

**FACTORS ASSOCIATED WITH NUTRITIONAL STATUS OF 6-59
MONTHS OF CHILDREN IN ATHPAHARIYA COMMUNITY OF
DHANKUTA DISTRICT, NEPAL**

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**Factors Associated with Nutritional Status of 6-59 Months of Children in
Athpahariya Community of Dhankuta District, Nepal**

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degree of B.Sc. Nutrition and Dietetics*

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Approval Letter

*This dissertation entitled **Factors Associated with Nutritional Status of 6-59 Months of Children in Athpahariya Community of Dhankuta District, Nepal** presented by Chandramani Poudel has been accepted as the partial fulfillment of the requirement for the B.Sc. degree in Nutrition and Dietetics*

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Abstract

This study was conducted in Athpahariya community of Dhankuta district, Nepal to assess the nutritional status and its determinant factors among under-five children. This study was based on the assumption that prevalence of malnutrition is less than national data. A prospective study was carried out in one hundred and nineteen under-five children were systematically selected from simple random sampling technique. Qualitative and quantitative data were collected using a pre-tested, semi-structured questionnaire and analyzed by using SPSS version 20 and WHO Anthro software to obtain information on subject socio-demographics status, hygiene practices, breastfeeding practices and child nutrition, child disease and nutritional education.

The prevalence of stunted, wasted and underweight children was 32.77%, 5.04%, and 6.72% respectively. The length /height, weight and age were plotted on WHO centiles curves. The malnutrition were graded according to WHO classification all children had MUAC greater than 124 mm and no cases were observed on clinical symptoms of Protein Energy Malnutrition (PEM). Early initiation and exclusive breastfeeding rate were found 65.55% and 57.14% respectively. Child disease ($p<0.05$) and belief on traditional healer ($p<0.05$) during illness of child were significantly associated with wasting, type of the family ($p<0.05$) was significantly associated with under-weight and exclusive breastfeeding ($p<0.05$) was significantly associated with stunting. The result shows that more nutrition education is needed on the part of the mothers so that the poor nutritional status of the children can be improved, to ensure healthy living for both mothers and their children.

Keywords: Athpahariya, Nutritional status, Wasting, underweight, stunting

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List of abbreviation

Abbreviation	Full form
HAZ	Height for Age Z-score
IFA	Iron and folic acid
MoPH	Ministry of Health and Population
MUAC	Mid Upper Arm Circumference
NDHS	Nepal Demographic Health Survey
PEM	Protein Energy Malnutrition
SD	Standard deviation
UNICEF	United Nation International Children Emergency Fund
VDC	Village Development Committee
WAZ	Weight for Age Z-score
WHZ	Weight for Height Z-score

Part I

Introduction

1.1 Background

Nepal demographic health survey reported that 41% of children under five years were stunted, 11% wasted and 29% underweight. Several factors were noted to contribute towards malnutrition- for example, socio-economic factors, mother's literacy, acute illnesses, age of the child (Sah N, Determinants of child malnutrition in Nepal). Social problems such as poverty, skewed land distribution and food insecurity are some of the underlying factors which cause malnutrition. World Health Organization (WHO) data from 2011 report the prevalence of moderate and severe malnutrition to be 29.8% and 8.5% respectively, among boys under five in Nepal. Moderate and severe stunting among Nepali boys who are under five were reported to be 41.3% and 16.8% respectively, and that among girls were 39.5% and 15.8% respectively.

Nepal with the total population of 26,494,504 with annual population growth rate as 1.35% and 65.9% is among the least developed countries and that has become the contributing factor for the high prevalence of malnutrition in Nepal. Developing of country like Nepal is a kind of difficult job due to its tedious geographical distribution. Hence, educating for eradication of malnutrition has also been difficult. However, scenario is being changed. (NDHS, 2011) Nutritional status of children is primarily concerned with the conditions that affect children at various stages in their growth and development (Katawal, 1989). Nutritional status depends on several factors e.g. income, food production, literacy, socio-cultural, environmental sanitation etc. (Nabarro, 1984) and holds causal relationship between malnutrition, mortality, morbidity and health (Rao, 1987).

Malnutrition is a major factor in the massive morbidity and mortality of children throughout the world. Among the many groups vulnerable to malnutrition, children are the most important ones because they are powerless, saving their life is more valuable than saving life of an older person, there are well developed means for assessing the nutritional status of children on an inexpensive and objective basis, and children's malnutrition is a massive problem all around the world (Kent, 1993).

1.2 Statement of the problem

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.

Because of topographic extremity, life is difficult in Dhankuta district. Thus, Children in this district are suffering from the extreme nutritional problem. Their nutrition Status directly affects the health status of the country. The factors behind the poor nutritional status and the under-five mortality rate are needs to be identified to support the Athpahariya community to improve their nutritional status and decrease the under-five mortality rate.

Athpaharyya community is one of the oldest community of Nepal which is sub group of Rai.whose habitant is in Dhankuta. They have their own language, own customs and rituals. They are different from other Rai. Athpahariya Rai is socially economically and educationally backward, they are social excluded groups (Mohan Rai, 2007). This community registered an organization called Kirant Athpahariya Samaj. There is no mention of this group in official records like Central Bureau of Statistics and District Profiles. Since, these people have their own tradition and dialect, For instance, no work has been done on community nutritional status of 6-59 month of children ,dietary habit, nutritional knowledge, food believe etc. that are intimately related to food security, food vulnerability and health status of the people.

According to Athpahariya Samaj and district profile,their economic condition is still poor so that there is lack of accessibility for foods consumption and health facilities. Most of them are illiterate and uneducated so, they are not much aware of food habits and the nutrition. Their hygiene and sanitation behavior are still not improved so their children are more susceptible to the various communicable diseases.

1.3 Objectives of the study

1.3.1 General objective

The general objective of this work is to determine the factors associated with nutritional status of 6-59 months of children in Athpahariya community of Dhankuta district, Nepal.

1.3.2 Specific objective

- a. To assess the nutritional status of children aged 6-59 months of Athpahariya community of dhankuta district.
- b. To assess determinant factors that directly or indirectly responsible for malnutrition.
- c. To suggest appropriate corrective measures.

1.4 Significance of the study

The significance of the study to:

- a. Provide the information of nutritional status to the governmental and non-governmental organization which will be helpful to initiate corrective measures of the problem
- b. Encourage concerned authorities for the proper nutrition planning and implementation of nutrition program effectively.
- c. Reflect the sanitary condition, degree of malnutrition and condition of mothers and child.
- d. The identification of the factors that may contribute to the occurrence of the condition of under nutrition among under-five children in Dhankuta may help in the creation of intervention strategies aimed at addressing those factors and in improving the nutritional status of the under-five population.

1.5 Limitation of the study

The limitations of the study are:

- a. Anthropometric method was used to determine the nutritional status of the children.
- b. Others method like biochemical test, clinical examination and dietary assessment methods were not done.
- c. All variables included in questionnaire were not discussed in result since their relationships with nutritional status were not found significant.

1.6 Hypothesis

The study will be based on the assumptions that prevalence of malnutrition in under-five children is less than the national data (NDHS 2011).

1.7 Research question

- a. What is the nutritional status of 6-59 months of children in Athpahariya community of dhankuta district?
- b. What are the different factors that associated with nutritional status of under five children?

1.8 Conceptual framework

The literature repeatedly shows that malnutrition is caused by a combination of factors, such as low income, illiteracy, an unhealthy environment, unsatisfactory health services, inadequate food habits, low agricultural productivity, etc., and that all these factors affect each other differently according to the particular situation. (Beghin, 1988) For this thesis I have chosen UNICEF framework.

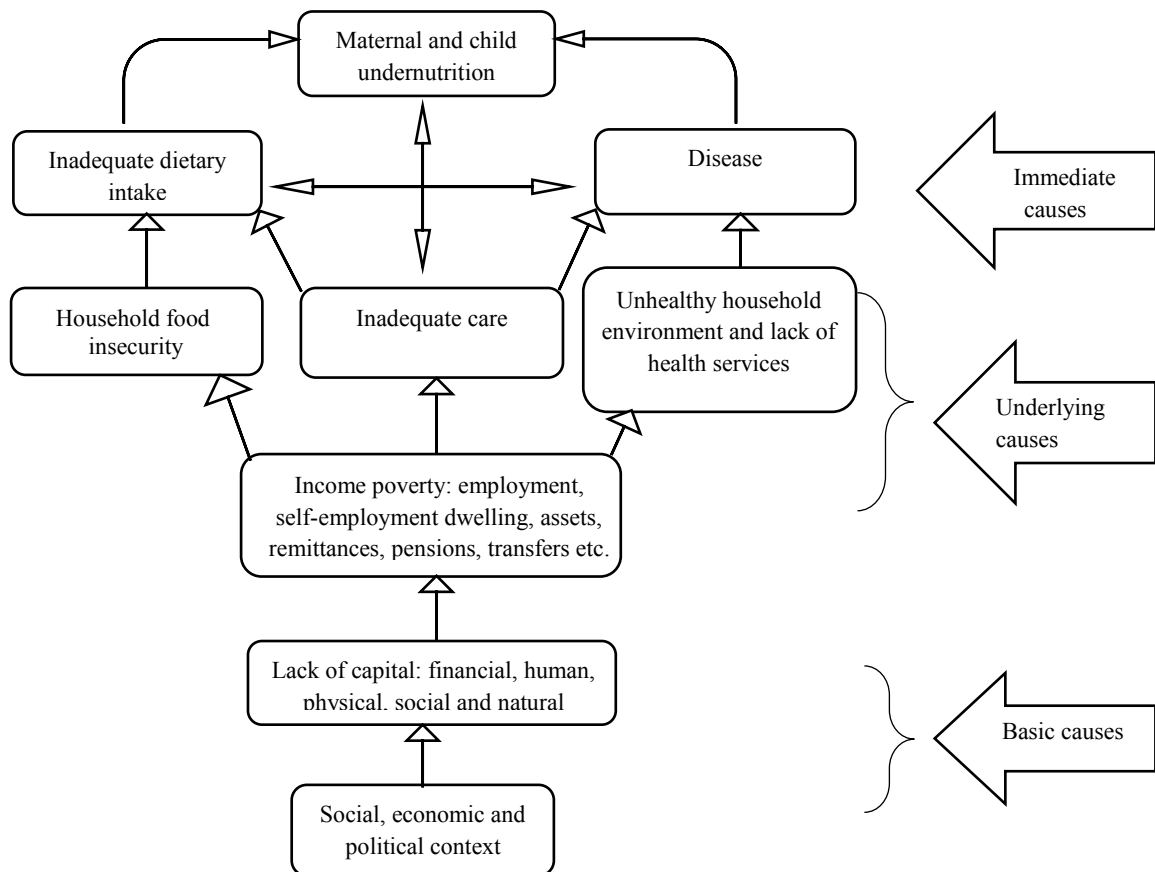


Fig.1.1 UNICEF Conceptual Framework (UNICEF,2015)

