New ERA, & ICF International Inc. (2012). *Nepal Demographic and Health Survey 2011*. Calverton, Maryland: 163.

Molina, H. (2012). Review of Health and Nutrition Indicators in Early Childhood: UNESCO: 4-5, 8 and 23.

Nepal demographic and health survey 2011 [Journal]. - [s.l.] : Ministry of Health and population, 2011.

PC Joshi Malnutrition in children [Book]. - [s.l.] : Health Prospect, 2012. - pp. 61-62.

Raja Lakshmi, R. (1990). Applied Nutrition (pp. 354-355): Oxford and IBH publishing company

Save the Children, & S. G. N. C. D. (2000). Bringing up Child in a Changing World-Who's Right? Who's Right's: 15-17.

Swaminathan M. Essential of food and Nutrition [Book]. - 2 : Vol. 1 : pp. 142-476.

Srilaxmi, B, Dietetics, New Age International (P) Limited, 4th edition, 2002

UNICEF. (2009). Tracking Progress on Child and Maternal Nutrition; A Survival and Development Priority: 5-23.

UNICEF. (2011). Infant and Young Child Feeding. New York: 1.

UNICEF. (2015). Retrieved from http://www.unicef.org/

UNDP (2012) Human Development Index http:/www.undp.org/

WHO et. Al. (1983). Nutrition Essentials: A Guide for Health Managers: 2.

WHO. (2007). Indicators for assesing infant and young child feeding practices: conclusion of a consensus meeting . Washington D.C., USA:1-5.

WHO (2015).Retrieved from http://www.who.int/nutritiongrowthdb/index 4.html

Appendices

Map

Questionnaire

<u>परिचय</u>

घरमुलिको नाम..

ठेगाना..

बच्चाको आमाको नाम...उमेर......

उत्तरदाताको नाम.............................लिङ्ग.........उमेर......

पारिवारिक विवरण

प्र.नं.	प्रश्नहरू (कोडिङ्ग का साथ)
१.	परिवारको प्रकार १.एकल २. संयुक्त
२.	परिवार संख्या.. ५ वर्ष भन्दा मुनिको बच्चाको सङ्ख्या......................
३.	शिक्षा आमा :- १. निरक्षर २. प्राथमिक ३. मा.वि. ४.उ.मा.वि. वा सो भन्दा माथि
४.	घरको मुख्य आम्दानीको स्रोत के हो ? १.कृषि २. सेवा ३. व्यापार ४.मजदुरी ६. वैदेशिक रोजगार
५.	तपाईंको घरको आम्दानीले घर परिवार चलाउन पुग्छ कि पुग्दैन ? ०.पुग्दैन १.पुग्छ

व्यक्तिगत तथा वातावरणीय स्वास्थ्य

प्र.नं.	प्रश्नहरू (कोडिङ्ग का साथ)
१.	पिउने पानीको स्रोत के हो? १. धारा २. कुवा ३. अन्य
२.	पिउने पानी शुद्धिकरण गर्नु हुन्छ कि हुदैन ? ०. गर्दिन १.गर्छु यदि गर्नु हुन्छ भने कुन विधि प्रयोग गर्नु हुन्छ ? १. उमालेर २. फिल्टर गरेर (छानेर) ३. रसायनिक पदार्थ मिसाएर (औषधी) ४. घाममा राखेर
३.	तपाईको घरमा कस्तो प्रकारको चर्पि छ ? १. आधुनिक २. परम्परागत
४.	फोहोर व्यवस्थापन कसरी गर्नुहुन्छ ? १. खाल्डोमा २. जलाएर ३.जथाभावी
५.	तपाई कुन-कुन बेला हात धुनुहुन्छ ?बहु उत्तर आउन सक्छ १. खाना खानु/खुवाउनु अघि २. दिसा गरेपछि ३.बच्चाको दिसा सफा गरेपछि ४.खाना तयार गर्नु अघि ५. अन्य (खुलाउनुहोस्).........................
६.	हात धुन के प्रयोग गर्नुहुन्छ ? १. पानी मात्र २. साबुन पानी ३. खरानी पानी
७.	घरमा खाना पकाउने इन्धन के छ ? १. दाउरा २. गोवर ग्यास ३. सिलिण्डर ४. अन्य

45

रोग सम्वन्धि ज्ञान/ विचार धारणा :

प्र.नं.	प्रश्नहरू (कोडिङ्ग का साथ)
१.	तपाईको विचारमा रोग कसरी लाग्छ ? (बहुउत्तर आउनसक्छ) ०.थाहा छैन १. रोगका कीटाणुले /फोहोरले २. सरसफाईको कमी ३.देवी देवताको श्रापले ४.पूर्वजन्मको पापको कारणले ५. भुतप्रेत को कारणले ६. अन्य (खुलाउनुहोस्)
२.	रोग लाग्न नदिन के गर्नु पर्ला ? १. सरसफाई गर्नु पर्छ २. सन्तुलित खाना खाने ३. खोप लगाउनु पर्छ ४. भगवान खुशी पार्नु पर्छ ५. अन्य (खुलाउनुहा
३.	तपाई अथवा परिवार बिरामी पर्दा उपचारको लागि सर्वप्रथम कहाँ जाने गर्नुहुन्छ? ०. कहिं पनि जान्न १. नजिकको स्वास्थ्य संस्था २. औषधि पस ३. धामी झाक्री ४.अन्य (खुलाउनुहोस्) …… यदि कहि नलगेको खण्डमा के कारणले ? १. आर्थिक स्थितिको कमजोरी २. अविश्वास ३. अज्ञानता ४.अन्य…………………
४.	तपाईको कुनै बच्चाको ५ वर्ष भन्दा कम उमेरमा मृत्यु भएको थियो ? ०. थिएन १. थियो

