

**ASSESSING THE NUTRITIONAL STATUS AND ITS ASSOCIATED  
FACTORS OF 6 – 59 MONTHS CHILDREN IN BUDHNAGAR VDC,  
MORANG**

by

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**2017**

**Assessing the Nutritional Status and its Associated Factors of 6 - 59  
Months Children in Budhnagar VDC, Morang**

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

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**Approval Letter**

This dissertation entitled *Assessing the nutritional status and its associated factors of 6 - 59 months children in Budhnagar VDC, Morang* by Pratik Dangol has been accepted as the partial fulfillment of the requirements for the B.Sc. degree in Nutrition and Dietetics.

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## **Acknowledgement**

First and foremost I would like to express deepest gratitude to my supervisor Asst. Lecturer Mrs. Babita Adhikari, for her great support and encouragement throughout my dissertation with her patience and knowledge. Also, I would like to express my sincere gratitude to Campus Chief, Central Campus of Technology Prof. Dr. Dhan Bahadur Karki, and to the Assistant campus chief, Central Campus of Technology Assoc. Prof. Dil Kumar Limbu for providing necessary facility and suggestion for this work.

I am also grateful to Dambar B Khadka, Department Head of Nutrition and Dietetics, Central Campus of Technology for sharing expertise, and sincere and valuable guidance and encouragement extended to me and also for providing me with all the necessary facilities for the research.

I take this opportunity to express gratitude to all of the Department faculty members & batch mates of Nutrition and Dietetics for their help and support. Also, I heartly thank my senior Mr. Arjun Poudel and Milan Dhakal for their guidance and suggestion for this research.

I cannot forget friends who went through hard times together, cheered me on, and celebrated each accomplishment: Sandeep, Basudev, Pratik, Yogita, Sushila, Sunita, Rita, Praja & Anuska. I take this opportunity to express my deepest gratitude towards Mrs. Sharda Dangol, Health worker of Budhnagar VDC, for her support during data collection. Also I would like to acknowledge all the juniors, in particular Sisir, Mohan, Deepak and Sundar for their support. I also thank my parents and sister (Prakriti and Palpasha) for the continuous encouragement, support and attention.

I am indebted to all of the people living in Budhnagar VDC because of their enormous help and passion in providing data and support my research team during research activities.

Regards,

Date of submission: January, 2017

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Pratik Dangol

## **Abstract**

A community based cross sectional study was conducted for assessing the nutritional status of 6-59 months children and its associated factors in Budhnagar VDC. For the study, 165 children were selected by random sampling. A structured questionnaire was administered to the mothers or care taker. Anthropometric measurements were used to determine if the children were underweight (weight-for-age), wasting (weight-for-height) and stunting (height-for-age) based on WHO reference. Statistical Package for the Social Science (SPSS) 20 version and World Health Organization (WHO) Anthro 3.2.2 version were used for analyzing the data. Chi-square test was used to identify the associated factors of malnutrition.

The analysis of the study revealed that, 41.2%, 32.7% and 11.5% of children were stunted, underweight and wasted, respectively. The main associated factor of stunting was child age. Similarly, underweight was associated with age of mother and iron intake was associated with wasting. Result from this study concluded that under nutrition is still an important problem among children aged 6-59 months in Budhnagar VDC. Furthermore, Child age, Iron intake of mothers and the age of mother are major risk factor of malnutrition and especial attention should be given on intervention of malnutrition.

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## Abbreviations

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<b>Abbreviations</b>	<b>Full form</b>
FCHV	Female Community Health Volunteer
HAZ	Height for Age Z Score
IDA	Iron Deficiency Anemia
IDD	Iodine Deficiency Disorder
LBW	Low Birth Weight
MoHP	Ministry of Health and Population
MUAC	Mid – Upper Arm Circumference
NDHS	Nepal Demographic Health Survey
NGO	Non – Governmental Organization
PEM	Protein Energy Malnutrition
RDA	Recommended Daily Allowance
SAM	Severe Acute Malnutrition
UN	United Nations
UNICEF	United Nations International Child Emergency Fund
VDC	Village Development Committee
WAZ	Weight for Age Z Score
WFP	World Food Program
WHO	World Health Organization

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## **Part-I**

### **Introduction**

#### **1.1 Background to the study**

Nepal is a food deficit, land locked and least developed country, having a population of more than 27 million people. Around 31 percent people in the country live below poverty level. Around 49.3 percent of under-five children are chronically malnourished. Globally, Nepal ranks 144th out of 182 countries in terms of its Human Development Index (UNDP, 2009).

Nutrition is defined as a science of food and its relationship to health. It is primarily concerned with the roles played by nutrients in the body growth, development, and its maintenance (Joshi, 2012). Adequate nutrition is one of the most basic needs of any human. Thus, adequate nutrition can be considered as a fundamental right of every human being. People who fail to receive the adequate nutrition both in quantity and quality will suffer from the hunger and elongated hunger or insufficiency of nutrient intake leads to malnutrition (B Srilakshmi, 2014).

