

**NUTRITIONAL STATUS OF 5 TO 10 YEARS CHILDREN OF
NAMJE, VEDETAR VDC OF DHANKUTA DISTRICT**

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2017

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

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January, 2017

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Approval Letter

This dissertation entitled Nutritional Status of 5 to 10 Years Children of Namje, Vedetar VDC Of Dhankuta District presented by Pranaya Udash has been accepted as the partial fulfillment of the requirement for the B.Sc. degree in Nutrition and Dietetics

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Acknowledgements

I would like to thank my dissertation supervisor Mr. Pashupati Mishra, Professor, Central Campus of Technology being supportive in every step of my thesis work i.e. proposal writing, data collection, statistics and writing.

I am obliged to Dambar Bahadur Khadka sir, Department chief of Nutrition and Dietetics for his valuable suggestions and guidance.

I would like to express my appreciation to my thesis committee, who exerted a tremendous effort to ensure that I received the support and academic advising that I needed for my thesis. I would also like to express my appreciation to all the teachers who taught us. They were instrumental in every aspect of my degree including academic work, career planning and research guidance.

I would like to thank Prof. Dr. Dhan Bahadur Karki (Campus Chief) for giving extra guidance to complete my thesis work and being always ready and free to give advice and motivation.

Particularly I would like to thank Mr. Dhan Bahadur Magar (social mobilizer) who is key informant for me, for giving the background information about the Namje village and informing all the villagers about my thesis work.

I would like to thank my parents, Suresh, Madan, Basudev, Pradeep, Sandip, Chandra, Jivan, Basanta, Anuj, for their patience guidance and, invaluable support during study and my personal life. They have been the source of motivation for me. I would like to acknowledge all of my classmates for their kindness and for being good friends.

Date of submission: January, 2017

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Abstract

Malnutrition is one of the major public health problem in developing countries like Nepal. The nutritional and morbidity status are indicators of the level of the quality of life of school children. Good health and adequate nutrition promotes both physical growth and learning. The objective of the study was to assess the prevalence of malnutrition and the factors that affect directly or indirectly nutritional status of 5 to 10 years old children of Namje, Vedetar VDC Dhankuta, Nepal. Cross-sectional study was carried out in fifty children of Five to Ten years old. Weight, height and BMI of children were measured using standard technique. Prevalence of malnourished children was determined based on the WHO classification. Detail information on family, hygiene and sanitation practice, child breastfeeding and care practice, feeding practice were collected. The surveyed data were analyzed using WHO Anthro plus 1.0.4 and SPSS 20.0.

Based on WHO classification, out of fifty children, 38% were found to be stunted as per height-for-age (10% were severely stunted and 28% were moderately stunted), 18% were found underweight as per weight-for-age (4% were severely underweight, 14% moderately underweight) and 6% were found to be thinned as per BMI-for-age (2% were severely thinned and 4% were moderately thinned). Factors that affect nutritional status of five to ten years' children were prevalent in the community. Malnutrition is still existing as the major health problem in the community. This may be a result of low education among mothers, poor knowledge on health, nutrition related behavior and practice and poor socio-economic status. Considering these figures, something needed to be done to improve nutritional status of children under study.

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List of Abbreviations

Abbreviation	Full form
NDHS	Nepal Demographic and Health Survey
PEM	Protein Energy Malnutrition
MDG	Millennium Development Goal
MoE	Ministry of Education
ECD	Early Childhood Development
WHO	World Health Organization
UNICEF	United Nations International Children Emergency Fund
WAZ	Weight for Age Z-score
BMIZ	Body Mass Index Z-score
HAZ	Height for Age Z-score
CDC	Center for disease control and prevention
MOHP	Ministry of Health and Population
ARIs	Acute respiratory infections
EBF	Exclusive breast feeding
MAM	Moderate acute malnutrition
FCHV	Female Community Health Volunteer

Part I

Introduction

1.1 General introduction

Malnutrition or malnourishment is a condition that results from eating a diet in which nutrients are either not enough or are too much such that the diet causes health problems. It may involve calories, protein, carbohydrates, vitamins or minerals. Not enough nutrients are called under nutrition while too much is called over nutrition. Malnutrition is often used specifically to refer to under nutrition where there are not enough calories, protein or micronutrients. (Srilaxmi, 2002)

Good nutrition is a fundamental basic right. Nepal with its ratification in 1990 of the ‘Convention on the rights of child, by UN General Assembly in 1980’, committed itself to recognizing and implementing a wide range of civil and political rights for Nepalese children. Childhood illnesses such as diarrhea and acute respiratory infections (ARIs) are also common. The convention recognizes children’s right to survival and to the highest attainable standard of health, implies a healthy environment, nourishing food, quality health services and parental awareness (Save the Children, 2000).

Strategies to improve Infant and Young Child Feeding (IYCF) are a key component of the child survival and development programs of many nations, supported by UNICEF and WHO. The scientific rationale for this decision is clear, with steadily growing evidence of underscoring the essential role of breastfeeding and complementary feeding as major factors in child survival, growth and development. Factors for success, in general, are the large-scale implementation of comprehensive, multi-level programs to protect, promote, and support breastfeeding, with strong Government leadership and broad partnerships. Despite the achievements, there is still significant room for improvement and acceleration in programming to improve infant and young child nutrition. This includes both increasing and sustaining good breastfeeding practices as well as interventions to improve complementary feeding (UNICEF, 2011).

1.2 Background

Malnutrition slows economic growth and causes poverty through direct losses in productivity from poor physical status, and indirect losses from poor cognitive function, and increased health costs. The main types of malnutrition seen in Nepal are protein-energy malnutrition, iodine deficiency disorders, iron deficiency anemia and vitamin A deficiency. In particular malnutrition places an enormous burden on children and women

Children contribute huge number in the total populations of Nepal. As this percentage covers wide range among total population, so it becomes very important to know about their nutritional status in order to predict the strength of backbone of developing Nepal.

Namje village, one of the dense habitats of *Magar*, in Dhankuta district has about 120 families. The southeast part of district is almost the rural areas. Mostly Magar community is living since ancient time followed by other communities such as Brahmin, Chhetri, and Dalit. The economic condition is average. There is lack of accessibility for foods consumption and health facilities. Though people are literate, they are not much aware of food habits and the nutrition. Their hygiene and sanitation behaviors still to be improved so their children are more susceptible to the various communicable diseases.

1.3 Statement of Problem

Magar community is included in the *Janajati* group. Among *Janajati* child 38.8% boy are enrolled in early childhood development and 39.6% girl are enrolled in early childhood development. Early childhood development percentage among the *Janajati* community is low as shown in fig. 1.1.

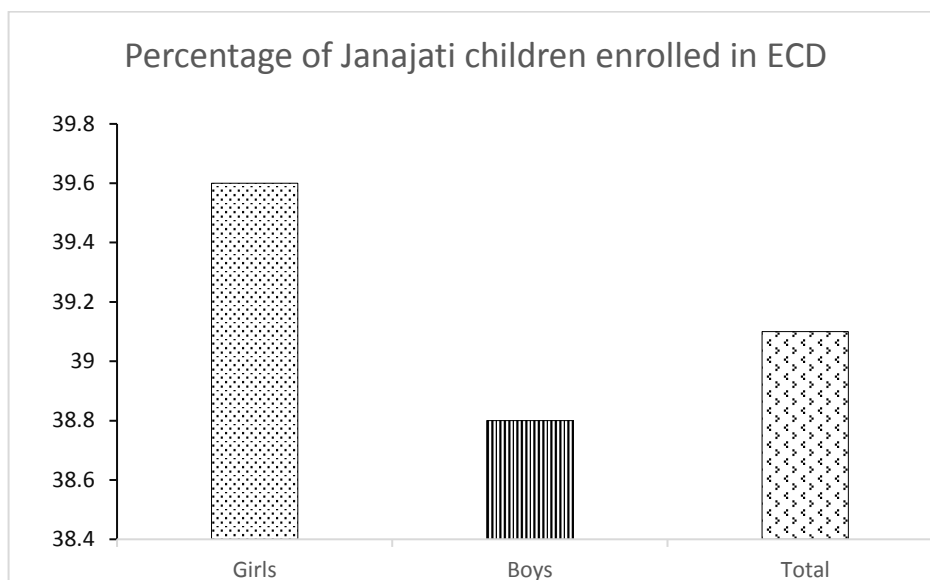


Fig. 1.1 Percentage of Janajati children enrolled in ECD (MoE, Nepal 2011)

It is seen that *Magar* community is suffering from the nutritional problem Their nutritional status directly affects the health status of the country. The prevalence of factors which affect directly or indirectly nutritional status of children must be find out.

The other reasons for the study of *Magar* community are as follows: -

They are the one of the oldest and large community in Nepal and still live in rural areas. Most of them are poor, illiterate and uneducated so, they are not much aware of food habits and the nutrition. There are not much researches carried out about them.

1.4 Objectives

1.4.1 General objective

The general objective of this work is to assess the nutritional status of 5 to 10 years' children of Namje, Vedetar VDC of Dhankuta district.

1.4.2 Specific objective

To fulfill the general objective following are the specific objectives which are to be carried out.

1. To assess the nutritional status of (5 to 10) years children of population.

2. To determine the prevalence of stunting, thinness and underweight of 5 to 10 years of children in Namje village.

1.5 Research question

1. What is the present condition of nutritional status of children (5-10 years old age) in *Namje* village, Dhankuta district?
2. What are the prevalence of different factors that directly or indirectly influence the nutritional status of 5-10 years of children?

1.6 Significance

The significances of the study are to:

1. Provide information to the government as well as voluntary organizations to initiate steps to tackle the problem i.e. provide the baseline information.
2. Encourage people for the improvement of their existing nutritional status by improving dietary pattern of the pre-school children.
3. Encourage the government and other concerned authorities such as NGOs and INGOs for the development of an adequate system of nutritional programs.
4. Provide data to concerned agencies.
5. Reflect sanitary condition, socio-economic variables, degree of malnutrition and condition of mothers and children.