The above figure can be divided into following parts:

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

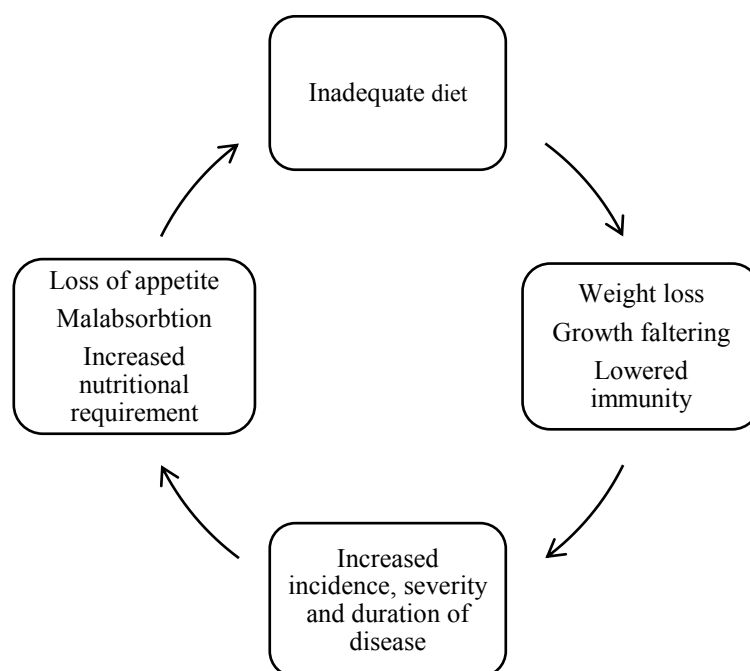


Fig.1.2 Poverty-malnutrition cycle (UNICEF, 2015)

- The level of interaction depends on the infection and the extent of under-nutrition but in general, poor nutrition can result in reduced immunity to infection
- This can increase the likelihood of an individual getting an infection or increase its duration and/or severity.
- Infection can result in loss of appetite, increased nutrient requirements and/or 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.

2. 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. They 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 a 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.

3. Basic causes: The third level of factor contributing the under-nutrition identified by the conceptual framework is considered basic causes. These refer to what resources are available (human, structural, financial,) and how they are used (the 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).

Part II

Literature Review

2.1 Nutrition

Nutrition is science that examines the relationship between diet and health. In Nutrition, the diet is the sum of food consumed by a person or other organism. Dietary habits are the habitual decision an individual or culture makes when choosing what food to eat. Although humans are omnivores, each culture holds some food preferences and some food taboos. Individual dietary choices may be more or less healthy. Proper nutrition requires the proper indigestion and equally important, the absorption of vitamins, minerals and fuel in the food of carbohydrates, proteins and fats. Dietary habit and choices play a significant role in health and mortality and can also define cultures and play a role in religion (Lieberman S, bruning N,1990).

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).

2.2 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). Both direct and indirect method can be helpful in the details assessment of nutritional condition particular community or groups.

2.2.1 Factor Affecting nutritional status

A number of factors affect acceptability and utilization of food such as availability, cultural practices, economic condition, familiarity, taste and knowledge about health (Bhatta *et al.*, 1998).

The factor affecting nutritional status are, mother's food security, types of food given to the young children, feeding frequency, poverty, illiteracy, ignorance to the child for care and feeding, status of woman and child nutrition and last but not the least who feed the child and how the child eat (NMIS, 1996). Also factor influencing the nutritional status are food availability and its distribution system, consumption, income and purchasing power, price of commodities, illiteracy, family size, socio-culture and religious belief, environmental sanitation, health facility etc (Bocobo, 1988). Some of them are given below:

- i. Inadequate dietary intake: - This can mean both macro nutrients (fat, protein, carbohydrate) and micro nutrients (vitamins and minerals). Though insufficient macro nutrient intake has serious implications for health and well-being, micro nutrients also play large role in immune function (Bhatta *et al.*, 1998).
- ii. Impact on immune function: - Insufficient macro nutrient intake can result in growth stunting (in children) as well as weight loss. Micro nutrients such as vitamin A, zinc and a large number of others are essential to a number of immune responses, and deficiency can lead to suppressed immunity, which in term increases risk of acquiring infection. In addition, in adequate dietary intake can also weaken immune response through changes in mucus membranes of the body (Bhatta *et al.*, 1998).
- iii. Infection: - Once immune function is lowered, it may lead to infectious disease. Malnutrition not only affects the occurrences infectious diseases, it can also increase the severity of illness, and the length of time they are experienced (Bhatta *et al.*, 1998).
- iv. Poverty: - At a micro-level, child malnutrition is related to poverty, but at the macro Community level poverty does not appear to be strongly related to child malnutrition in

many cases. Other actors are equally important. One of these is related to the intra-household use of resources such as the time management and knowledge of the main caregiver, who is usually the mother (Bocobo, 1988). For example, how much time is allocated to feeding, caring and ensuring a healthy environment for children?

2.3 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 41% stunted, 11% wasted and 29% underweight respectively. Similarly in Eastern Development Region, the percent of the children below 5 years of age who are stunted, wasted and underweight are 37%, 11% and 30% respectively and the percentage for the terai region, Nepal is 37%, 10% and 25 % respectively (NDHS, 2011).

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 (Jelliffe, 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., 20011)

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).

2.4.1 Classification of malnutrition

Malnutrition in children can take the form of stunting, wasting, or underweight (Mahgoub, Nnyepi & Bandeke 2006:2). Children whose weight-for-age indicator is more than two or three standard deviations below the median for the international reference population (ages 0-59 months) are considered moderately or severely underweight (WHO website 2011b). Children whose height/length-for-age indicator is more than two or three standard deviations below the median for the international reference population (ages 0-59 months) are considered moderately or severely stunted (World Bank website 2011). Children whose weight-for-height/length indicator is more than two or three standard deviations below the median for the international reference population (ages 0-59 months) are considered moderately or severely wasted (Botswana Ministry of Health & UNICEF 2008:2).

2.4.2 Causes of malnutrition

Malnutrition during childhood is as a result of a wide range of factors, most of which relate to unsatisfactory food intake or severe and repeated infections, or a combinations of the two. The most frequently suggested causes of malnutrition are: poverty, low parental education, lack of sanitation, low food intake, diarrhea and other infections, poor feeding practices, family size, short birth intervals, maternal time availability, child rearing practices and seasonality. There are also economic, social, and cultural causes of malnutrition which underscore the close link between malnutrition (Jelliffe, D. B. 1996).

2.4.3 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; Das et al., 2008; Ubesie and Ibeziakor, 2012)

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:

2.4.3.1 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).

2.4.3.2 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 wasting of muscle mass and of subcutaneous fat, shrunken eyeball, depressed cheeks, and ribs becomes prominent, dry and atrophic skin, etc.(Swaminathan, 2000).

2.4.3.3 Marasmic- kwashiorkor

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

2.5 Breastfeeding

According to WHO, breastfeeding is the normal way of providing young infants with the nutrients they need for healthy growth and development. WHO and UNICEF(2003) recommend that infants be exclusively breastfed for the first 6 months of life and thereafter receive adequate complementary foods in addition to continued breastfeeding until 2 years of age or beyond. Appropriate complementary feeding is critical for the achievement of healthy growth and development and mere survival of young children.

Under nutrition is responsible for at least 35% of under-5 deaths. It is also a direct cause of mortality, and a major disabler preventing children who survive to reach their full developmental potential. An estimated 32% of children less than 5 years of age in developing countries are stunted and 10% are wasted. 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. Many countries suffer from the double burden of both types of malnutrition (Anil Kumar Sah, 2011)

High rates of exclusive breastfeeding during the first 6 months of life and continued breastfeeding with complementary feeding can potentially prevent 13% and 6% respectively of under-5 deaths each year. Recently, increasing emphasis has been placed on exclusive breastfeeding for infants up to 6 months of age as an important factor for child survival, growth and development. However, continued breastfeeding is also very critical to improve feeding in children 6-23 months of age, as breast milk is an important source of energy and nutrients in the child's diet and has numerous other beneficial effects (Anil Kumar Sah, 2011).

2.6 Measurement of nutritional status

2.6.1 Direct method

2.6.1.1 Anthropometric assessment

It is the physical measurement of the human body and is commonly used to estimate the nutritional status of children, Anthropometry measures have been extensively used for identification of children from protein-energy malnutrition. Different anthropometric measurements are combined as ratios or indices such as height-for-age, weight-for-height and weight-for-age.

2.6.1.1.1 Height-for-age (H/A)

H/A is an indicator of past or chronic malnutrition. H/A cannot be used to measure short term changes in malnutrition. Deficits in L/A or H/A are signs of stunting. Stunting usually results from extended periods of inadequate food intake, diseases or a combination of both, especially during the periods of greatest growth for children when the slowing of skeletal

growth results in reduced stature or length. Stunting begins in utero; therefore, pre-pregnancy health and nutritional status of women and the nutrition and health of mothers during pregnancy is critical. Stunting is a result of a process over time; most of the damage occurs before two years of age. Emphasis should be on prevention.

2.6.1.1.2 Weight-for-height (W/H)

W/H helps to identify children suffering from current acute malnutrition. It is used to examine short term effects, i.e. recent rapid weight loss associated with a period of starvation and/or severe diseases.

Wasting results from weight falling significantly below the weight expected of a child of the same length or height. Wasting indicates current/acute malnutrition resulting from feeding practices, disease and infection, or, more frequently, a combination of these factors. Wasting in individual children and population groups can change rapidly and shows marked seasonal patterns associated with changes in food availability or disease prevalence.

2.6.1.1.3 Weight-for-age (W/A)

It is a composite measure of stunting and wasting. Low weight-for-age identifies the condition of being underweight at a specific age. W/A may reflect both past (chronic) and present (acute) under nutrition; however, it is unable to distinguish between the two.