46

पोषण तथा स्तनपान सम्बन्धि

प्र.नं.	प्रश्नहरू (कोडिङ्ग का साथ)
१.	जङ्क फुड बच्चालाइ कतिको दिनुहुन्छ ? (१) दिन्छु (२) दिन्नँ (३) अलिअलि दिन्छु
२.	बच्चालाई आफ्नो विगौति दुध खुवाउनु भयो ? ०. खुवाइन १. खुवाए २.सम्झना छैन यदि खुवाउनु भयो भने जन्मेको कति समयभित्र खुवाउनु भयो ? १. घण्टा भित्र २. घण्टा पछि
३.	तपाईले आफ्नो बच्चालाई जन्मेको कत्ति महिना सम्म दुध मात्र खुवाउनु भयो १. ६ महिना सम्म २. ६ महिना भन्दा कमउमेरसम्म
४.	तपाई बच्चालाई आफ्नो दूध कति उमेरसम्म खुवाउनु हुन्छ /भयो ? १.६ महिना २. १ वर्ष ३. २ वर्ष वा सो भन्दा माथि
५.	तपाईले आफ्नो बच्चालाई जन्मेको कत्ति महिना पछि ठोस/झोल खानेकुरा खुवाउनु भयो ? ……………………………
६.	तपाईको बच्चा जन्मिदा उसको तौल कति थियो ? १. २.५केजी भन्दा कम २. २.५ केजी भन्दा बढी ३. थाहा छै
७.	सन्तुलन भोजन भनेको थाहा छ ? ०. छैन १.छ

प्र.नं.	
५.	के तपाईले कुपोषण (रुन्चे/सुकेनास) को बारेमा सुन्नुभएको छ/थाहा छ ? ०. छैन १. छ यदि थाहा छ भने यसका कारणहरु के-के हुन् ? १. सन्तुलित भोजनको कमीले २. भगवानको श्रापले ३. कसैको आँखा लागेर ४.अन्य
९.	तपाईले बच्चालाई भिटामिन ए र जुकाको औषधि खुवाउनु भयो ? ०. खुवाइन १. खुवाए यदि नखुवाएको भए किन ? १. थाहा नभएर २. उमेर नपुगेर ३. समय नभएर
१०.	तपाईले आफ्नो घरमा खानको लागी कुन नुन प्रयोग गर्नु हुन्छ ? १.२ बालबालिकाको चिन्ह भएको प्याकेटको २. ढिक्के नुन यदि आयोडिनयुक्त नुन खानु हुन्छ भने थियो किन आवश्यक छ ? १.गलगाँडबाट बाच्न २. शारीरिक विकासको लागि ३. मानसिक विकासको लागि ४.अन्य

मातृस्वास्थ्य र नवजात शिशुको स्याहार सम्बन्धि

प्र.नं.	प्रश्नहरू (कोडिङ्ग का साथ)
१.	बच्चाको जन्म कस्तो प्रकारको हो ? (१) प्राकृतिक (२) सल्यक्रिया गरी
२.	तपाई पहिलोपटक कति उमेरमा गर्भवती हुनुभएको थियो ?……………………

३.	गर्भवती अवस्थामा आइरन चक्की खानुभयो ? ०. खाइन १.खाए

४.	गर्भवती अवस्थामा पहिलाको भन्दा बढी खानेकुरा खानुभयो कि भएन ?
	
	           ०. खाइन १. खाए
	
	  यदि खानेकुरा खानुभयो भने के कस्ता खानेकुरा खानुभयो ? ....

५.	गर्भवती अवस्थामा धुम्रपान ∕ मद्यपान गर्नुभएको थियो ? ०.गरिन १. धुम्रपान २. मद्यपान
६.	बच्चालाई सम्पुर्ण खोप लगाउनुभयो ? ०. लगाएको छैन १.लगाए२. केहि

७.	विगत २ हप्तामा तपाईंको बच्चालाई कुनै स्वास्थ्य सम्बन्धि समस्या छ ?
	
	        ०.छैन १. छ
	
	यदि छ भने कस्तो समस्या छ ?
	