1.7 Limitation

1. Language used by the *Magar* community is different than that of national language so collected information might be slight different than the actual statement.
2. Many families who were illiterate and tribal might not provide the correct age of their children.
3. Rough floor surface, struggling of the young children, personal error during taking reading might have caused some error.

4. This study was conducted with limited resources which made it impossible to include many important question and many other clinical, biochemical and dietary assessment.

5. It does not provide information about the seasonal variation.

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 *et. al.*, 1988). Conceptual framework of nutritional status is given in Fig. 1.2 below.

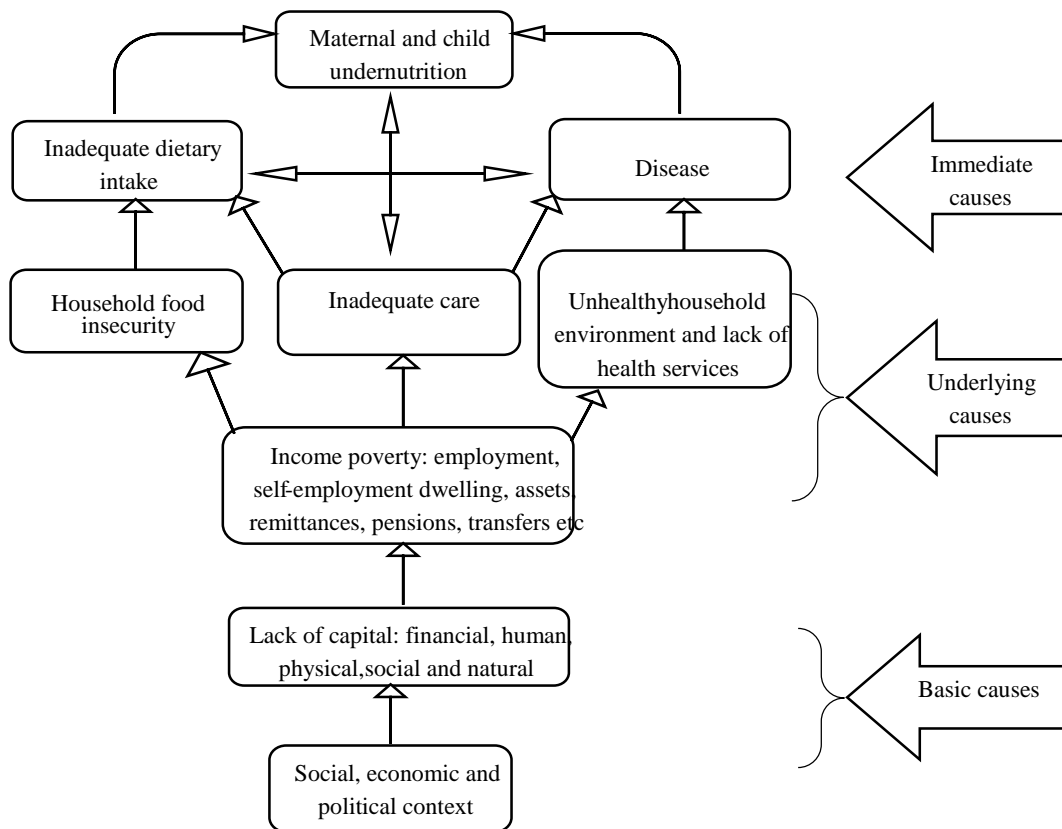


Fig. 1.2 UNICEF conceptual framework (UNICEF, 2015)

The above figure can be divided into following parts:

1. Immediate causes of undernutrition: The immediate cause of undernutrition 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 nutrients. This part focuses on the infection-undernutrition cycle. In practice, undernutrition and infection often occur at the same time because one can lead to another.

This is illustrated in the Fig. 1.3 below (UNICEF, 2015).

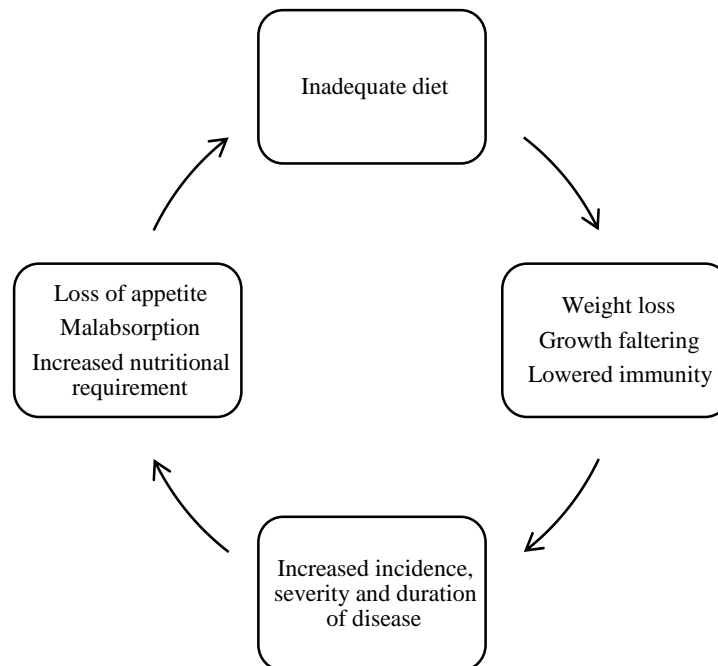


Fig. 1.3 Poverty-malnutrition cycle (UNICEF, 2015)

- The level of interaction depends on the infection and the extent of undernutrition 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 undernutrition: 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 (UNICEF, 2015). 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 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 (UNICEF, 2015).

Caring practices such as breastfeeding, appropriate complementary feeding, as well as hygiene and health seeking behavior’s support good nutrition. This practice can be severely disrupted in an emergency which can lead to poor dietary intake and increased infection, both of which are underlying causes of undernutrition (UNICEF, 2015).

The third category of the underlying causes of undernutrition 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 (UNICEF, 2015).

3. Basic causes: The third level of factors contributing to undernutrition identified by the conceptual framework are 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 Nutritional Status

Nutritional status is defined as the condition of the body resulting from the intake, absorption and utilization of food. It cannot be measured directly. 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. 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).

Factors contributing to malnutrition are poverty, poor feeding practices, lack of land, Insufficient, food production, ignorance on the part of mothers, food losses, exploitation, diarrhea, no potable water, high price of fertilizer, drought, measles, too many children to feed, credit too expensive, health care too far away (Beghin *et. al.*, 1988).

2.2 Malnutrition

Human beings need to have adequate nutrition to attain normal physical growth (in children) and for a healthy life. Adequate nutrition is a fundamental right for every human being. If people fail to consume sufficient quality and quantity of nutrients, they will suffer from hunger or malnutrition. Malnutrition takes a variety of forms. The main types of malnutrition seen in Nepal are protein-energy malnutrition, iodine deficiency disorders, iron deficiency anemia and vitamin A deficiency (MOHP, 2004).

Malnutrition has been defined as “a pathological state resulting from a relative or absolute deficiencies or excess of one or more essentials nutrients”, it comprises four forms of under nutrition, imbalance and the specific deficiency (Park, 2011).

Malnutrition is a state in which the physical function of an individual is impaired to the point where he or she can no longer maintain adequate bodily performance processes such as growth, pregnancy, lactation, physical work, and resisting and recovering from disease (Beghin *et. al.*, 1988).

Malnutrition, a widespread problem with devastating consequences, weakens immune systems and worsens illnesses. It is a factor in about half the deaths for children under-five; malnourished children who survive have diminished learning capacity and lower productivity in adulthood. Malnutrition reduces the quality of life and financially drains families, communities, and countries (WHO *et. al.*, 1999).

Malnutrition prevents children from reaching their full physical and mental potential. Health and physical consequences of prolonged states of malnourishment among children are: delay in their physical growth and motor development; lower intellectual quotient (IQ). According to the World Health Organization (WHO), 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 (Kandala *et. al.*, 2011).

For girls, chronic undernutrition 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 undernutrition repeats itself, generation after generation (UNICEF, 2009).

National estimates of the burden of malnutrition, including estimates for child malnutrition, provide vital information on preventable ill-health, and indicate the health gains possible from interventions to prevent the risk factor (malnutrition). The results also allow policy-makers to direct resources to the most vulnerable segments of the population, and thus make better use of resources (Blakely *et. al.*, 2004).

2.2.1 Forms of malnutrition

There are 4 types of malnutrition (Jelliffe, 1966):

1. Undernutrition: The pathological state results from the consumption of an inadequate quantity of food over an extended period of time.
2. Over nutrition: It is the pathological state resulting from the consumption of an excessive quantity of food and hence a calorie excess, over an extended period of time.
3. Specific deficiency: It is the pathological state resulting from a relative or absolute lack of an individual nutrient.

4. Imbalance: This pathological state results from a disproportionate consumption of essential nutrients with or without the absolute deficiency of any nutrient as determined by the requirements of a balance diet.

From the point of view of time, in its early acute stages, malnutrition affects only weight and body composition. When it becomes more deeply chronic, individuals suffer from altered stunted growth, height and impaired physical and intellectual ability. There may be compensation (weight for normal size) or decompensation in intercurrent acute episodes (weight affecting height for age and sex) during a diarrheal or respiratory infection, for example (Molina, 2012).

2.2.2 Causes of low nutritional status of the 5 to 10-year age group children.

Main causes of the low nutritional status in seemingly developed city are market cycle, food habits, agricultural season or seasonality in food availability, religious cycle, low income, spacing in child birth, food habit, and child birth frequency, food accessibility and economic level (Den Hartag, A. P. 1973 & 1990).

2.2.3 Micronutrient deficiency

Micronutrient deficiency is a major contributor to childhood morbidity and mortality. Children can receive micronutrients from foods, food fortification, and direct supplementation (MOHP, 2012).