2.6.1.1.4 Mid-upper arm circumference

The mid-upper arm circumference does not need to be related to any other anthropometric measurement. It is a reliable indicator of the muscular status of the child and is mainly used to identify children with a risk of mortality. The MUAC is taken for every child, but is an indicator of malnutrition only for children equal or taller than 65 cm (Smith, 2013). 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). WHO classified the acute malnutrition on the basis of mid-upper arm circumference as shown in table 2.1.

Table 2.1 WHO (2009) MUAC cut-off points for children of age 6-59 months

WHO recommended cut-off	Classification
> 135 mm	Normal
125-135 mm	At risk of malnutrition
115-124 mm	Moderate malnutrition
<115 mm	Severe malnutrition

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

Clinical examination is the most essential part of all nutritional survey, since the ultimate objective is to assess levels of health of individuals or of population groups in relation to the food they consume. Numerous functional or structural manifestations are known to be associated with state of malnutrition. They are assessed in the course of clinical examination with or without instrument aid (Darby et al., 1953).

2.6.1.3.1 Edema

Bilateral pitting edema is a sign of Kwashiorkor, one of the major clinical forms of severe acute malnutrition. When associated with Marasmus (severe wasting), it is called marasmic-kwashiorkor. Children with bilateral edema are automatically categorized as being severely malnourished, regardless of their weight-for-height index, and referred immediately to the nearest center (Smith, 2013). 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).

2.6.1.4 Dietary evaluation methods

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

2.6.2 Indirect methods

2.6.2.1 Ecological information

The nutritional status of an individual or community is affected by socioeconomic (family size, occupation, per capita income, population density, education, customs and social habits) and ecological factors (agricultural crop production, food balance sheet, health and educational services). Therefore these parameters are likely to serve useful indirect indicators. (Raja Lakshmi ,1987)

2.6.2.2 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.

2.7 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:

$$\text{Z-score (or SD-score)} = (\text{observed value} - \text{median value of the reference population}) / \text{standard deviation value of reference population}$$

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 ages 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, 2015).

2.8 Description of the research site

Dhankuta is a hilly district with geographic coordinates 26° 53'N to 27° 19'N and 87° 8'E to 87° 33'E and elevation in the range 305-2135m. It consists of 1 municipality and 28 village development committee (VDC).

According to the survey conducted in 2061 B.S. by Jointed venture between HUSADEC, Nepal and Athpahariya Kirat Rai Samaj, Dhankuta; the total population of Athpahariya was 7405 and the total households was 1442 (Khatiwada, Shambhu; 2004) whereas according to households survey conducted in 2063 B.S.; Dhankuta municipality alone covers 820 households (Diwas, Tulasi, 2066 B.S.).

The Athpahariya group is confined to ward no. 4, 5, 7, 8, 9, 10, 11 and 14 of Dhankuta municipality. The area of the study has confined in Dhankuta municipality specially wards no. 8 and 9 within where significant number of Athpahariya reside and others wards 4, 5 and 7 were also included.

2.9 Literature review from previous studies

In the Nepal demographic and health survey, 41% of children under-five years of age were stunted, 11% were wasted, and 29% are underweight. Breastfeeding was nearly universal in Nepal, and half of the children born in the three years before the survey were breastfed

for about 34 months or longer. 70% of children less than age 6 months were exclusively breastfed, and the median duration of exclusive breastfeeding was 4.2 months. Complementary foods were not introduced in a timely fashion for all children. 70% of breastfed children had been given complementary foods by age 6-9 months. Overall, only one-fourth of children age 6-23 months were fed appropriately based on recommended infant and young child feeding (IYCF) practices. Infant mortality was 67 deaths per 1,000 live births and under-five mortality is 76 deaths per 1,000 live births. 94.87% household did not have toilet which is much more than national data where 40% rural household did not have toilet. More than 95% of households were using iodized salt (MOHP, 2012).

In far western district Kanchanpur Nepal 21.8% of under five year children were severely stunted, 25% moderately stunted, 9.1% were moderately and 1.4% was severely wasted, 28% were moderately underweight and 9.7% were severely underweight. In a study done in under five children in Padampur VDC chitwan Nepal, the prevalence of stunting, wasting and underweight was found to be 22.7%, 37.3% and 25.7% respectively (Ruwali D, 2010).

A cross-sectional study conducted in Belahara VDC of Dhankuta district in Nepal located in South Asia, the prevalence of underweight, stunting and wasting were 27%, 37% and 11%, respectively (Sapkota VP, Gurung CK, 2008). In Nghean Vietnam, 31.8% were underweight, 44.3% were stunting and 11.9% were wasting. Region of residence, the mother's level of education and occupation, household size, number of children in the family, weight at birth and duration of exclusive breastfeeding were found to be significantly related to malnutrition. Similar research was conducted in Eastern Cape and KwaZulu-Natal Provinces, Prevalence of wasting, underweight and stunting was 3.4%, 7.3% and 28.6% respectively (Prof. C.M. Smuts, 2009).

Part III

Methodology

3.1 Research design

In this study both quantitative and qualitative method were used. Community based cross sectional study was done to study nutritional status among the under five children of Athpahariya community of dhankuta district, Nepal.

Data collection was carried out by our team. We were well trained on standardized procedure for conducting interview and performing anthropometry. All standardization and field work was conducted under the direction and supervision of my guide teacher.

3.2 Study population

Target population of this study was 6-59 months age of Athpahariya community of dhankuta district and interview taken from mothers.

3.2.1 Inclusion criteria

Children who are 6-59 month old and belong to Athpahariya 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

3.2.2 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.

3.3 Sampling techniques and sample size determination

3.3.1 Sample size

Underweight does not distinguish between stunting and wasting and therefore it was used as the index for calculating the sample size for this study. According to JNHRC Vol.7 No.2 Issue (Sapkota VP, Gurung CK) 15 Oct 2009, Prevalence of underweight, stunting and wasting of Belahara VDC was 27.3%, 37% and 11% respectively. So, sample size is calculated on the basis of underweight.

The calculation of the sample size will be done by using the statistical formula,

$$\text{Sample size } (n_o) = z^2 \times p(1-p) / d^2$$

Where, n_o = required sample size

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

p = estimated prevalence of malnutrition in project area

d = margin of error at 8% (standard value of 0.08)

$$= 1.96^2 \times 0.273(1-0.273) / 0.08^2$$

$$= 119.13$$

$$= 119 \text{ children}$$

3.3.2 Sampling procedure

Simple random sampling was used to select the different wards (4, 5, 7, 8, 9, 10, 11 and 14). Out of these 4, 5, 7, 8 and 9 wards were selected by simple random sampling. Ethical approval was taken from District Health Office and Dhankuta Municipality to the survey. Data collection was done from household survey and from school.

3.4 Research instruments

- a. Weighing machine (1 piece) – To measure the weight of children
- b. Stadiometer (1 piece) – To measure height or length of children
- c. MUAC tape (1 piece) – To measure mid upper arm circumference
- d. Structured questionnaire – To collect qualitative data

3.5 Pre testing of data collection tools -

The questionnaire was pre-tested for accuracy and clarity prior to the main study on a selected from mothers of selected 15 children aged 6-59 months. Similarly, equipment were also tested from 15 school children. Since fault was not found on the equipment and they were confirmed for the actual survey.

3.6 Validity and reliability

3.6.1 Validity

To ascertain validity of the data collected, the questionnaires to be used were pre-tested. The clarity of information was ascertained to be containing only the information that was

required for the purposes of the study on the 15 mothers. Anthropometric data were collected using weighing machine, stadiometer and MUAC tape which were validated by a group of professionals from Central Campus of Technology, department of Nutrition and Dietetics. Pre-tested ascertain the degree of both the intra and inter observer error. Standardization was done on data collected.

3.6.2 Reliability

Test-retest method was used to test consistency in producing the same results. 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. Questionnaire will be checked daily for completeness, consistency and clarity as mentioned earlier.

3.7 Data analysis

The anthropometric data was analyzed by WHO Anthro v3.2.2. Other qualitative and quantitative data were analyzed by SPSS20.

3.8 Study variables

The dependent variable for this study was the nutrition status of children 6-59 months old. Nutritional status of children less than six months of age was not established in this study since it is not standard practice to measure nutritional status of this age of children since they are not at high risk of developing under-nutrition because of the protection provided by breastfeeding. WHO growth Standards does not provide protocol for assessing anthropometric indices for this age category. The nutrition status was based on weight for height/length (wasting), weight for age (underweight), height/length for age indices (stunting), and presence/absence of edema. Independent variable included Socio-economic and demographic variables (family size, income, occupation, education), Child characteristics (Age, sex, breastfeeding status, mortality and morbidity status), health care practices (deworming, health seeking behavior, vitamin A supplementation, immunization), Maternal characteristics (age at first child, intake of additional food intake during pregnant and lactation) and Environmental health condition (water supply, sanitation).

Part IV

Results and discussion

4.1 Nutritional status

The analysis of the three anthropometric indices height-for-age, weight-for -age and weight-for-height revealed that 32.77%, 6.72% and 5.04% of the total 119 children included in the survey were found to be stunted, underweight and wasted, respectively.

4.1.1 Weight for height (wasting)

Wasting indicate the short term exposure of malnutrition. Distribution of weight-for-height Z-score curve comparing with WHO standards 2006 as shown in figure 4.1.