	    १.खोकी २. पखाला ३.निमोनिया ४.वरो ५.जन्डिस ६.अन्य

८.	बच्चालाई झाडापखाला भएको बेलामा आफ्नो दूध वा तरल पदार्थ कतिको खुवाउनुहुन्छ ? १.सधैं भन्दा बढी २. सधैं जस्तो ३. सधैंभन्दा कम

<u>२४ घण्टामा खाएको खानेकुराहरु</u>

खाना खाएको समय (६ बजे बिहान देखि अर्को दिनको ६ बजे बिहान सम्म)	खानाको परिकारहरु

<u>बच्चाको नापतौल</u>

नाम...   लिङ्ग ....   जन्म मिति (उमेर)................**............**

तौल(kg)..................................   उचाई(cm):.....................

MUAC(cm)..............................Edema :क) छ   ख) छैन

Informed consent

INFORMED CONSENT

Date:………………..

Namaste!

I Mr.Modnath Paudyal, graduate student in Department of Nutrition and Dietetics conducting a dissertation work for award of bachelor's degree in Nutrition and Dietetics.

The topic for the study **'NUTRITIONAL STATUS OF 6-59 MONTHS OF CHILDREN IN MECHE COMMUNITY OF JHAPA DISTRICT, NEPAL'**

I have been told in a language that I understand about the study. I have been told that this is for a dissertation procedure, that my and my son/daughter's participation is voluntary and he/she reserve the full right to withdraw from the study at my own initiative at any time without having to give reason and that refresh to participate or withdraw from the study at any stage will not prejudice my/his/her rights and welfare. Confidentiality will be maintained and only be shared for academic purposes.

I hereby give consent to participate in the above study. I am also aware that I can withdraw this consent at any later date, if I wish to. This consent form being signed voluntarily indicates participate in the study until I decide otherwise. I understand that I will receive a signed and dated copy of this form.

I have signed this consent forms before my participation in the study.

Signature of parent/guardian: _____   Sign of witness: _____

I hereby state the study procedures were explained in the detail and all questions were fully and clearly answered to the above mentioned participant /his/her relative.

Investigator's sign:………………

Contact address:…………………

केन्द्रीय प्रविधि क्याम्पस

हात्तिसार, धरान

पोषण तथा आहार विज्ञान, चौथो वर्ष

मन्जुरीनामा

नमस्कार,

मेरो नाम मोदनाथ पौडेल हो । म केन्द्रीय प्रविधि क्याम्पस, धरानमा पोषण तथा आहारा विज्ञान, चौथो वर्ष अध्ययनरत् विद्यार्थी हुँ । यस संकायको चौथो वर्षको पाठ्यक्रम अन्तर्गत म शोधपत्र गरिरहेको छु । मेरो शोधपत्रको विषय 'झापा जिल्लामा रहेको मेचे समुदायका १२ देखि ५९ महिनासम्मका बालबालिकाहरुको पोषण स्थितिको अध्ययन' रहेको छ । यो अध्ययनको उद्देश्य यस क्षेत्रका बालबालिकाको पोषण स्थितिका बारे जानकारी संकलन गर्नु रहेको छ । यो जानकारीले हाम्रो अध्ययनलाई सहज बनाई हामीलाई सहयोग गर्नेछ र यसले यस जिल्लाको पोषण स्थितिलाई सुधारका लागि पनि मद्दत गर्न सक्नेछ ।

तपाईको छोरा ⁄ छोरी यस अध्ययनका लागि छानिनु भएको छ र म तपाईलाई यस सर्वेक्षणका प्रश्नहरु गर्नेछु र साथै तपाईको बच्चाको केही विवरणहरु लिनेछु । यो सर्वेक्षणले तपाईको बच्चाको पोषण स्थिति बारे थाहा हुनेछ र बच्चालाई पोषणसम्बन्धी विशेष हेरचाह आवश्यक पर्ने वा नपर्ने पनि थहा पाउनसक्नुहुनेछ । अध्ययनका केही प्रश्नहरु नितान्त व्यक्तिगत पनि हुन सक्दछन् तर तपाईले दिनुभएको सबै जनकारीहरु महत्वपूर्ण हुनेछन् र सो जानकारीहरु एकदमै गोप्य राखिनेछ । साथै तपाईले दिनुभएको सूचना तथा तथ्याङ्कको दुरुपयोग गरिनेछैन । यो अध्ययनमा तपाईको सहभागिता स्वेच्छिक हुनेछ । यदि तपाईलाई कुनै वा सबै प्रश्न व्यक्तिगत तथा संवेदनशील लागेमा उत्तर नदिन पनि सक्नुहुनेछ तर म आशा गर्दछु कि तपाई यस अध्ययनमा सहभागी हुनुहुनेछ ।

के तपाई यस अध्ययनमा सहभागी हुन इच्छुक हुनुहुन्छ ? (इच्छुक भए मात्र प्रश्न गर्ने नभए अन्तर्वार्तामै टुङ्ग्याउने) ।

म यस अध्ययनमा सहभागी हुन इच्छुक छु र यस अध्ययनका लागि आवश्यक पर्ने मेरो बालबच्चाको विवरण लिन अनुमित दिन्छु ।

…………………………   …………………………………

अध्ययनमा छानिएको बच्चाको अभिभावकको   सर्वेक्षण गर्नेका सही

सही ⁄ औंठा छाप

सर्वेक्षण गरेको मिति : ....

Photo gallery