Vitamin A is an essential micronutrient for the immune system that plays an important role in maintaining the epithelial tissue in the body. Severe vitamin A deficiency (VAD) can cause eye damage. VAD can also increase the severity of infections, such as measles and diarrheal diseases in children, and slow recovery from illness. Vitamin A is found in breast milk, other milk, liver, eggs, fish, butter, mangoes, papayas, carrots, pumpkins, and dark green leafy vegetables. The liver can store an adequate amount of the vitamin for four to six months. Periodic dosing (usually every six months) of vitamin A supplements is one method of ensuring that children at risk do not develop VAD. In Nepal, campaigns are in place for semiannual mass supplementation of vitamin A capsules (for children age 6-59 months) and distribution of deworming tablets (for children age 12-59 months) since the past 15 years under the National Nutrition Program (MOHP, 2012).

Iodine deficiency, most frequently caused by inadequate iodine intake, has serious effects on body growth and mental development. Fortification of salt with iodine is the most common method of preventing iodine deficiency. In Nepal, the compound used for fortification of salt is potassium iodate (KIO₃). According to the World Health Organization, a country's salt iodization program is considered to be on a good track in eliminating iodine deficiency when 90% of households are using iodized salt. Fortified salt that contains 15 parts of iodine per million parts of salt (15 ppm) is considered adequate for the prevention of iodine deficiency (MOHP, 2012).

In Nepal, a number of interventions have been put in place to address anemia in women. These include supplementation of iron with folic acid tablets for pregnant women from the second trimester to 45 days following delivery, deworming of pregnant women after completion of the first trimester, postpartum vitamin A supplements, and promotion of the use of insecticide-treated mosquito nets for pregnant women in malaria endemic areas (MOHP, 2012).

2.3 Anthropometry

Nutritional anthropometry is concerned with the measurement of the variations of the physical dimensions and the gross composition of the human body at different age levels and degrees of nutrition (Jelliffe, 1966).

The field of anthropometry encompasses a variety of human body measurements. Weight, stature (standing height), recumbent length, skinfold thicknesses, circumferences (head, waist, limb, etc.), limb lengths, and breadths (shoulder, wrist, etc.) are examples of anthropometric measures (CDC, 2007).

Three indices are commonly used in assessing the nutritional status of children (CDC, 2007):

1. Weight-for-age
2. Length-for-age or Height-for-age
3. Weight-for-length or Weight-for-height
4. BMI for age

There are many other anthropometric measures including mid - upper arm circumference (MUAC), sitting height to standing height ratio and many skinfold measures. This guide will concentrate on the measurements and interpretation of weight and height in children (Cogill, 2003).

2.3.1 Weight-for-height index

Weight is the anthropometric measurement most in use. Its potential value, especially for children, is appreciated not only by health personnel, but 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).

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 anthropology usually only the total height (or length) is measured (Jelliffe, 1966).

The prevalence of acute malnutrition (or wasting) is determined using the weight-for-height index, as an indicator of current nutritional status. The weight-for-height index of a child from the studied population can be expressed either as a percentage of the median or as a Z-score (Smith, 2013).

The expression of the weight-for-height index as a Z-score (WHZ) compares the observed weight (OW) of the surveyed child to the median weight (MW) of the reference population, for a child of the same height. The Z-score represents the number of standard deviations (SD) separating the observed weight from the median weight of the reference population (WHO, 1997).

$$\text{WHZ} = (\text{OW} - \text{MW}) / \text{SD}.$$

WHO recommends the use of Z-scores as it is considered more reliable in terms of statistical theory, Definitions of acute malnutrition according to weight-for-height index (W/H), expressed as a Z-score or as a percentage of the median are shown in Table 2.1 below.

Table 2.1 Acute malnutrition according to weight-for-height index (W/H), expressed as a Z-score

Type	Z-score
Moderate Acute Malnutrition (MAM)	
Z-score / SD	W/H <-2 z-score and \geq -3 z-score and absence of bilateral edema
Severe Acute Malnutrition (SAM)	
Z-score / SD	W/H <-3 z-score and/or bilateral edema
Overweight	
Z-score / SD	W/H >+2 Z-score

2.3.2 Height-for-age index

The height-for-age index indicates if a child of a given age is stunted. This index reflects the nutritional history of a child rather than his/her current nutritional status. This is mainly used to identify chronic malnutrition. The same principle is used as for weight-for-height, except that a child's chronic nutritional status is estimated by comparing his/her height-for-age with NCHS reference or WHO standards height-for-age curves, as opposed to weight-for-height curves. The height-for-age index of a child from the studied population is expressed in Z-score (HAZ) (Smith, 2013). The cut-off points are shown in Table 2.2 below.

Table 2.2 Chronic malnutrition according to height-for-age index (H/A), expressed as a Z-score

Definition	Index
Not stunted	≥ -2 z-score
Moderate stunting	-3 z-score \leq H/A < -2 z-score
Severe stunting	< -3 z-score

2.3.3 Weight-for-age index

Weight-for-age is thus a composite index, which reflects both wasting and stunting, or any combination of both. In practice about 80% of the variation in W/A is related to stunting and about 20% to wasting. It is not a good indication of recent nutritional stress. It is used because it is an easy measurement to take in practice, and can be used to follow individual children longitudinally in the community (Smith, 2013).

Weight-for-age is a composite index of height-for-age and weight-for-height. It takes into account both chronic and acute malnutrition. Children whose weight-for-age is below minus two standard deviations (-2 SD) are classified as underweight. Children whose weight-for-

age is below minus three standard deviations (-3 SD) are considered severely underweight (MOHP, 2012).

2.3.4 BMI for age (aged 2 to 20)

BMI is used differently for children. It is calculated in the same way as for adults, but then compared to typical values for other children of the same age. Instead of comparison against fixed thresholds for underweight and overweight, the BMI is compared against the percentile for children of the same sex and age.

A BMI that is less than the 5th percentile is considered underweight and above the 95th percentile is considered obese. Children with a BMI between the 85th and 95th percentile is considered to be overweight (CDC,2007)

2.4 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).

2.5 Breastfeeding 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).

2.5.1 Definition of breastfeeding categories

Breastfeeding can be categorized into three groups; exclusive, predominant and partial breastfeeding (WHO *et. al.*, 2007):

1. 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.
2. 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.
3. 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).

2.6 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 (WHO, 1997).

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 Score can be subjected to summary statistics such as the mean and standard deviation (WHO, 1997).

Interpreting the results in terms of Z-scores has several advantages as follows (WHO, 1997):

- 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 Zscore 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

2.6.1 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.

2.6.2 Prevalence-based reporting

For consistency with clinical screening, prevalence-based data are commonly reported using a cut-off value, often <-2 and $>+2$ Z-scores. The rationale 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.

2.6.3 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 that, 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/>, 2016)

2.6.4 WHO/NCHS international reference 2007 for assessing growth in children of 5 to 10 years' age.

Previously, in 2006 who recommended the national center for health statistics (NCHS)/WHO international reference for assessing growth in children and adolescents above 5 years of the age? However, this reference had several drawbacks. The BMI reference data starts only at 9 years of age and has a limited percentile range 5th-9th in addition the NCHS reference curves were constructed using a different (by now outdated) method compare to what was used for the WHO standard. Given that the NCHS sample of 1977 included children who had reached their full height potential while not yet being overweight, it was considered as a valid approach to use these data, conduct data cleaning, i.e., identifying outline and excluding those. The NCHS data were merged with the records of the 18-71-year-old of the WHO standards sample and this new standard data set was used to drive a new reference by applying state-of-the-art growth curve construction methods (Deonis, et al, 2007).

The WHO reference 2007 provides a smooth transition from the child growth standard for 0-5 years to the older age group. The data tables and charts cover the 1st to the 99th percentile and from -3 to +3 standard deviation (SD). The 2006 WHO growth standard should be used for the assessment of children 0-60 months and the 2007 WHO growth reference should be used in the assessment of children 5-14 years. There are no global standard or reference populations for adult or older people of this time. WHO Anthro plus is software for use on desktop personal computer or laptops using Microsoft windows. It was developed to facilitate the application of the WHO reference 2007 for 5-14 years to monitor the growth of school-age children and adolescent. To show the continuity with the WHO child growth standard for 0-5 years, these are included in Anthro plus for the three indicators that apply, i.e., weight-for-age, height-for-age and BMI-for-age. This software enables monitoring growth in individual and population of children from birth to 18 years of age.

Indicator	Age ranges
Height-for-age	5-14 year
Weight-for-age	5-14 year
BMI-for-age	5-14 year

The most widely used system is world health organization (WHO) classification based on z-scores.

Mild	< -1 to > -2 z-score
Moderate	< -2 to > -3 z-score
Severe	< -3 z-score

The commonly used under-nutrition indicators, i.e. underweight, stunting and thinness are used to evaluate the nutritional status of the subject.

Underweight = < -2 WAZ (z-score for weight. -for-age).

Stunting = < -2 HAZ (z-score for height-for age).

Thinness = < -2 BAZ (z-score for BMI-for-age).

2.7 Literature review from previous studies

A study conducted in urban primary school children in Meerut, India found that out of 800, 396 children (49.5%) were found to be malnourished. Grade I malnutrition was most common (35.5%) followed by Grade II (11.4%) and grade III (2.6%) malnutrition. Wasting was found in 44.6% children (46.3% girls and 43.2%) out of which 1.2% children showed severe degree of wasting. Stunting was found in 43.8% children (46.0% girls and 41.8% boys) (Neelu, *et al.*2010).