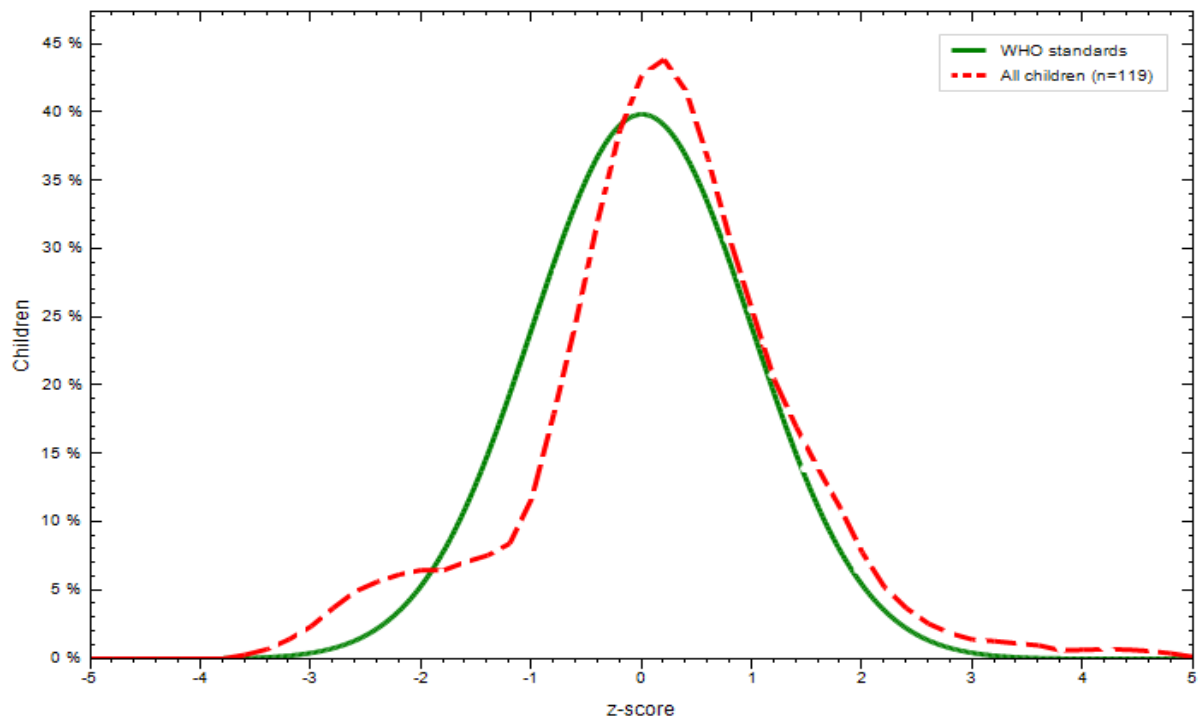


Fig.4.1. Distribution of weight-for-height Z-score curve comparing with WHO standards 2006

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 most of the children in the population were normal. The mean of the sample is at -0.17 Z-scores, and the Standard Deviation (SD) is 1.13. The SD is within the interval of -2.93 and 4.22, which shows a normal distributed population.

According to Z-score classification system, classification of acute malnutrition as shown in table 4.1.

Table 4.1 Z-score for weight for height

WHZ	Frequency	Percent
<-2	6	5.04%
-2 - <-1	7	5.88%
-1 - <0	36	30.25%
0-<1	43	36.14%
1 - <2	21	17.65%
>2	6	5.04%
Total	119	100%

According to weight-for-height Z-score, 5.04% were below -2SD i.e. moderately wasted, 5.88% were below -1SD to -2SD, 30.25% were below 0 to -1SD, 36.14% were below 1SD to 0, 17.65% were below 2SD to 1SD, and 5.04% below 3SD to 2SD as shown in table 4.1

We found that 5.04% of children were wasted. Acute malnutrition occurs within short period of time. This may be due to suffering from different type of disease like diarrhea, jaundice, common cold, fever etc. to the children and untimely or less intake of food than requirement. In overall, personal hygiene and sanitary condition of the rural site households were poor so that different germs may attract to the child and caused the diseases. Similar type of cross sectional study conducted in Belahara VDC of Dhankuta district where prevalence of wasting was 11% and other same type of research found the 3.4% of child were wasted in Eastern Cape and KwaZulu. Nepal Health Demographic Health Survey 2011 reported that 11% of under-five children were wasted.

4.1.1.1 Factors associated with Weight for height

There are different variable out of these only child disease and traditional belief during child illness were significantly associated with wasting as shown in table 4.2

Table 4.2 Factors associated with Weight for height (wasting)

Variables	Weight for height class		χ ² value	P- value	
	Wasting	Normal			
Gender	Male	3	60	0.022	0.603
	Female	3	53		
Family type	Nuclear	4	56	0.667	0.348
	Joint	2	57		
Mother's education	Illiterate	0	5	0.523	0.971
	Literate	2	30		
	Primary	3	56		
	Secondary	1	19		
Occupation	H. secondary or above	0	3	4.409	0.353
	Agriculture	2	53		
	Service	1	9		
	Business	0	6		
	Labor	1	3		
Water purification	Foreign employment	2	42	0.133	0.514
	No	2	30		
Exclusive breastfeeding	Yes	4	83	0.234	0.484
	Completely	4	64		
Disease in children	Partially	2	49	33.192	0.00*
	No dieses	0	80		
	Common cold	2	13		
	Fever	1	7		
	Jaundice	0	2		
	Diarrhoea	3	3		
	Pneumonia	0	5		
Others dieses	0	3			
Knowledge on balance diet	No	5	94	0.000	0.735
	Yes	1	19		
Believed on traditional healer	No	1	76	6.385	0.02*
	Yes	5	37		

(*Statistically significant if p <0.05)

From the table 4.2, it can be concluded that, there was no any significant association of wasting of under-five children with gender, type of family, mother education, occupation of the family, purification of water, exclusive breastfeeding and knowledge on balance

diet. However there was significant association ($p=0.000$) found with disease in children and believed on traditional healer at the time of illness of child ($p=0.020$). Personal hygiene and sanitary condition of the rural site households were poor so that different germs may attract to the child and caused the diseases. A research study conducted in India by DR. ANIL GUPTA (2014) was found significant ($p=0.001$) association of wasting with diarrhea in under five children.

4.1.2 Weight for age (underweight)

It is composite measure of stunting and wasting. It may reflect both past and present under-nutrition. Distribution of weight-for-age Z-score curve comparing with WHO standards 2006 as shown in figure 4.2.

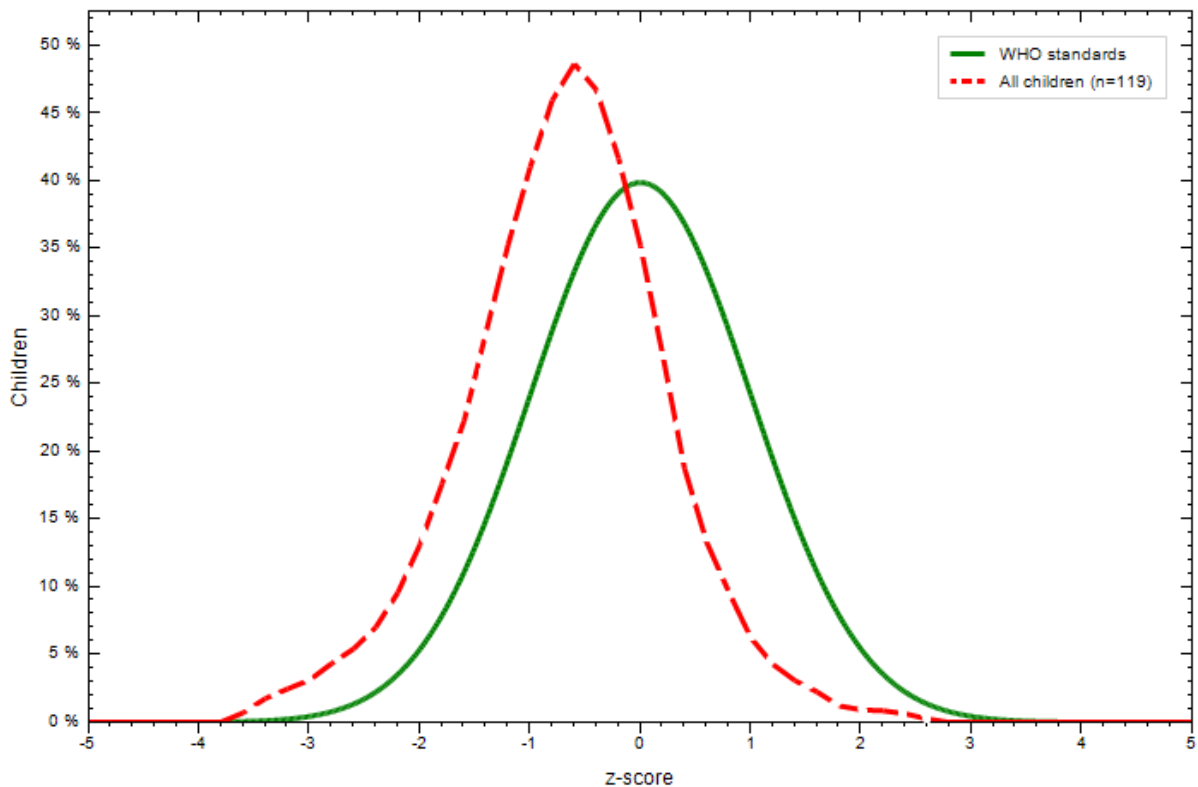


Fig.4.2. Distribution of weight-for-age Z-score curve comparing with WHO standards 2006

The displacement of the WAZ sample curve to the left side of the reference curve indicates a less than average nutritional situation in the surveyed population. The mean of the sample is at -1.41 Z-scores, and the Standard Deviation (SD) is 1.13. The SD is within the interval of -4.19 and 3.21, which shows a normal distributed population.

According to Z- Score classification system, classification of under-weight (weight for age) as shown in table 4.3.

Table 4.3 Z-score for weight for age

WAZ	Frequency	Percent
<-3	2	1.68%
3 - <-2	6	5.04%
-2 - <-1	30	25.21%
-1 - <0	57	47.90%
0-<1	19	15.97%
1 - <2	4	3.36%
>2	1	0.84%
Total	119	100%

According to weight-for-age Z-score, 1.68% were below -3SD, 5.04% were below -2SD to -3SD, 25.21% were below -1SD to -2SD, 47.90% were below 0 to -1SD, 15.97% were below 1SD to 0SD, 3.36% were below 2SD to 1SD, 0.84% were more than 2SD as shown in table 4.2

From above table, prevalence underweight of under-five Athpahariya children found to be 7.72% which is very less than national data (2011) i.e. 29%. It may due to imbalance of daily diet and no proper care of child. Same type of research conducted in Padmapur VDC of Chitawan and Belahara VDC of Dhankuta, where percentage of underweight 37.3% and 27% respectively.

4.1.2.1 Factors associated with underweight

Out of these different factors only type of family was significantly associated with underweight as shown in table 4.4.