A descriptive cross sectional study conducted in schools of Kaski district of western Nepal from Jan 2007 to June 2007 to find the prevalence of under nutrition among school children in 4 to 14 years' age group and the role of socio-demographic characteristics of

mothers on child nutrition. A total of 786 students were randomly selected from six schools in the study area and nutritional status of children was assessed by anthropometric measurements. Among 786 students, 26% of students were found to be undernourished and 13% as stunted, 12% wasted and only 1% both stunted and wasted. The present study shows highly significant association ($p < 0.005$) of maternal factors like, literacy, occupation, diet knowledge and monthly per- capita income respectively with child nutrition (Joshi, et al 2011)

A study conducted in 2010 conducted a cross sectional study in 20 public primary schools among 499 children of 6 to 10 years' age group in Garhwali Himalayan village of India and found that underweight, stunting and wasting were present in 60.9%, 56.1% and 12.2% of school children respectively (Osei, *et al.* 2010).

A descriptive, cross-sectional study shows which was conducted on July 2002 to July 2003 was administered in five governmental school of Dhankuta and Inaruwa municipalities. Schools were selected using simple random sampling method. From those selected schools, total number of 818 students studying grade 1 to 5 were enumerated. In the study, using census survey method, 61% were found to be malnourished. The students were more stunted (21.5%) than wasted (10.4%). Only 5.4% of the students were found to be both wasted and stunted. The collection of blood and stool samples from the students revealed parasitic infection on 65.85% and anemia on 58%. The most common diseases in those schools were skin disease (20%), dental caries (19.8%) and lymphadenopathy (10.5%). Among skin diseases, pediculosis was more common among girls while ringworm and scabies were common among boys (Shakya SR *et al.*, 2002).

A descriptive cross-sectional study conducted in the household of residing in Dharan municipality ward no-17 at Falkland tapu. Simple random sampling technique was used to select the village and census survey technique was followed to find out the nutritional status of 1-5 years' children. A total of 40 children were selected from 60-65 household. In this study, 85% found to be suffered from skin disease, 35% ear infection, and 50% diarrhea/vomiting, 5% enlarged lymphoid, 12.5% abdominal enlargement and 45% malnutrition with different grade (Adhikari D *et al.*, 2006).

A study conducted among 150 students of 6 to 12 years' age group, a total of 150 students were selected from six schools in which, 20.66% were found to be normal and 79.33% were found to be malnourished on the basis of weight for age, of different grades as 28% in 1st degree, 22.66% in 2nd degree, 27.33% in 3rd degree and 8% in 4th or severe. According to height for age, 54.66% were found to be normal and 45.34% were found to be malnourished of different degree as 36% in 1st degree, 6.66% in 2nd degree, 2% in 3rd degree and 0.66% in 4th or severe. Similarly, according to weight for height, 68% were found to be normal and 32% were found to be malnourished of different grades as 22% in 1st degree, 8% in 2nd degree and 2% in 4th or severe (Subba, 2003).

Similarly, study conducted among 500 children studying in class 1st to 8th in government schools in the field area of Azad Nagar Bangalore, India found the prevalence of malnutrition was found to be 52%. The prevalence of malnutrition among boys was 53.85% and among girls was 49.25% (Hasan, et al. 2011)

Part III

Methodology

3.1 Research design

Data was collected from multiple levels within the community and with various respondents, as outlined below:

1. Household interview with the help of questionnaire: A set of questionnaires containing indicators that can directly or indirectly influence the nutrition status was prepared and questions were asked to the parents of the children. Information was both qualitative and quantitative. Data was collected on household socioeconomic, food security and dietary characteristics, including education and occupation of parents, hygiene and sanitation behavior and health care and nutrition services etc.
2. Women's interview: The children's mothers were interviewed with the help of framed questionnaire about pregnancy history, pre- and post- natal care, recent morbidity, recent child mortality, receipt of health and nutrition services, child care and feeding practices, and knowledge and practices related to maternal and child health and nutrition.
3. Anthropometric measurements of 5-10 years' age children:

The following indices were used:

- i. Weight-for-age ii. Height-for-age iii. BMI for age
4. Edema check for protein energy malnutrition (PEM)
5. The 24-hour dietary recall: In this method, respondents were asked to remember details of the types of foods given to their children during the previous 24 hours. This information was collected to know common types of foods they eat.

3.2 Measurement methods

3.2.1 Height measurement

Height measuring stand (Stadiometer): - The height measuring tape of 5ft capacity (2 pieces).

3.2.2 Weight measurements

The type of the weighing scale used was Digital bathroom scale, Swiss made, Micro life co. pvt. Ltd. The child was subjected to the machine with the minimum number of cloths to 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. The measurements were taken three times for each child.

3.2.3 Edema checkup

Firm pressure for three seconds with one digit on the lower portion of the median surface of the tibia was applied. 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 area

Namje village is located in Vedetar VDC, Dhankuta district. Purposive method was used to select the location. There were about 120 families.

3.4 Target population

All the children of 5 to 10 years' age of children, living in Namje village, Vedetar VDC ward no.5, 6 and 7, Dhankuta district were chosen for the study. Children were used for the anthropometric measurements.

Mothers of the respected children were asked framed questionnaire about the breastfeeding, nutritional care, health care and the hygiene and sanitation related practices.

Father/Mother or the head of the family were also asked questionnaire about the household members, occupation and education etc.

Some of the important information were collected verbally from the local leaders, teachers, old people from the community, and other expert people, about the condition of the community before survey and the behavior's related to basic foods, nutrition, hygiene and sanitation.

3.5 Sample size

This is the census method so sample size was not calculated. 50 children were studied.

3.6 Research equipment

Equipment needed for performing the survey:

1. Child weighing machine (1 piece)- To measure the weight of the children
2. Height measuring machine (Stadiometer, 1 piece)- To measure the height of children

3.7 Pre- testing

The equipment was tested before the actual survey by measuring 5 to 10 years old children. Since no fault was found on the equipment they were confirmed for the actual survey. The questionnaire was pretested among the mothers of *Namje village* to see if there were any ambiguous questions or not and also to see if all the questions and options on the question were easily understandable or not. By taking the suggestions from the people, the questions were modified.

3.8 Validity and Reliability

3.8.1 Validity

Validity is a matter describing a phenomenon correctly. For example, anthropometry reflects a person's or population group's nutritional status in relation to an accepted standard. A valid indicator of food safety is food consumption.

To ascertain the degree to which the data collection instruments would measure what they purposed to measure, the instruments was validated by a group of professionals from Central Campus of Technology, Central department of Nutrition and Dietetics. The aspects tested in the questionnaire was also drawn from the available literature in nutrition about the preschool children. The questionnaire was also pre-tested prior to data collection to ascertain content and face validity.

3.8.2 Reliability

Reliability concerns the quality of information sources, accuracy and precision of the data and their representativeness. For example, the accuracy of anthropometric measurements or the determination of age.

Reliability refers to quality control measure of data collected. Questionnaire was checked daily for completeness, consistency and clarity as mentioned earlier. The methods used to increase the validity and reliability of the survey is mentioned in the different topics above.

3.9 Data analysis

The anthropometric data was analyzed by the help of WHO Anthro plus v1.0.4. Z-score of height-for-age, weight-for-age and BMI-for-age for each child was calculated and curve was made. Other qualitative and quantitative data were analyzed by IBM SPSS Statistics 20 and Microsoft Excel 2016. Frequencies of different variables were calculated in the visual dashboard. Mean of the triplet anthropometric measurement was filled in the WHO anthro plus.

3.10 Measurement of variable

Analysis of health and nutrition indicators should include the environmental and social determinants of disease, mortality, poor population group's quality of life and the inequality gaps between and within countries. Social determinants of health and nutrition are factors that characterize environments to which individuals and the population are "exposed" and which can influence lifelong developmental and health outcomes. Social determinants act at different levels of influence, interact with each another and represent a broad array of characteristics that are not biologically or genetically based but rather are entrenched in interactions between individuals and socio-physical environments. Examples of the most important social determinants of child health, nutrition and development include living conditions, child parents-peer's interpersonal relations, family socio-demographics, learning environments in day care centers and schools, access to premises, neighborhood safety and socio-political context (Molina, 2012).

As the word suggests, an indicator gives an "indication" that is intended to reflect a particular situation or an underlying reality, usually by providing an order of magnitude, which means that it is difficult to meet the criteria directly. Indicators are variables that attempt to measure or objectify a quantitative or qualitative collective (especially bio demographic) event in order to support political action and evaluate achievements and goals (Molina, 2012).

WHO defines indicators as "variables used to measure changes". Some indicators may be sensitive to more than one situation or phenomenon; for example, the infant mortality rate is a population health indicator and it is also sensitive enough for use in assessing the general population welfare. However, it may not be specific to any particular health measure because the reduction rate may be the result numerous factors of social and economic development.

Health indicators are used to evaluate the effectiveness of courses of action and effects (Molina, 2012).

Part IV

Results and Discussion

Namje village lies in ward no 5, 6 and 7 of *Vedetar* VDC and is a hilly region and nearly about 4 km east of Koshi highway near *Vedetar*. The main ethnic group of village is *Magar*. There are 120 families in this village. This study is mainly focused on the nutritional status of 5 to 10 years of age children of *Namje* village. Accurately 50, 5-10 years of age children were taken as sample for anthropometry and a semi structured questionnaire was set for interviewing the mothers or caretakers to obtain important information related to access the nutritional status and other information related to it. Some of the important findings of the study are listed below.

4.1 Nutritional status

4.1.1 Height-for-age

Prevalence of moderate stunting was 28% among which 20% were female and 36% were male. Prevalence of severe stunting was 10% among which 12% were male and 8% were female. 62% children were normal according to height-for-age among which 72% were female and 52% were male as shown in Table 4.1.

Table 4.1 Prevalence of stunting based on height-for-age Z-score and by sex

HAZ	Classification	Female		Male		Total	
		Frequency	%	Frequency	%	Frequency	%
< -3	Severe	3	8	2	12	5	10
-3 to < -2	Moderate	9	20	5	36	14	28
-2 ≤	Normal	13	72	18	52	31	62
Total		25	100	25	100	50	100

The HAZ 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 Fig. 4.1. The median value of HAZ was -1.63.

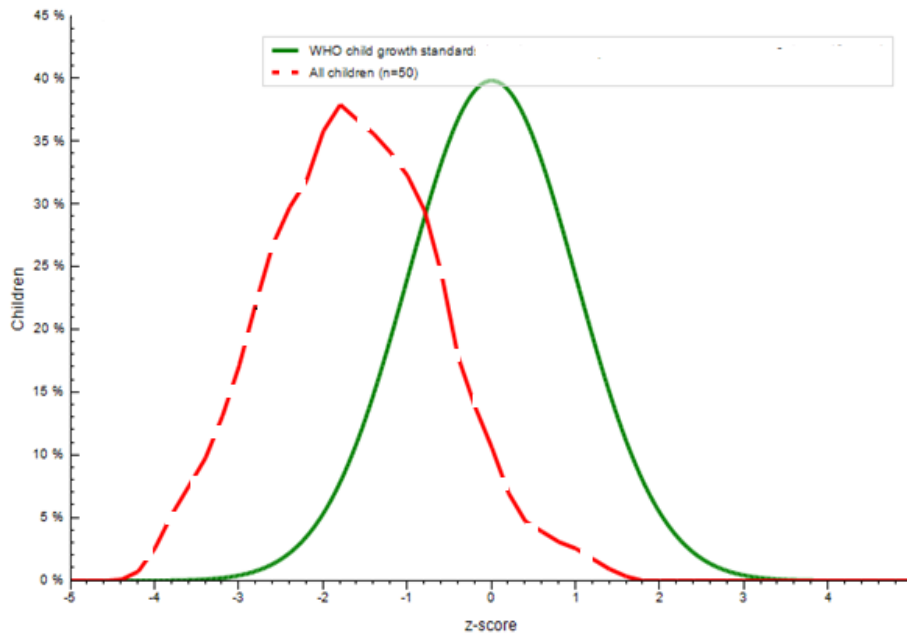


Fig. 4.1 Distribution height-for-age Z-score curve comparing with WHO standards 2007

On comparison of this studies with previously performed studies, the study conducted by (Dhakal, 2015), reported that 23.57 % of the children (5 to 10 years' age group) were stunted which was less as compared to this study. The reason this study showed stunting 38% was more than the study conducted by (Dhakal, 2015) might because it was affected by the difference in the study area, where our study was conducted in Namje village which is an underdeveloped village where tourism industry has just flourished and is emerging as main tourism spot in eastern development region and his study was conducted in Itahari municipality which is far more developed then the place where this study. Another reason that showed the difference in the result might be the level of education among their parents where the parents of the children in this study were less educated as compared to the parents of those children in the study conducted by (Dhakal, 2015).

The current study showed that the prevalence of stunting among public 5 to 10 years' children was found higher in male than in females. This might be due to fact that, illiterate mothers have no or very little knowledge regarding to improved maternal and child health care whose effects can be seen as stunting in children as a chronic effect in future.

Only 62% children were not stunted but still 38% children were below -2 Z-score in which 10% were severely stunted and 28% were moderately stunted among which 48% were male and 28% were female as shown in table 4.1. The result showed that more male were lack on taking sufficient amount of nutritious food for longer period of time which might be due to the parents busy schedules, improper caring, skipping of midday meal and snacks by children.

1.1.2 Weight-for-age

Moderate underweight prevalence was 14% among which 16% were female and 12% were male. Prevalence of severe underweight was 4% among which 0% were female and 8% were male. 82% children were normal according to weight-for-age among which 84% were female and 80% were male as shown in Table 4.2.

Table 4.2 Prevalence of underweight based on weight-for-age Z-score and by sex

WAZ	Classification	Female		Male		Total	
		Frequency	%	Frequency	%	Frequency	%
<-3	Severe	0	0	2	8	2	4
-3 to <-2	Moderate	4	16	3	12	7	14
-2 ≤	Normal	21	84	20	80	41	82
Total		25	100	25	100	50	100

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 Fig. 4.2. The curve shows that more number of children was within normal range but there was still prevalence of moderate underweight and prevalence of severe underweight was also found. However, the prevalence of overweight was not reported. The prevalence of severely underweight children was less than moderately underweight children. The median value of WAZ was -0.57.

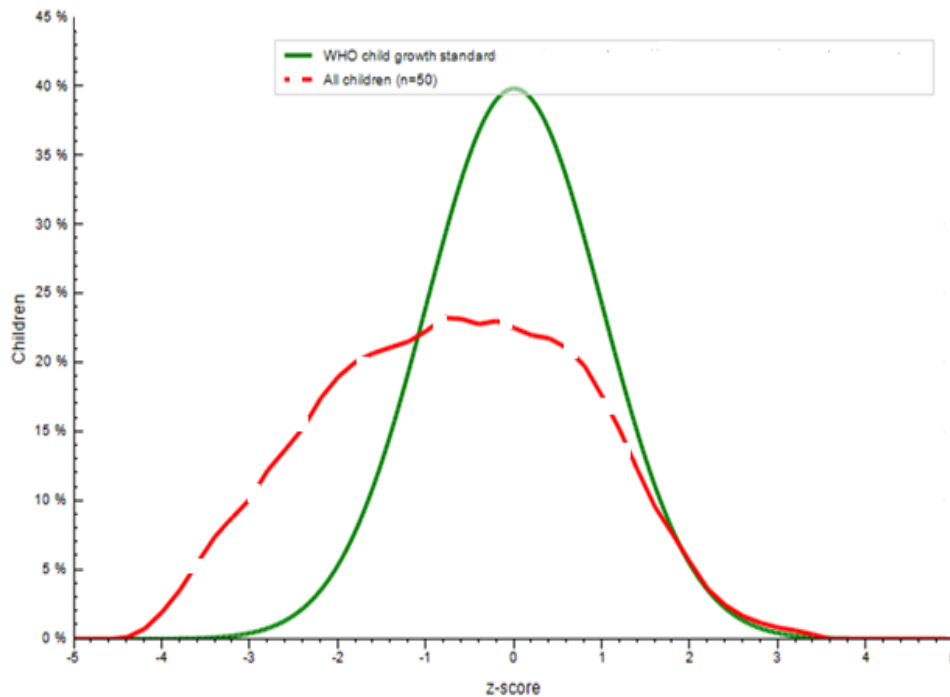


Fig. 4.2 Distribution of weight-for-age Z-score curve comparing with WHO standards 2007

The current study showed prevalence of underweight was found to be more among males (16% boys Vs 20% girls) which is contrast to result noted in survey done at Medical Teaching Hospital, Uttarkhel where 17% male and 11.9% female were undernourished (Rijal *et al.*,2011) similarly higher prevalence of underweight in girls than boys was noted in result by B Shrestha, where 23.1% boys and 15.3% girls were underweight (Shrestha, 2014).

Similarly, a cross-sectional study conducted in Itahari municipality, Nepal by (Dhakal, 2015) reported that, 10.57% of children of age group 5-10 years were underweight which was less as compared to this study where underweight is (18%). A cross-sectional study conducted by (Neupane,2015) in Nepal reported that 30.76% of public primary school children were underweight which was far more as compared to our study (18%).

Only 82% children were not underweight but still, 18% children were below -2 Zscore in which 4% was severely underweight and 14% were moderately underweight among which

20% were male and 16% were female as shown in table 4.2. The result obtained of the prevalence on underweight was found lower as compare to a cross sectional study conducted in Pumdi Bhumdi village of Kaski district where 35.4% children were underweight (Bastola *et al.*, 2015)

The children's who were below the -2 SD means they were at risk of becoming thinness, stunted and underweight if not given nutritious food and sufficient care. Among three indicators of malnutrition (38% and 18% stunting and underweight respectively) were found to be most prevalent in the village. Stunting occur due to long term exposure of malnutrition and disease starting before the birth of the child i.e. with the pregnant mother. Underweight occur due to the long term deficient in food intake. So, an intervention to improve the nutritional status of pregnant mother as well as the child of under-five is also required. The prevalence of stunting and underweight as dominant was due to the ignorance by parents. So the parents need to be aware about Nutrition education.

4.1.3 BMI for Age

Moderate thinness prevalence was 4% among which 4% were female and 4% were male. Prevalence of severe thinness was 2% among which 4% were female and 0% were male. 94% children were normal according to BMI for age among which 92% were female and 96% were male as shown in Table 4.3.

Table 4.3 Prevalence of Thinness based on BMI for age Z-score curve and by sex

WHZ	Classification	Female		Male		Total	
		Frequency	%	Frequency	%	Frequency	%
<-3	Severe	1	4	0	0	1	2
-3 to <-2	Moderate	1	4	1	4	2	4
-2 ≤	Normal	23	92	24	96	47	94
Total		25	100	25	100	50	100

The BMIZ 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, and not only those below a given cut-off, were affected as shown in Fig. 4.3. The median value of BMIZ was 0.41.