Table 4.4 Factors associated with underweight

Variables	Weight for age class		χ ² value	P-value	
	Underweight	Normal			
Gender	Male	6	57	1.675	0.178
	Female	2	54		
Family type	Nuclear	7	53	4.717	0.032*
	Joint	1	58		
Mother's education	Illiterate	0	5	3.668	0.453
	Literate	4	28		
	Primary	2	57		
	Secondary	2	18		
Occupation	H. secondary or above	0	3	2.876	0.579
	Agriculture	3	52		
	Service	1	9		
	Business	0	6		
	Labor	1	3		
Water purification	Foreign employment	3	41	2.330	0.134
	No	4	28		
Exclusive breastfeeding	Yes	4	83	1.351	0.213
	Completely	2	65		
Disease in children	Partially	5	46	7.437	0.282
	No dieses	3	77		
	Common cold	3	12		
	Fever	1	7		
	Jaundice	0	2		
	Diarrhoea	1	5		
	Pneumonia	0	5		
Knowledge on balance diet	Others dieses	0	3	0.412	0.402
	No	6	93		
Believed on traditional healer	Yes	2	18	0.398	0.416
	No	6	71		
	Yes	2	40		

(*Statistically significant if p <0.05)

From the above table 4.4, it can be concluded that there was no significant association of underweight of under five children with gender, mother education, occupation, purification of water, exclusive breastfeeding, disease in children, knowledge on balanced diet among parents and believed on traditional healer but significantly associated($p=0.032$) with family type. This result show that underweight child found higher in nuclear families. Mainly fathers of the child were out of country and others family members were busy in their agricultural or household work. So they have less time for caring of child which affects the child health status. Similar result was found in Indian by J. Prev. Soc. Med. Vol. 43 No.3, 2012. There was significantly associated ($p < 0.05$) of underweight with type of family.

4.1.3 Height for age (stunting)

It is an indicator of past malnutrition and cannot be used to measure short term changes in malnutrition. Distribution of weight-for-age Z-score curve comparing with WHO standards 2006 as shown in figure 4.3.

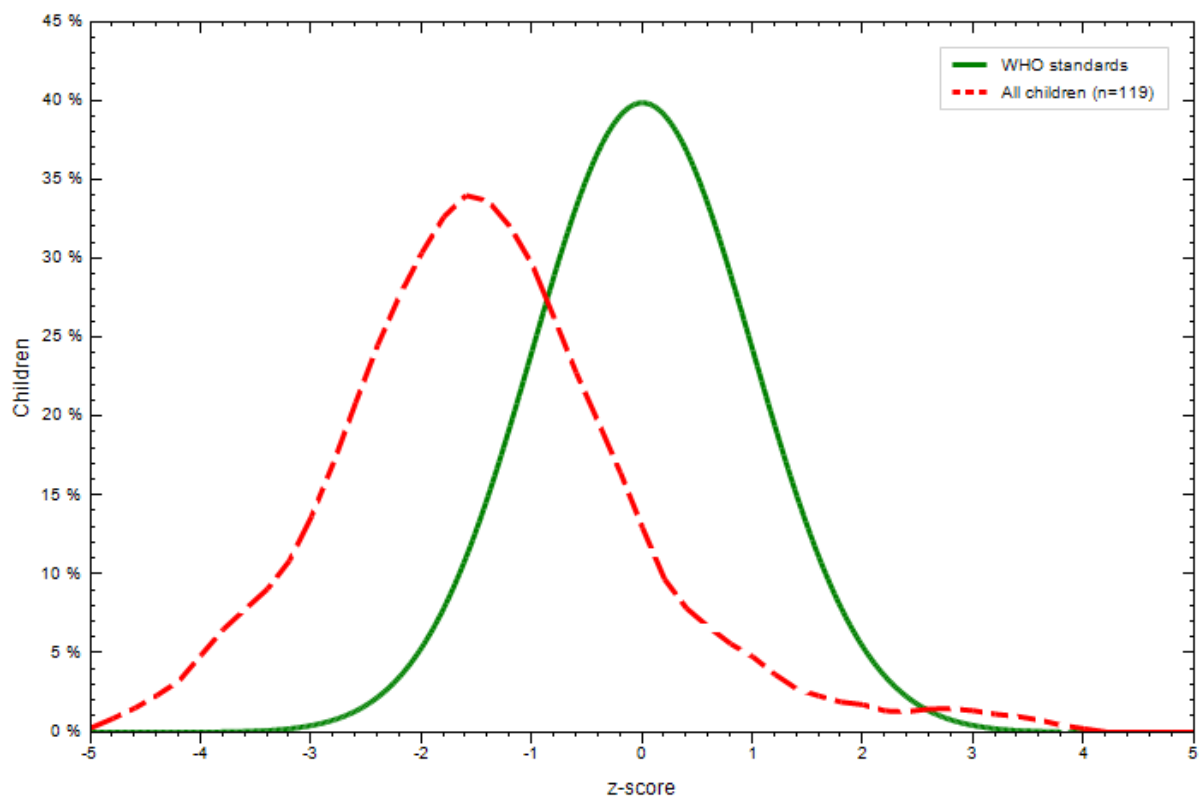


Fig. 4.3 Distribution of weight-for-age Z-score curve comparing with WHO standards 2006

The displacement of the HAZ sample curve to the left side of the reference curve indicates a less than average nutritional situation in the surveyed population. The mean of the sample is at -0.68 Z-scores, and the Standard Deviation (SD) is 0.88. The SD is within the interval of -3.13 and 2.02, which shows a normal distributed population.

According to Z-Score classification system, classification of chronic malnutrition as shown in table 4.5.

Table 4.5 Z-score for height for age

HAZ	Frequency	Percent
<-3	14	11.76%
-3- <-2	25	21.01%
-2 - <-1	40	33.62%
-1 - <0	25	21.01%
0-<1	8	6.72%
1 - <2	3	2.52%
2- <3	2	1.68%
>3	2	1.68%
Total	119	100%

According to height-for-age Z-score, 11.76% were below -3SD i.e. severely stunted, 21.01% were below -2SD to -3SD i.e. moderately stunted, 33.62% were below -1SD to -2SD, 6.72% were below 0SD to -1SD, 2.25% were below 2SD to 1SD, 1.68% was below 3SD to 2SD and 1.68% were above 3SD shown in table 4.3

We found that stunting rate of under-five children in Athpahariya community was 32.77% (male=18.49% and female=14.28%), which is slightly less than NDHS 2011 data i.e. 41%. The results of this study show that the prevalence of malnutrition in the community among the under-five-year-old children is high, which clearly confirms that malnutrition is a wide spread problem of public health. Stunting occur due to long term exposure of malnutrition and disease starting before the birth of the child i.e. with the pregnant mother. Saimilar type of result (37%) was found in previous study in Belahara VDC of Shankuta district. Same type of study done in Padmapur VDC in Chitawan where 22.7% of children were found stunted. Also same type of result was found in Eastren Cape and KwaZulu-Natal provinces i.e. 28.6%.

4.1.3.1 Factors associated with stunting

Chronic malnutrition is caused by long term exposure of malnutrition and other disease. In this study, I found that exclusive breastfeeding was significantly associated with stunting as shown in table 4.6.

Table 4.6 Factors associated with stunting

Variables	Height for age class		χ^2 value	P- Value	
	Stunting	Normal			
Gender	Male	22	41	0.280	0.370
	Female	17	39		
Family type	Nuclear	23	37	1.698	0.134
	Joint	16	43		
Mother's education	Illiterate	1	2	2.362	0.669
	Literate	2	3		
	Primary	8	24		
	Secondary	19	40		
	H. secondary or above	9	11		
Occupation	Agriculture	16	39	5.407	0.248
	Service	5	5		
	Business	0	6		
	Labor	2	2		
	Foreign employment	16	28		
Water purification	No	11	21	0.051	0.493
	Yes	28	59		
Exclusive breastfeeding	Completely	14	54	10.692	0.001*
	Partially	25	26		
Disease in children	No diseases	26	54	10.145	0.119
	Common cold	9	6		
	Fever	2	6		
	Jaundice	0	2		
	Diarrhoea	2	4		
	Pneumonia	0	5		
Knowledge on balance diet	Others diseases	0	3	0.054	0.503
	No	32	37		
Believed on traditional healer	Yes	7	13	2.367	0.090
	No	29	48		
	Yes	10	32		

(*Statistically significant if $p < 0.05$)

From the above table 4.6, it can be concluded that there was no significant association of stunting of under five children with gender, family type, mother education, occupation, purification of water, disease in children, knowledge on balanced diet among parents and believed on traditional healer but significantly associated with exclusive breastfeeding ($p=0.001$). Education status of mothers was very good but they have no nutritional knowledge so they were not completely breastfeed the child up to 6 months. A research study conducted in Kenya by Ayisi, R. K. & Wakoli, A. B. (2014) were found significant ($p=0.047$) association of stunting with exclusive breastfeeding in under five children.

4.1.4 MUAC (Mid upper arm circumference)

All children had MUAC greater than 124 mm. Most of the family had good economical status, they self-produced different types of food (include all food groups) and they feed their child properly so all children were found normal by measuring MUAC. Same type of result found in Danuwar community of Sarlahi district (Karki, A. 2015).

4.1.5 Edema

No cases with nutritional edema were found. Most of the family involved in agricultural work and produced different types of food like cereals, legumes, peas, milk and milk product, meat and other vegetables. So they consumed protein and other diet properly and children have no PEM. Same type of work done in danuwar community of Sarlahi district (Karki. A. 2015) there were also no cases were found with nutritional edema.

4.2 Socio-economic and demographic characteristics

50.42% of family livings in separate manner and 49.58% of family living in combine manner. There were mean 5.86 - 6 family members in each family. We found that minimum number of family member was 4 and the maximum number of family member was 11. The percentage of male and female children were 52.94% and 47.04% respectively. The mean age of children was 34.69 months with SD of 15.58 months. There are 49.58% were completed secondary level, 26.90% primary level, 16.80% higher secondary or above, 4.20% literate and only 2.52% of mothers were illiterate as shown in figure 4.4.