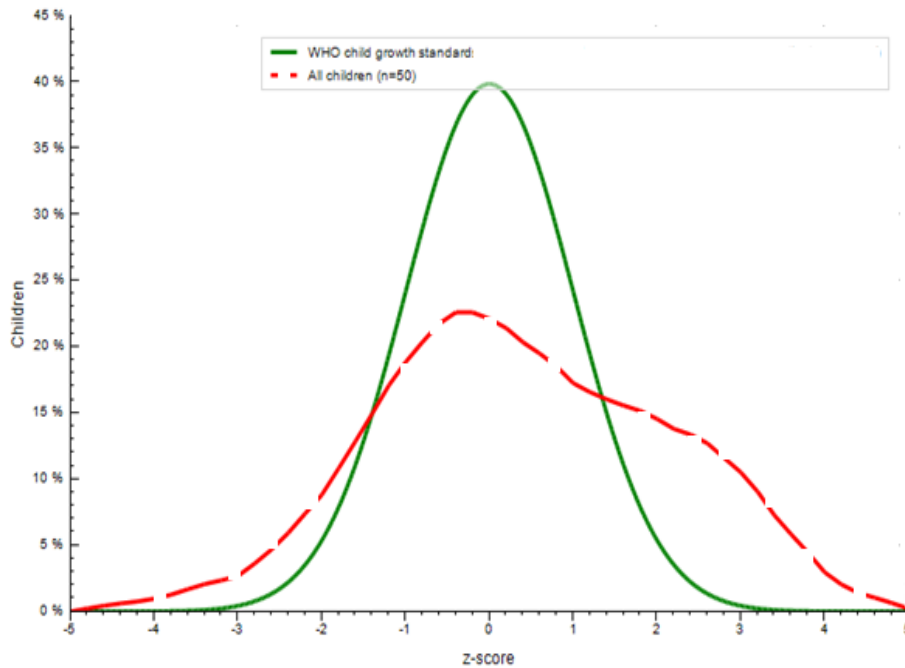


Fig. 4.3 Distribution of BMI for age Z-score curve comparing with WHO standards 2007

According to BMI for age z-score, 4% were below -3 SD to -2SD i.e. moderately thinned, 2% were below -3 SD i.e. severely thinned. In the Case of female Gender group 4% were below -3SD i.e. severely thinned, 4% were below -3 SD to -2SD i.e. moderately thinned, Similarly, in case of males 0% were below -3SD, 4% were between -2 SD to -3 SD, 51 as shown in table 4.3

Among all the children 94% were not thinned but still, 6% children were below -2 Zscore in which 2% were severely thinned and 4% were moderately thinned among which 4% were male and 8% were female as shown in table 4.3. Similar result was found in a descriptive, cross-sectional study conducted in Dhankuta and Inaruwa where 10.4% children were thinned (Shakya *et al.*, 2002). The obtain result of this study was lowered as compared to the study conducted in Pumdi Bhumdi village of Kaski district where 12.3% children were thinned (Bastola *et al.*, 2015).

This result might be due to intake of nutrient at recent was less. Only small percentage of children were severely thinned which indicate that more children were taking enough

nutritious food on their daily diet. Namje village is an emerging tourist destination until now it was hidden until CNN discovered it as top 10 most need to visit place but not yet discovered so it is accelerating the development of village and Tourism industry is also booming in this study area which is upgrading the living standard of this village which directly plays role in improving nutritional status of population.

4.1.4 Edema

No cases with nutritional edema were found.

4.2 Family details

64% of families were living in nuclear manner and 36% of families were living in joint manner. Mean of family members was 5.90. Family with minimum number of member was 3 and the maximum number of member was 10. The most of household had 4 family members as shown in Table 4.4.

This is similar to study conducted by (Hasan *et al.*, 2011) in which maximum 55.40% belonging to nuclear family. From this result, there must be least of member were available for caring the children. The children were receiving not in optimum level of care by their families because of business and child can intake the food mostly from market rather than food made by their parents. Due to the modernization and education this study has indicated that joint family have changed to nuclear manner.

Table 4.4 Distribution of family members

	Mean	Minimum	Maximum	Mode
Total member	5.9	3	10	4

4.3 Education

16 % of fathers had primary education, 8 % had a lower secondary education, 22 % had a secondary education, 34 % had a higher secondary education, 10 % had a bachelor level education and 10 % were illiterate. 22 % of the children's mother had only a primary education, 26 % had a lower secondary education, 24 % had a secondary education, 6% had

a higher secondary education and 22% were illiterate. The result might be due to the gender discrimination in previous generation in terms of education.

Parent’s education is positively related to the better nutritional status of children. 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). Percentage of illiterate mother was 22%, which may be one of the major cause of malnutrition among children. Comparatively female guardians were found to be less in number than male in education. This is similar to the study conducted by (Hasan *et al.*, 2011) and the study conducted by (Amruth, 2012) was more literate father than mother.

4.4 Socio-economic factors

Most of the family’s members were involved in agriculture (father 2 %, mother 44 %) which is located near to the village, 10 % of father and 4 % of mother were involved in service, 36 % of father and 30 % of mother were labor due to the lack of special skills, and 12 % of father and 8 % of mother were involved in business. 14 % of mother were involved in house work as shown in table 4.5.

Many of parents were uneducated, so they did not have good jobs and involved in the agriculture and manufacturing industry as a labor. Due to the lack of good job, they had low income. This low income was creating vicious cycle of poverty and malnutrition. Better education for this generation will ultimately improve the income. They can get good health services, improve their lifestyle etc. In this way, vicious cycle of poverty and malnutrition can be broken.

Table 4.5 Occupation of household members

	Father		Mother	
	Frequency	Percentage	Frequency	percentage
agriculture	21	42%	22	44%
service	5	10%	2	4%
Labour	6	36%	4	30%
Business	18	12%	15	8%
housework	0	0%	7	14%
Total	50	100%	50	100%

Annual income of 80% of families was between 1 lakh to 3 lakhs and 20% of families was above 3 lakhs.

Table 4.6 Annual income of family

Annual income	Frequency	Percent
1 lakh to 3 lakhs	40	80
Above 3 lakhs	10	20
Total	50	100

4.5 Water purification and types of water purification method

All of them purify water for the consumption. 18% of house used boiling method for purification, 72% used filtration method and 10% used chemical for water purification.

The study showed that there is less prevalence of water-borne disease due to all of the household using purified water for drinking purposes.

4.6 Water supply and hand wash

Tap water was used as water source by all the people. Everybody washed hands before meal, after cleaning baby's stool, after defecation, before meal preparation and before feeding the child. All of them used soap water for hand wash.

There was no problem regarding the water source. All the household had access to the good water source. The vast majority of households in Nepal (89%) 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). Children in Namje village are safe from the water borne diseases and water was not the major factor that was causing malnutrition in children.

4.7 Toilet and waste disposal

All of the houses have toilet. 72 % of houses had modern toilet and 28 % had traditional toilet. The percentage of the people who incinerated wastes was 68 % and bury wastes in the pit was 32 %.

All household have toilet which is far less than the result found in national data where 40% rural household did not have toilet (MOHP, 2012). Toilet was found to be the one of factor for causing malnutrition in study carried out in Mahottari district (Mishra *et. al.*, 2010)

4.8 Source of Fuel

48 % of the houses used firewood and 52 % used cylinder gas as the source of fuel. The household using cylinder as source of fuel is higher than national data which is 21.03 % uses

cylinder gas. (National Report, 2011).

Due to the most of the household using cylinder gas there is less prevalence of Air-borne disease caused by smoke from firewood while cooking.

4.9 Disease and disease based knowledge

The percentage of people who thought, disease occur due lack of hygiene and sanitation was 60 %, germs or dirt was 40 %.

Table 4.7 Concept for occurrence of diseases

Concept for occurrence of diseases	Frequency	Percentage
Lack of hygiene and sanitation	30	60%
Germs or dirt	20	40%
Total	50	100%

There were no any death of child below 5 years.

The percentage of people who believed that disease can be prevented by hygiene and sanitation was 98 %, balanced diet was 2 %.

Table 4.8 Believes for prevention of disease

Believes for prevention of disease	Frequency	Percentage
Hygiene and sanitation	49	98%
Balanced diet	1	2%
Total	50	100%

The percentage of people who went to near health facilities was 72 %, pharmacy was 12 % and FCHV was 16 when they were sick as shown in Table 4.8.

Table 4.9 Preference of health service

Preference of health service	Frequency	Percentage
Health facilities	36	72%
pharmacy	6	12%
FCHV	8	16%
Total	50	100%

The percentage of people who thought, disease occur due lack of hygiene and sanitation was 60% and germs or dirt was 40% this means they were aware of diseases. The percentage of people who thought that diseases can be prevented by hygiene and sanitation was 98% and balanced diet was 2%. The percentage of people who went to health facilities was 72% and FCHV 16% when they were sick. This result shows that they knew better way to control diseases and better way to improve health. But due to lack of education and poverty they were not in the position to maintain it properly. They believed doctors this indicates that they were at transition phase of the modernization.

4.10 Breastfeeding and child nourishments

All the women breastfed their children. The percentage of women who breastfed their children in Less than 1 hour was 70 %, Less than 8 hours was 16 % and Less than 24 hours was 0 % but 14 % of women reported as they did not know exactly the time of breastfeeding after birth as shown in Table 4.9.

Table 4.10 Initiation of breastfeeding

Initiation of breastfeeding	Frequency	Percentage
Less than 1 hour	35	70%
Less than 8 hours	8	16%
Less than 24 hours	0	0%
Don't know	7	14%
Total	50	100.00%

82 % of women fed colostrum and 18 % of women did not remember the feeding colostrum to neonate. The percentage of continuous breastfeeding at the age of 2 years or more than 2 years was 92 % and breastfeeding up to 1 years is 8 %

62% of children parents answered that they know about balanced diet and 38% of them don't know.

All the women introduced complementary feeding to the children at the age of 6 months. The percentage of children having birth weight less than 2.5 kg was none, more than 2.5 kg was 100 %.

All the women under the study 40 % of them know about the malnutrition and 60 % don't know about malnutrition. The percentage of children who get the vitamin A and deworming tablet was 100 %.

Table 4.11 Birth weight of children

Birth weight of children	Frequency	Percentage
Less than 2.5 kg	0	0%
More than 2.5 kg	50	100%
Total	50	100.00%

All the mother breastfed their children which was same as result found by national survey (MOHP, 2012). 70% mothers breastfed their children in less than 1 hour which is a good result as compared to national level survey where only 45% of mothers breastfed their children in less than 1 hour (MOHP, 2012). This may be due to the facility that was given by the hospital. Hospital used to give money and ambulance service to the pregnant women for delivery. 82% of mothers fed colostrum to their children. This result is good as compared to result found in Bhajang district where 74.7% of children were fed colostrum (Caroline, 2007). Colostrum feeding and suffering from diarrhea had significant effect on underweight but not on stunting (Shah, 2004). Children whose mothers squeezed out colostrum were two-fold more likely to have malnutrition than those who fed their children colostrum (Bantamen *et. al.*, 2014). Education on important of colostrum for the development of children should be given to mothers. There may be some traditional believes that are preventing the feeding of colostrum. Further survey should be done to identify those taboos and should be eradicated.

All the children below six months were exclusively breastfed but exclusive breastfeeding was not strictly followed. They sometimes fed their children water or other food stuffs. The present result is good as compared to the national data where 70% of children under 6 months

were exclusively breastfed (MOHP, 2012). 92% of women were breastfeeding their children after 2 years of age.

All the mothers introduced complementary feeding to children at the age of 6 months but only 92% of breastfed children at the age of 6-23 months receive solid or semisolid complementary foods in addition to breast milk in Nepal (MOHP, 2012). Only 2.56% of mothers fed their children commercial milk. This may be because they did not have sufficient money to buy it. 92.31% of mother fed their children what was available in the household for adults i.e. rice, *daal*, curry etc. as the complementary food. They did not know about the household method for making complementary food. Only few of them used *sarbottam pitho*. There may be the economy problem with them but if they could know household method to make complementary food by their own there would be increased number of parents who used *sarbottam pitho*. 40% of mothers under the study reported as they know about the malnutrition and 60% don't know about malnutrition.

The percentage of children who get the vitamin A and deworming tablet was 100% which is good as compared to national data which found that Children in rural areas were more likely to receive vitamin A supplements (91 %) than those in urban areas (86 %) (MOHP, 2012).

4.11 Iodized salt

100 % of the houses used iodized salt. The percentage of people who thought that using iodized salt helps in physical development was 89.74%, mental development was 48.72%, prevent goiter was 10.26% and other was 2.56% but 5.13% of people reported as they did not know about the function iodized salt as shown in Table 4.11.

Table 4.12 Function of iodized salt

Function of iodized salt	Frequency	Percentage
Physical development	3	6%
Mental development	18	36%
Goiter	29	58%
Total	50	100%

All the children seemed as they were mentally and physically active. Similar result was found by national survey where More than 95 percent of households were using iodized salt,

indicating that Nepal is on track toward eliminating iodine deficiency according to national survey (MOHP, 2012).

4.12 Mother and child care

When women were asked if pregnant mother need extra food, 52 % replied yes and 48 % replied no. 100 % women had consumed iron and folate tablet during their pregnancy.

When women were asked about if they have done smoking and drinking during pregnancy then 28 % had replied they had done drinking alcohol only and 72 % had not done both drinking and smoking.

When women were asked about their first pregnancy age 2 % said 17 years, 14 % said 18 years, 26 % said 19 years, 28 % said 20 years, 12 % said 21 years, 8 % said 22 years, 6 % said 23 years and 4 % said 24 years as shown in Table 4.12

Table 4.13 Age at first pregnancy

Age in years	Frequency	Percentage
17	1	2%
18	7	14%
19	13	26%
20	14	28%
21	6	12%
22	4	8%
23	3	6%
24	2	4%
Total	50	100%

52% of mother reported that pregnant mothers need extra food than usual. But when asked about types of food, they simply replied ‘all types of foods’. This was 50% good and 50% bad. When they mean all food, they might be missing special foods that is required during the pregnancy. They might be eating a lot of rice or *daal* but might not be eating meat, fish, egg, green leafy vegetables. So, they need education about the foods that should be eaten necessarily during the pregnancy. May be this was the cause of high rate of stunting than the

wasting and underweight. By fulfilling the maternal nutritional need prevalence of chronic malnutrition like stunting can be lowered.

100% of mothers had consumed iron and folate tablet during their pregnancy. In national survey the proportion of women taking daily iron supplements for 90 or more days differs substantially between urban and rural areas (68% and 54%, respectively). Pregnant women in the terai are more likely to take iron supplements daily for 90 or more days (58%) than those in the mountain zone (49%) (MOHP, 2012). The present result is far better as compared to national data.

4.13 Child Immunization

100 % of household had done immunization to their children.

4.14 Diarrhea

When child was suffering from the diarrhea, 18 % mother breastfed and gave liquid food same as usual, 82 % mother breastfed and gave liquid food more than usual.

4.15 Types of foods child eats

The following types of foods were given children:

- cereals
- pulses
- vegetables
- fruits
- animal originated food

4.16 24-hour dietary recall

Almost all of them had similar pattern of food consumption. Children were given same foods as adult. The commonly used foods at different timetable in a day is shown below.

Breakfast

Rice, roti, tea, biscuits, bread, rice flakes and milk. They consumed these foods separately or in combined manner.

Launch

Rice, daal, pickle and curry (as season). The combination of these foods were used for launch.

Tea time

Roti, tea, biscuits, puffed rice, bread, rice flakes and milk, noodles, fried potato, other market products. They consumed these foods separately or in combined manner.

Dinner

Rice, daal, pickle and curry (as season). The combination of these foods was used for dinner.

This community loved meat, and other non-vegetarian products and consumed frequently. They ate non-vegetarian products especially pork meat minimum 1 to maximum 4-5 times a week.

4.17 Mortality of children

No child was found dead due to the malnutrition or disease in previous 1 year.

Part V

Conclusion

As the general objective was to assess the nutritional status of 5 to 10 years' children of Namje, Vedetar VDC of Dhankuta district the general objective was fulfilled. Similarly, the specific objective which was to determine the nutritional status and determine the prevalence of stunting, thinness and underweight of 5 to 10 years' children in Namje village. In conclusion, the results of this study indicate that under nutrition is still an important problem among 5-10 years' age group children of Namje village, Vedetar VDC, Dhankuta.

Few points can be concluded from the study:

- i. There is a higher prevalence of undernutrition among the children of 5-10 years' age group children of Namje village, Vedetar VDC, Dhankuta. i.e., stunting (38 %), underweight (18 %) and thinness (6 %).
- ii. Collectively, males were found to be more under nourished (stunted and underweight) than females i.e., prevalence of stunting (48 % in males and 28 % females) and underweight (20 % in males and 16 % in females) respectively. Whereas, female children were found more thinned than male children i.e., the prevalence of thinness was 4 % in males and 8 % in females.

Part VI

Recommendations

1. Stunting was found in high percentage than underweight and wasting. So, programs to improve the women's nutritional status and intervention programme on under 5 year children is required
2. Another anthropometric nutritional survey during another season in the same areas should be conducted to determine seasonal variations and their effect on the nutritional status of the children.
3. Consider the provision of supplementary food targeting the most vulnerable in the community, pregnant and lactating women and children under.
4. Health education program should be conducted targeting behavior change for pregnant women, lactating mothers and caretakers of children, with a special focus on hygiene and sanitation and appropriate IYCF practices.
5. Strengthen routine expanded micronutrient supplementation program at community level.
6. Professional in the study should disseminate health information on importance of colostrum milk.
7. Encouraging people for better sanitation.
8. Moreover, to validate the data obtained from anthropometry and household survey biochemical tests and clinical examinations can be performed
9. 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

Part VII

Summary

Malnutrition is the major factor in the massive morbidity and mortality of children throughout the world. A large number of children are affected by malnutrition mentally and physically. So, it has been important to assess the prevalence and their causes.

School children are the backbone of the development of the Nation. So, it is important to assess the nutritional status of school age children. For this purpose, the school age children of age group 5-10 years to find the prevalence of malnutrition among school children for the nutritional research, at Namje village, Dhankuta district. For the survey, 50 children were studied.

Anthropometric measurements (height-for-age, weight-for-age and BMI-for-age) of all 50 children were taken. Household survey was conducted by means of questionnaire to find the prevalence of variables affecting nutritional status. According to height-for-age, the percentage children found stunted were 38% where 28% (moderately stunted) and 10% children were found to be severely stunted According to weight-for-age, the percentage of 18% children found underweight where 4% were found severely underweight and 14% were found to be moderately underweight. According to BMI-for-age, the percentage of children found thinned were 6% where 2% were found to be severely thinned and 4% were found to be moderately thinned.

From the analysis of the result it was found that the percentages of malnourished children were found (38%, 18% and 6% were stunted, underweight and thinned respectively)

From the survey, it was found that male children were found to be more under nourished (stunted and underweight) than females i.e., prevalence of stunting (48% in males and 28% in females) and underweight (20% in males and 16% in females) respectively. Whereas, female children were found more thinned than male children in i.e., the prevalence of thinness was 4% in males and 8 % in females.

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APPENDICES

APPENDIX-A

9.1 Map of Namje village

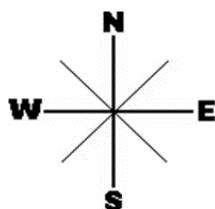


Fig. 9.1 Namje village map

APPENDIX-B

9.2 Questionnaire

फारम नं.

परिचय

१. घरमुलिको नाम.....

ठेगाना.....

२) बच्चाको आमाको नाम..... उमेर.....

३) उत्तरदाताको नाम..... लिङ्ग..... उमेर.....

घरमुलीसागको सम्बन्ध (यदी अन्य व्यक्ति भएमा)

.....