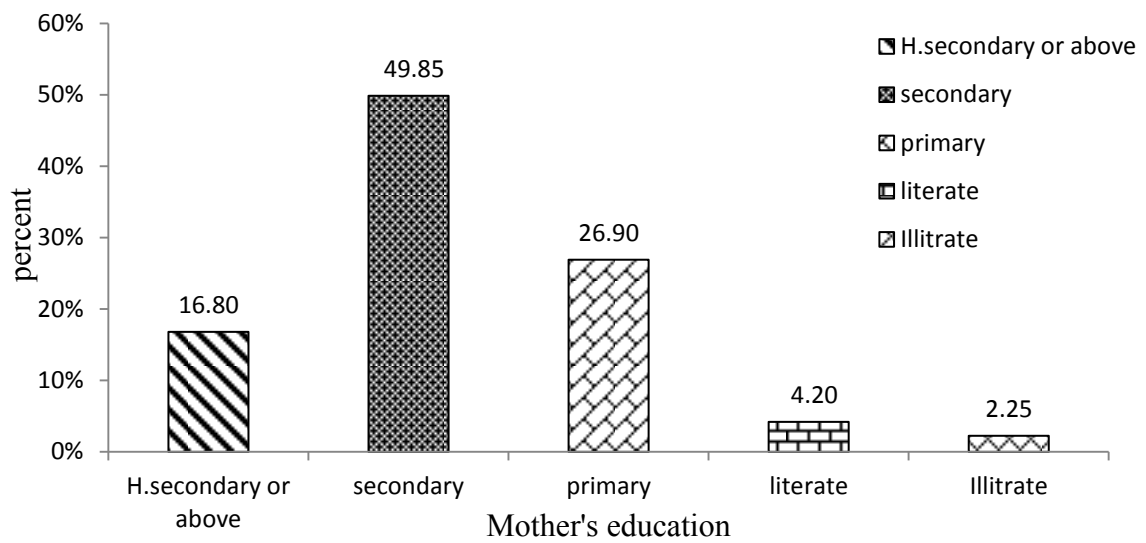


Fig 4.4 Mother's education

Most (46.22%) of family's members were involved in agricultural work. Similarly 36.97 % were outside of country as abroad labor, 8.41% involved in services, 5.04% involved in business and 3.36% involved in labor as shown in figure 4.5.

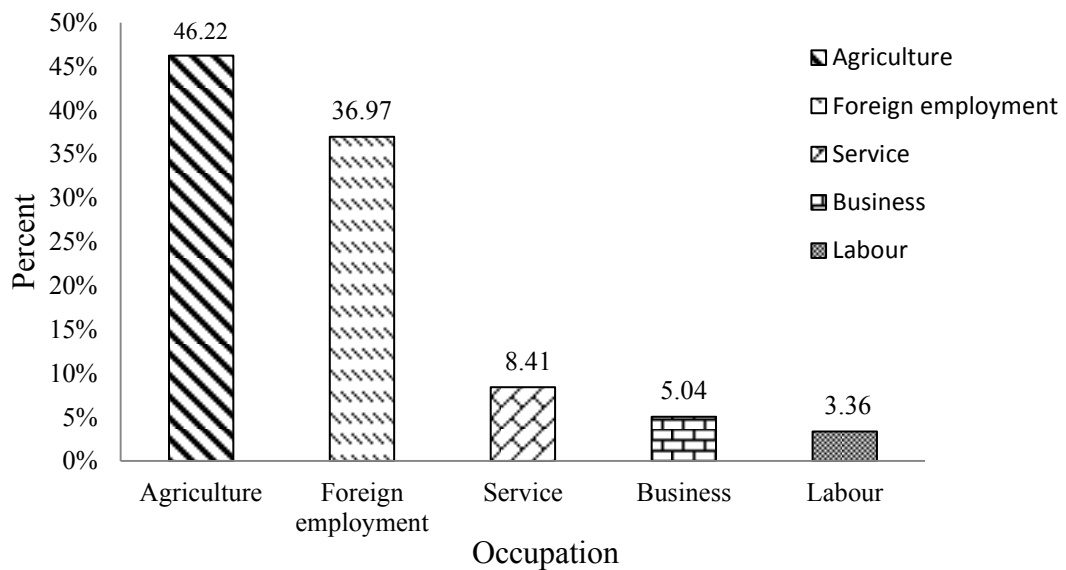


Fig 4.5 Occupation

According to Mohan Rai (2007), the literacy rate of the Dhankuta district is 71% of male and 44% of females and only 35% of parents of Athpahariya children were found literate. But this study found that literacy rate of mother was found to be higher i.e.

97.75%. Because this community mainly lived in municipality where facilities of education are good.

The main occupation of Athpahariya Rais is agriculture. The sample parents stated their main occupation is farming they grow the seasonal vegetables and sell them in market. Almost all of the Athpahariya women go to weekly haat bazaar in every Thursday and carry to sell their production, like tomato, cabbage, brinjal, pulses etc. Sometimes they visit door to door in order to sell firewood and their agricultural and non-agricultural production. Now selling fire wood is decreasing order because of two reasons there is scarcity of fire wood locally and second people use gases to cook food.

Younger male persons have gone to Malaysia, Qatar, Saudi Arab and Dubai their life standard is somewhat better than before. As a peasant they have no other source of income for supporting their day to day life. The boys and girls of Athpahariya are allotted different household works suited to their age. They helped their mother in lighting the fire, preparing food, cleaning the house and then go to the field for work. Economical status of few families were poor i.e. they had low income which was not sufficient for their expense. This ultimately can create the vicious cycle of poverty and malnutrition. Better educational status and economical status help to break the malnutrition cycle.

4.3 Personal hygiene and environment health

88.23% of people used tap water as water sources and remaining 11.77% were used well water. National Population Census 2001, overall, 53.4 per cent household in Nepal is served by piped water. Tap water located at every house and well at near to house. 73.11% (49.58% by filtration and 23.53% boiling method) of household were used to found purifying water for drinking purpose where as 26.89% 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 56.31% of mothers were not hand wash before the preparation of meal. To wash the hands, 79.83% of people used soap water, 19.23% by water only and 0.84% use ash water respectively.

All of the houses had toilet facilities. 89.92% household had modern toilet and remaining 1.08% had traditional toilet. In terms of waste disposal, 37.82% of households use to pit to bury of wastes, 35.29% of house used incinerated waste product, 18.48%

households were not use any waste disposal method of waste disposal or throw haphazardly and 8.41% of household use container van of municipality to disposed waste product. Environmental health condition around the maximum household in the rural area was poor.

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). Athpahariya children were safe from the water borne diseases and water was not the major factor that was causing malnutrition in children. Firewood was used by 92.44 % of houses and 7.56% were used cylinder gas as a source of fuel.

4.4 Diseases, its knowledge and others concepts

32.77% of children were found having health problem in previous two weeks before survey and 67.23% of children were not found not having any health related problem.

14.28% of children suffering from common cold (rugha khoki), 6.72% had fever, 4.21% had pneumonia , 3.36% had diarrhea 1.68% had jaundice, and 2.52% had some others problem as shown in figure 4.6.

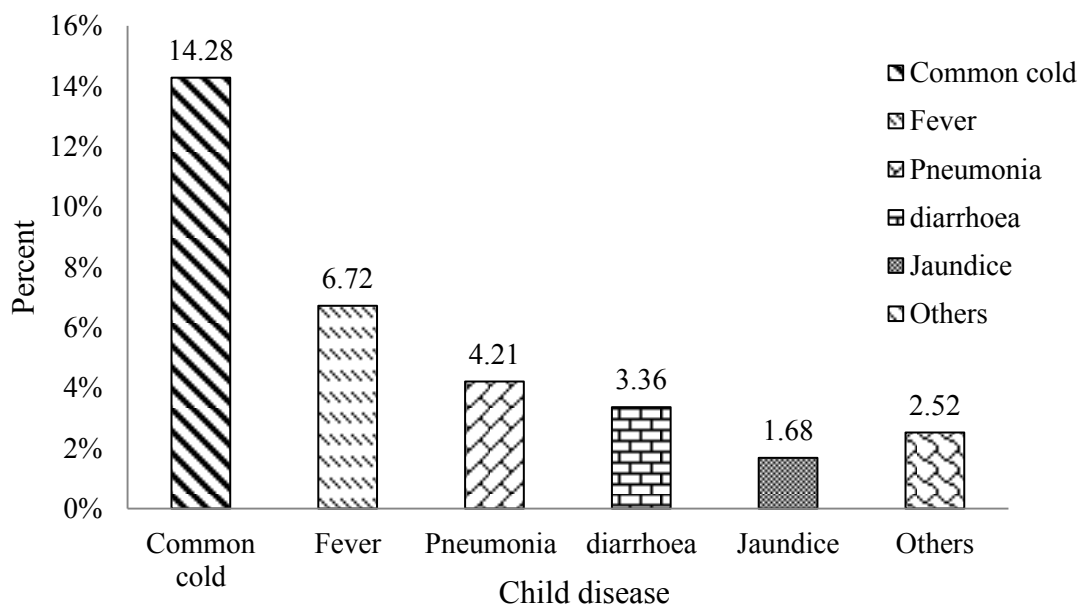


Fig 4.6 Child disease

There were only 68.91% of people had knowledge of causes of disease. 65.55% of people thought that disease causes due to the lack of hygiene and sanitation and 42.86% of

people thought due to germs or dirt as main cause of diseases. Similarly 14.28% of people said disease also causes from lack of balance diet, 2.52% believed on due to curse of god and also 1.68% believed on ghost.

There were 78.15% of people thought that disease can be prevented by cleanliness and 14.28% by balance diet, 10.93% by immunization and 0.84% of people believed that disease can be prevented by pleasing of god as shown in figure 4.7.

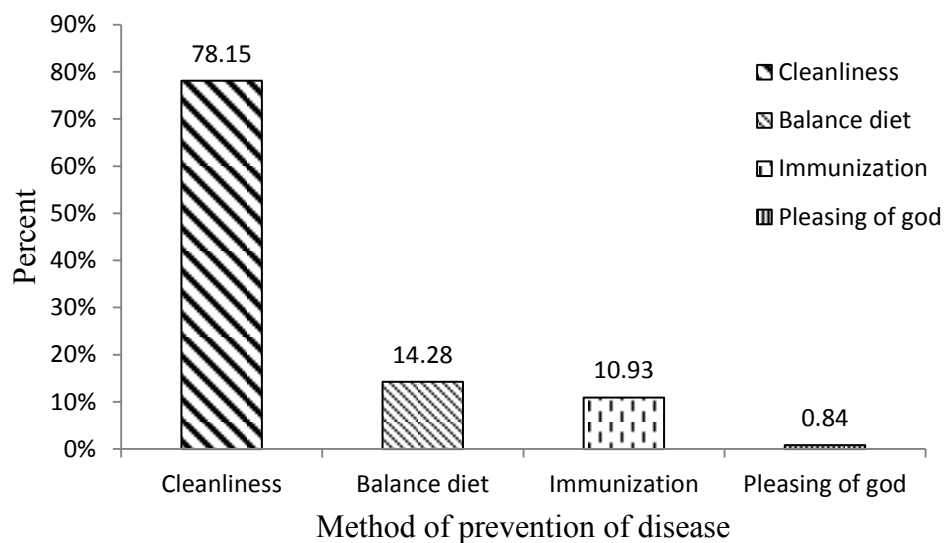


Fig 4.7 Method of prevention of disease

64.71% people went to health post or hospital and 35.29% of people treatment from traditional healer. 63.86% of children were intake of more fluid than normal intake during diarrhoea. Similarly, 34.46% were intake as usual and 1.68% consumed less than normal intake.