पारिवारिक विवरण

१.	परिवारको प्रकार : क) एकल (ख) संयुक्त
२.	परिवार संख्या :
३.	शिक्षा :- बुबा :- क) निरक्षर ख) प्राथमिक ग) ति.मा.वि. घ) मा.वि. ङ) उ.मा.वि. च) स्नातक छ) सो भन्दा माथि
४.	पेशा :- बुबा :- क) कृषि ख) सेवा ग) व्यापार घ) व्यापार घ) ज्याला मजदुर ङ) गृहिणी

५.	तपाईंको घरको मासिक आम्दानी कति छ ?
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व्यक्तिगत तथा वातावरणीय स्वास्थ्य :

६.	पिउने पानीको स्रोत के हो ? (क) धारा (ख) खोला (ग) कुवा
७.	पिउने पानी शुद्धिकरण गर्नु हुन्छ कि हुदैन ? (क) गर्छु (ख) गर्दिन यदि गर्नु हुन्छ भने कुन विधि प्रयोग गर्नु हुन्छ ? (क) उमालेर (ख) फिल्टर गरेर (छानेर) (ग) रासायनिक पदार्थ मिसाएर (औषधी) (घ) घाममा राखेर (ङ) अन्य (खुवाउनुहोस्)
८.	तपाईंको घरमा कस्तो प्रकार चर्पी छ ? (क) आधुनिक (ख) परम्परागत (ग) चर्पी छैन
९.	फोहोर व्यवस्थापन कसरी गर्नुहुन्छ ? (क) खाल्डोमा (ख) जलाएर (ग) जथाभावी
१०.	तपाईं कुन-कुन बेला हात धुनुहुन्छ ? (क) खानाखानु/खुवाउनु अघि (ख) दिसा गरेपछि (ग) बच्चाको दिसा सफा गरेपछि (घ) खाना तयार गर्नु अघि (ङ) अन्य (खुलाउनुहोस्).....

११.	हात धुन के प्रयोग गर्नु हुन्छ ? (क) पानीमात्र (ख) साबुनपानी (ग) खरानीपानी (ग) माटोपानी
१२.	घरमा खाना पकाउने इन्धन के छ ? (क) दाउरा (ख) गोबर म्यास (ग) सिलिण्डर (घ) अन्य

रोग सम्बन्धित ज्ञान/विचार धारणा :

१३.	तपाईंको विचारमा रोग कसरी लाग्छ ? (बहुउत्तर आउनसक्छ) (क) थाहा छैन (ख) देवी देवताको श्रापले (ग) पूर्व जन्मको पापको कारणले (घ) भूतप्रेतको कारणले (ङ) रोगका कीटाणुले/फोहोरले (च) सरसफाईको कमी (छ) अन्य -खुलाउनुहोस्)
१४.	रोग लाग्न नदिन के गर्नु पर्ला ? (क) सरसफाई गर्नु पर्छ (ख) सन्तुलित खाना खाने (ग) खोप लगाउनु पर्छ (घ) भगवान खुशी पार्नु पर्छ (ङ) अन्य (खुलाउनुहोस्)
१५.	तपाईं अथवा परिवार विरामी पर्दा उपचारको लागि सर्वप्रथम कहाा जाने गर्नुहुन्छ ? (बहु उत्तर आउन सक्छ) (क) नजिकको स्वास्थ्य संस्था (ख) औषधी पसल

	<p>ग) महिला स्वास्थ्य स्वयं सेवका घ) धामि भ्रात्री ड) कही पनि जान्न</p> <p>च) अन्य खुलाउनुहोस्.....</p> <p>यदि कही नलगेको खण्डमा के कारणले ?</p> <p>क) आर्थिक स्थितिको कमजोरी (ख) अविश्वास ग) अज्ञानता घ) लामो बाटो</p> <p>ड) अन्य.....</p>
१६.	<p>तपाईंको कुनै बच्चाको ५ वर्ष भन्दा कम उमेरमा मृत्यु भएको थियो ?</p> <p>(क) थियो (ख) थिएन</p>
१७.	<p>बच्चालाई आफ्नो विगौति दुध खुवाउनु भयो ?</p> <p>(क) खुवाए (ख) खुवाइन (ग) सम्झना छैन</p>
१८.	<p>यदि खुवाउनु भयो भने जन्मेको कति समय भित्र खुवाउनु भयो ?</p> <p>(क) १ घण्टा भित्र (ख) ८ घण्टाभित्र</p> <p>(ग) २४ घण्टाभित्र (ग) सम्झना छैन</p>
१९.	<p>तपाईं बच्चालाई आफ्नो दूध कति उमेरसम्म खुवाउनुभयो ?</p> <p>(क) ६ महिना (ख) १ वर्ष (ग) २ वर्ष (घ) ५ वर्ष</p>
२०.	<p>तपाईंले आफ्नो बच्चालाई जन्मेको कति समय पछि ठोस/भोल खानेकुरा खुवाउनु भयो ?</p> <p>क) ६ महिना अघि ख) ६ महिना पछि</p>
२१.	<p>बच्चालाई कस्तो खाने कुरा खुवाउनुभयो ?</p> <p>(क) अन्न (ख) गेडागुडी (ग) सागपात/फलफूल (घ) पशुजन्य (ड) सबै</p>
२२.	<p>तपाईंको बच्चा जन्मदा उसको तौल कति थियो ?</p> <p>(क) २.५ केजी भन्दा कम (ख) २.५ केजीभन्दा बढी</p>

	(ग) थाहा छैन
२३.	सन्तुलन भोजन भनेको थाहा छ ? क) छ ख) छैन
२४.	के तपाईंले कुपोषण (रुन्चे/सुकेनास) को बारेमा सुन्नुभएको छ/थाहा छ ? (क) छ (ख) छैन
२५.	यदि थाहा छ भने यस कारणहरु के के हुन् ? (क) सन्तुलित भोजनको कमीले (ख) भगवानको श्रापले (ग) कसैको आखा लागेर (घ) अन्य
२६.	तपाईंले बच्चालाई भिटामिन ए र जुकाको औषधि खुवाउनु भयो ? क) खुवाए ख) खुवाइन यदि नखुवाएको भए किन ? क) थाहा नभएर ख) उमेर नपुगेर ग) समय नभएर
२७.	तपाईंले आफ्नो घरमा खानको लागि कुन नुन प्रयोग गर्नु हुन्छ ? (क) ढिक्के नुन (ख) २ बालबालिकाको चिन्हभएको प्याकेटको (ग) प्याकेटको
२८.	यदि आयोडिन युक्त नुन खानु हुन्छ भने किन आवश्यक छ ? (क) गलगाडवाट बाच्च (ख) शारीरिक विकासको लागि (ग) मानसिक विकासको लागि (घ) अन्य
२९.	तपाईं कतिबेला सागसब्जी पखाल्नु हुन्छ ? (क) काटनुभन्दा अगाडि (ख) काटीसकेपछि

मातृ स्वास्थ्य र नवजात शिशुको स्याहार सम्बन्धि

३०.	तपाईं पहिलो पटक कति उमेरमा गर्भवती हुनु भएको थियो ?
३१.	गर्भवती अवस्थामा आइरन चक्की खानुभयो ? (क) खाए (ख) खाइन (ग) कति अवधिमा.....
३२.	गर्भवती अवस्थामा पहिलोको भन्दा बढी खानेकुरा खानुभयो कि भएन ? क) खाए ख) खाइन यदि खानेकुरा खानुभयो भने के कस्ता खानेकुरा खानुभयो ?
३३.	गर्भवती अवस्थामा धुम्रपान/मद्यपान गर्नुभएको थियो ? क) धुम्रपान ख) मद्यपान ग) छैन घ) दुवै
३४.	बच्चालाई खोप लगाउनुभयो ? क) लगाए ख) लगाएको छैन
३५.	बच्चालाई भ्नाडापखाला भएको बेलामा आफ्नो दूध वा तरल पदार्थ कतिको खुवाउनुहुन्छ ? (क) सधैं भन्दा बढी (ख) सधैं जस्तो (ग) सधैं भन्दा कम (घ) बन्द गरे (ङ) बच्चाले दूधचुस्न नसकेको

9.3 Informed consent

केन्द्रिय प्रविधि क्याम्पस

हात्तिसार, धरान

पोषण तथा आहार विज्ञान, चौथो वर्ष

मन्जुरीनामा

नमस्कार,

मेरो नाम प्रणय उदास 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 जिल्ला, भेडेटार गा.वि.स. नाम्जेमा रहेका ५ देखि १० वर्ष उमेरका मगर बालबालिकाहरूको पोषण स्थितिको अध्ययन” रहेको छ। यो अध्ययनको उद्देश्य यस क्षेत्रका बालबालिकाको पोषण स्थितिको बारेमा जानकारी संकलन गर्नु रहेको छ। यो जानकारीले हाम्रो अध्ययनलाई सहज बनाई हामीले सहयोग गर्नेछ र यसले यस जिल्लाको पोषण स्थितिलाई सुधार गर्नका लागि पनि मद्दत गर्न सक्नेछ।

तपाईंको छोरा/छोरी यस अध्ययनको लागि सहयोगी हुन छानिनु भएको छ र म तपाईंलाई यस सर्वेक्षणका प्रश्नहरू गर्नेछु र साथै तपाईंको बच्चाको केही नापहरू लिनु छ। अध्ययनका केही प्रश्नहरू नितान्त व्यक्तिगत पनि हुन सक्छन् तर तपाईंले दिनुभएको सबै जानकारी महत्वपूर्ण हुनेछ र सो जानकारीहरू एकदमै गोप्य राखिनेछ, साथै तपाईंले दिनुभएको सूचना तथा तथ्यांकको दुरुपयोग गरिने छैन। यो अध्ययनमा तपाईंको सहभागिता स्वेच्छिक हुनेछ। यदि तपाईंलाई कुनै वा सबै प्रश्न व्यक्तिगत तथा सम्बेदनशील लागेमा उत्तर नदिन पनि सक्नु हुन्छ। तर म यो आशा गर्दछु कि तपाईं यस अध्ययनमा सहभागी हुनु हुनेछ।

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

म यस अध्ययनमा सहभागी हुन इच्छुक छु र यस अध्ययनका लागि आवश्यक पर्ने मेरो बाल बच्चाको नापतोल लिन अनुमति दिन्छु।

.....
अध्ययनमा छानिएको बच्चाको अभिभावकको

.....
सर्वेक्षण गर्नेको सही

सही/औंठाछाप

APPENDIX-D

9.4 Survey photos