4.5 Breastfeeding practices and child nutrition

100% of mother breast fed their child during the time of lactation but only 65.55% of mothers were breastfed her child within one hour after birth. Similarly, 24.27% of mothers feed her breast milk after one hour and 10.08% of women reported as they did not know exactly the time of breastfeeding after birth.

The percentage of women were exclusive breastfeeding their child 57.14% completely and 42.86% partially. 97.48% of mother continue feeding her breast milk at the age of 2

years or more than 2 years as show in figure 4.8. All women introduced complementary feeding at the age of 5-6 months of children.

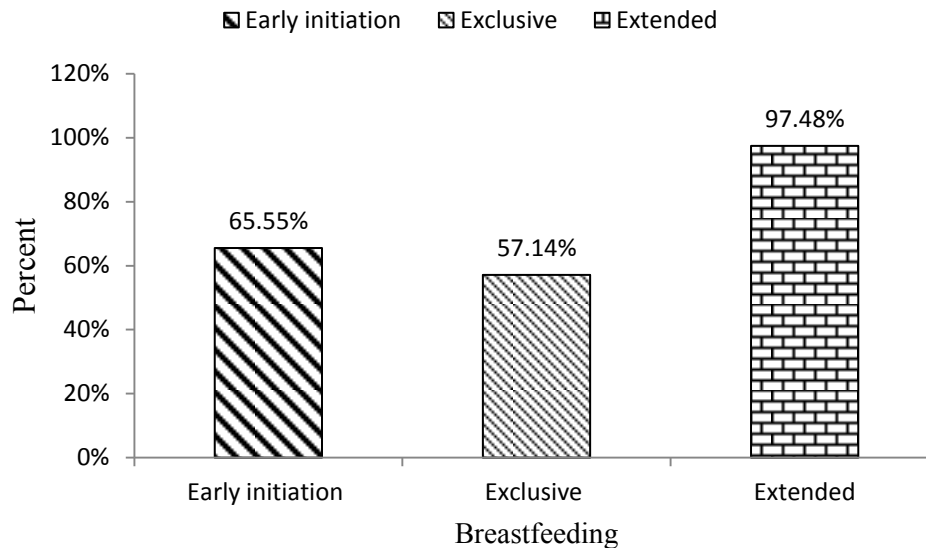


Fig 4.8 Breastfeeding

100% of mother breast fed their child during the time of lactation. Similar pattern was seen on National survey (MOHP,2012). According to NDHS 2011, percentage of early initiation and exclusive breast feeding were 45% and 70% respectively. But this study found that 65.55% of mothers were breastfed her child within one hour after birth and 57.14% percentage of women were exclusive breastfeeding their child and 97.48% 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.

Child having weight less than 2.5 kg was 10.93%, more than 2.5 kg was 71.43% and 17.64% of mother reported as they did not know ta exact weight of children during the birth as shown in figure 4.9.

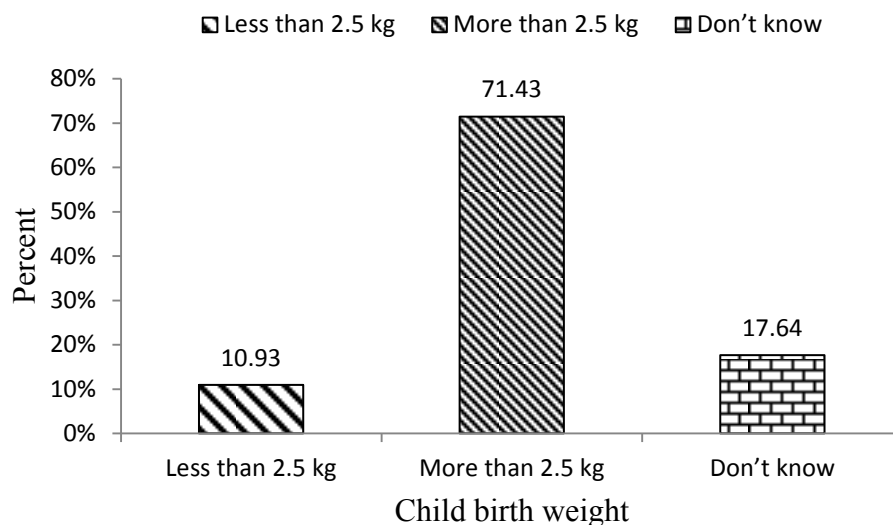


Fig 4.9 Weight of child at birth

97.48% of children were received vitamin A and Albendazole where as 2.52% of children were unable to receive it. Main reason about that was mother did not about intake of vitamin A and deworming tablet. Similarly 99.16% of children were immunized properly and reaming 0.84% was not.

Biannual Vitamin A supplementation coverage among children 6-59 months of age was at 90% in 2011, and deworming of children 12-59 months during Vitamin A days was at 84%

4.6 Mother's education on malnutrition

Only 16.81% of mothers were known about the balance diet and most (84.03%) of the women did not know about the cause of 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 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.

4.7 Salt

From this study, we found that 95.79% of household used iodized salt and remaining 4.21% were used non-iodized salt which is more than 15% of NDHS 2011(80%).

Most of the mother 77.31% did not know importance of iodized salt. 11.76% of people thought that it helps to prevent from goiter. Similarly 9.25% used it for the physical development and 1.68% for the purpose of mental development as shown in figure 4.10.

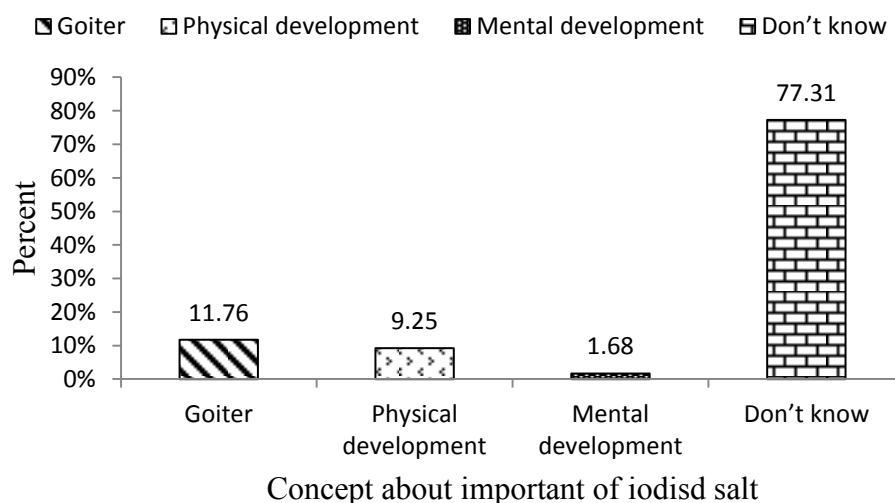


Fig 4.10 Concept about importance of iodized salt

4.8 Nutrition of mother

67.23% of female's birth the first child after the age of 20 years and 33.77% before the age of 20. According to Nepal Demographics Survey, mother's mean age at first birth was 20.1 Percentage of women consuming IFA during pregnancy was found to be 90.76% and rest 9.24% of women were found that they did not consume IFA during pregnancy. A research conducted in Baklauri VDC of sunsari district, percentage of women consuming iron tablet during pregnancy was 99.09%.

When we asked to the women if pregnant and lactating mother need extra food, among them 66.38% of women consumed additional foods whereas 33.62% 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 5.04% and 4.21% respectively.

4.9 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 24-hour recall.

Breakfast

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

Lunch

Rice, daal and vegetable but usually did not use green leafy vegetable.

Tea time

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

Dinner

Same pattern as lunch

4.10 Mortality

The under-five child mortality due to disease or malnutrition was not found on that community in past 1 year. According to Nepal Demographic Survey (2016), there were 28.9 deaths/1,000 live births.

Part V

Conclusion and recommendations

5.1 Conclusion

- a. It was found that problem of stunting, wasting and underweight were 32.77%, 5.04% and 6.72% respectively. Among these prevalence of stunting is higher than underweight and wasting.
- b. From this study, I conclude that different factors affect the nutritional status of under-five children i.e. breastfeeding was significantly associated with stunting.
- c. Child diseases in under-five children and believed on traditional healers during child illness were significantly associated with wasting.
- d. Type of the family was significant associated with under-weight.
- e. I founded that the percentage of breastfeeding within one hour was 65.55%, exclusive breastfeeding 57.14% and extended breastfeeding 97.48% respectively.
- f. Mother's education on malnutrition and balance diet found was to be poor.
- g. To improve the nutritional status and proper feeding practices, health education of mothers on breast feeding and complimentary feeding practices need to be strengthened and simple, understandable, proper nutritional messages through public health staff will be provided to the community. Behavioral change communication might be more useful than the information, education and communication method as the behavior and attitudes of the care givers affect their feeding practices.

5.2 Recommendation

- a. Similar research should be conducted on a large sample of under-five children to detect the effects of some of the factors that could not be observed by the current study.
- b. Health education should be reinforced at child welfare clinics, health facilities and, at community level to improve parents' knowledge of the recommended infant and child feeding practice
- c. Most of the parents were found giving their children junk food and other less nutritious food. Instead of that they should be encouraged to provide nutritious and balance diet to their children.
- d. Some of the women believed on traditional healer to treatment of many diseases. Malnutrition and other related diseases are can't be prevented by this, so illness child should be checked in nearest health post or hospital.
- e. Dietary assessment should be suggested for further research.

Part VI

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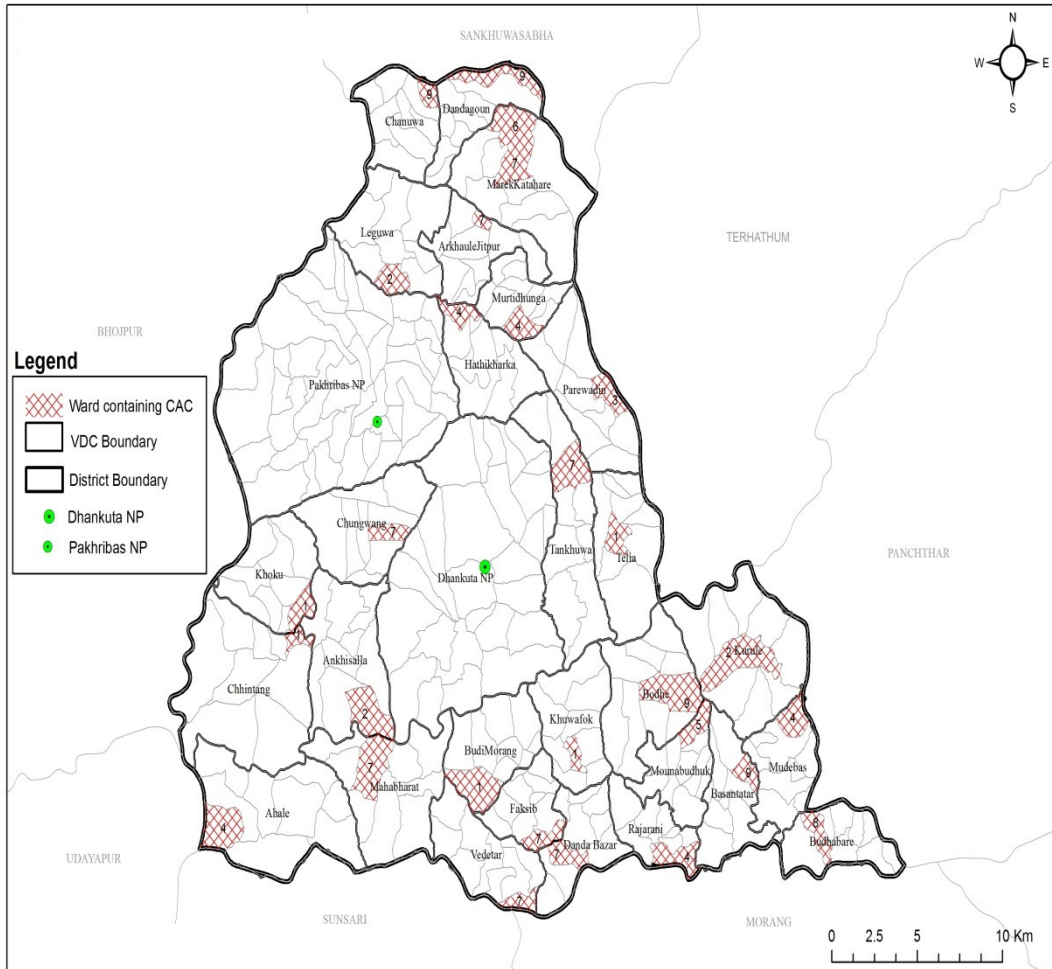
<http://umeshg.com.np/status-of-micronutrient-in-nepal/>

www.indexmundi.com/nepal/demographics_profile.html

Part VII

Appendices

7.1 Maps



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. गर्छ यदि गर्नु हुन्छ भने कुन विधि प्रयोग गर्नु हुन्छ ? १. उमालेर २. फिल्टर गरेर (छानेर) ३. रसायनिक पदार्थ मिसाएर (औषधी) ४. घाममा राखेर
३.	तपाईंको घरमा कस्तो प्रकारको चर्पि छ ? १. आधुनिक २. परम्परागत
४.	फोहोर व्यवस्थापन कसरी गर्नुहुन्छ ? १. खाल्डोमा २. जलाएर ३. जथाभावी
५.	तपाईं 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. गोबर ग्यास ३. सिलिण्डर ४. अन्य

रोग सम्बन्धि ज्ञान/ विचार धारणा :

प्र.नं.	प्रश्नहरू (कोडिङ्ग का साथ)
१.	तपाईंको 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 ४. भगवान खुशी पार्नु पर्छ २. सन्तुलित खाना खाने ५. अन्य (खुलाउनुहा ३. खोप लगाउनु पर्छ
३.	तपाईं अथवा परिवार बिरामी पर्दा उपचारको लागि सर्वप्रथम कहाँ जाने गर्नुहुन्छ? ०. कहिं पनि जान्न ३. धामी भक्ताक्री यदि कहिं नलगेको खण्डमा के कारणले ? १. आर्थिक स्थितिको कमजोरी २. अविश्वास ३. अज्ञानता ४. अन्य..... १. नजिकको स्वास्थ्य संस्था २. औषधि पस
४.	तपाईंको कुनै बच्चाको ५ वर्ष भन्दा कम उमेरमा मृत्यु भएको थियो ? ०. थिएन १. थियो

पोषण तथा स्तनपान सम्बन्धि

प्र.नं.	प्रश्नहरू (कोडिङ्ग का साथ)
१.	बच्चालाई आफ्नो विगौति दुध खुवाउनु भयो ? ०. खुवाइन यदि खुवाउनु भयो भने जन्मेको कति समयभित्र खुवाउनु भयो ? १. घण्टा भित्र २. घण्टा पछि १. खुवाए २. सम्भना छैन
२.	तपाईंले आफ्नो बच्चालाई जन्मेको कति महिना सम्म दुध मात्र खुवाउनु भयो १. ६ महिना सम्म २. ६ महिना भन्दा कम उमेर सम्म
३.	तपाईं बच्चालाई आफ्नो दूध कति उमेरसम्म खुवाउनु हुन्छ / भयो ? १. ६ महिना २. १ वर्ष ३. २ वर्ष वा सो भन्दा माथि
४.	तपाईंले आफ्नो बच्चालाई जन्मेको कति महिना पछि ठोस/भोल खानेकुरा खुवाउनु भयो ?
५.	तपाईंको बच्चा जन्मादा उसको तौल कति थियो ? १. २.५केजी भन्दा कम २. २.५ केजी भन्दा बढी ३. थाहा छैन
६.	सन्तुलन भोजन भनेको थाहा छ ? ०. छैन १. छ

६.	<p>विगत २ हप्तामा तपाईंको बच्चालाई कुनै स्वास्थ्य सम्बन्धि समस्या छ ?</p> <p>०. छैन १. छ</p> <p>यदि छ भने कस्तो समस्या छ ?</p> <p>१. खोकी २. पखाला ३. निमोनिया ४. वरो ५. जन्डिस ६. अन्य</p>
७	<p>बच्चालाई भन्दापखाला भएको बेलामा आफ्नो दूध वा तरल पदार्थ कतिको खुवाउनुहुन्छ ?</p> <p>१. सधैं भन्दा बढी २. सधैं जस्तो ३. सधैंभन्दा कम</p>

२४ घण्टामा खाएको खानेकुराहरु

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

बच्चाको नापतौल

नाम..... लिङ्ग जन्म मिति (उमेर).....

तौल(kg)..... उचाई(cm):.....

MUAC(cm).....

Edema : क) छ ख) छैन

7.3 Informed consent

INFORMED CONSENT

Date :.....

Namaste!

I Mr. Chandramani Poudel, 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 '**FACTORS ASSOCIATED WITH NIUTRITIONAL STATUS OF 6-59 MONTHS OF CHILDREN IN ATHPAHARIYA COMMUNITY OF DHANKUTA 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:.....

केन्द्रिय प्रविधि क्याम्पस

हात्तिसार, धरान

पोषण तथा आहार विज्ञान, चौथो वर्ष

मन्जुरीनामा

नमस्कार,

मेरो नाम चन्द्रमणि पौडेल हो, म केन्द्रिय प्रविधि क्याम्पस, धरानमा पोषण तथा आहार विज्ञान, चौथो वर्ष अध्ययनरत विद्यार्थी हु । यस संकायको चौथो वर्षको पाठ्यक्रम अन्तर्गत म सोधपत्र गरिरहेको छु । मेरो सोधपत्रको विषय “धनकुटा जिल्लामा रहेका देखि ६ देखि ५९ महिना सम्मका आठपहरिया बालबालिकाहरुको पोषण स्थितिको अध्ययन” रहेको छ । यो अध्ययनको उद्देश्य यस क्षेत्रका बालबालिकाको पोषण स्थितिको बारे जानकारी संकलन गर्नु रहेको छ । यो जानकारीले हाम्रो अध्ययनलाई सहज बनाई हामीलाई सहयोग गर्नेछ, र यसले यस जिल्लाको पोषण स्थितिलाई सुधार गर्नका लागि पनि मद्दत गर्न सक्नेछ । तपाईंको छोरा/छोरी यस अध्ययनको लागि सहभागी हुन छानिनु भएको छ र म तपाईंलाई यस सर्वेक्षणका प्रश्नहरु गर्नेछु र साथै तपाईंको बच्चाको केही नापहरु लिनेछु । अध्ययनका केही प्रश्नहरु नितान्त व्यक्तिगत पनि हुन सक्छन् तर तपाईंले दिनुभएको सबै जानकारीहरु महत्वपूर्ण हुनेछन् र सो जानकारीहरु एकदमै गोप्य राखिनेछ, साथै तपाईंले दिनुभएको सूचना तथा तथ्यांकको दुरुपयोग गरिने छैन । यो अध्ययनमा तपाईंको सहभागिता स्वैच्छिक हुनेछ । यदि तपाईंलाई कुनै वा सबै प्रश्न व्यक्तिगत वा सम्बेदनशील लागेमा उत्तर नदिन पनि सक्नु हुन्छ । तर म यो आशा गर्दछु कि तपाईं यस अध्ययनमा सहभागी हुनुहुनेछ ।

के तपाईं यस अध्ययनमा सहभागी हुन इच्छुक हुनुहुन्छ ? (इच्छुक भए मात्र प्रश्न गर्ने नभए अन्तर्वार्ता टुंग्याउने ।)

म यस अध्ययनमा सहभागी हुन इच्छुक छु र यस अध्ययनका लागि आवश्यक पर्ने मेरो बच्चको नाप तौल लिन अनुमति दिन्छु।

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अध्ययनमा छानिएको बच्चाको अभिभावकहरुको

.....
सर्वेक्षण गर्नेको सही

सही/औंठा छाप

सर्वेक्षण गरेको मिति :

7.4 Survey photos