Nutritional status is the condition of the health of an individual as influenced by the utilization of the nutrient. It can be determined only by correlation of information obtained through a careful medical and dietary history, through a physical examination and appropriate laboratory investigation (Robinson, 1972). Nutritional status is recognized to be a prime indicator of health of individuals or community. Growth assessment is the single measurement that best defines health and nutritional status of children, because disturbances in health and nutrition, regardless of their etiology, invariably affect child growth (Acharya, Gautam, Kaphle, & Naupane, 2013). Protein energy malnutrition has been a common health problem of the third world countries like Nepal. Stunting and wasting are common patterns of under-nutrition in children. In children, acute nutritional deficit and/or disease (such as diarrhea) produce wasting, characterized by a reduction in weight-for-height or arm circumference, or both (Acharya et al., 2013).

According to Gomez et al (1955), Malnutrition is defined as a pathological condition of varying degree of severity and disease clinical manifestation, resulting from the deficient assimilation of components of nutrient complex. The disease affects the physiological patterns of tissue, reduces the defensive capabilities to withstand different environmental

condition and lowers both the efficiency and ability in work and shortens life. Severe malnutrition in early childhood may interfere with normal physiological development such as children not having properly physical growth and full mental development. This means he/she will not be benefited as a normal adult in his/her future. Therefore, the child malnutrition is the indicator of his/her nutritional status during the period of childhood (Rajalakshmi, 1990).

Historically, Morang district has been derived from *Mawarang*, the name of *Kirati* administrative zone during regime of *Kirati* king *Hang*.<sup>1</sup> *Gograha* was its older name of present Biratnagar; headquarter of the district and Koshi zone, coined during *Ranna* regime which is connected with the name of King *Birat* of *Mahabharat* era. Now people believe that the capital of King *Birat* of that *Mahabharat* era was located at present Budhanagar V.D.C. which is 10 Km south east from Biratnagar. Morang district is one of the Eastern Terai district comprising 65 VDCs where 66 governmental health institutions are available for providing Primary Health Care services (DPHO., 2061/62).

Budhnagar is located at the border with India in the Eastern Development Region of Nepal and is therefore a major center for trade and commerce with India. The mother tongue for the majority of residents is Rajbansi, Maithili and hindi. The main inhabitants of the municipality chiefly consist of groups like Rajbansi, Yadav, Mandal, Amat, Malha and Ram etc. Hence, most of the people in Budhnagar are busy in agriculture and least is as foreign employment.

## **1.2 Problem Statement**

The Nutritional status of people of the developing countries is very poor. The major types of nutritional problems in developing countries are under nutrition and nutritional disorders which are resulting from inadequate food intake both in quality and quantity, particularly of calories, proteins, vitamins and minerals; and parasitic infection and disease (Burk, 1984). Malnutrition during childhood can lead to a risk of life-style diseases in the future as well as immediate risks of morbidity/mortality, according to a recent study (ACC/SCN., 1999).

Nepal suffers from extensive malnutrition, ranking in the top 10 countries with the highest prevalence of stunting (less than -2 SD scores) (UNICEF., 2009). The World Health Organization estimates that approximately 150 million children younger than 5

years in developing countries are underweight and an additional 200 million children are stunted (Laura, 2004).

Although, WHO, UNICEF and National breastfeeding policy recommended that infants be exclusively breastfed from birth to 6 months and continue breastfeeding to 24 months and beyond for optimal survival, growth development 70% of infants under six months of age are exclusively breastfed in Nepal (MoHP, 2012). The poor breastfeeding and inadequate complementary feeding explained the protein energy malnutrition level in children as they grow older.

The prevalence of under nutrition is still high in Eastern Terai i.e. 31.4% stunting, 10.3% wasting and 24% underweight (MoHP, 2012). Budhnagar VDC, though located just about 10 km away from main highway of Biratnagar, is still underdeveloped and no any study were conducted before to assess the nutritional status. Thus, there was need for determining the current nutritional status of Budhnagar VDC. Therefore, this study is designed to assess the factors associated with nutritional status of 6 – 59 month children which can be used as a reference in priority setting and designing effective nutritional programs at Budhnagar VDC.

### **1.3 Propose of study**

The study is conducted to fulfill following purposes:

- To provide primary data on nutritional status, household status and related factors of particular area which could be utilized further by concerning agencies in improvement of living standard through better nutrition of people.
- To make people aware of the real situation of nutrition among them and further encourage to bring about awareness in the improvement of their existing nutritional status.
- As a representative of the nutritional well-being of an entire population because this age group suffers the effects of malnutrition more severely.

## **1.4 Objective of the study**

### **1.4.1 General**

The general objective of this work is to assess the nutritional status of 6-59 months children of Budhnagar VDC and to assess the factors which are responsible for the nutritional status of the children.

### **1.4.2 Specific objectives**

- a. To carry out the anthropometric survey of particular age group population.
- b. To collect information regarding various variables such as illiteracy, socioeconomic levels, history of infectious disease.
- c. To find out the significant association with various factors affecting nutritional status.

## **1.5 Research questions**

- a) What is the existing nutritional status of 6-59 months children in Budhnagar VDC?
- b) What are the factors associated with the nutritional status of 6-59 month children of Budhnagar VDC?

## **1.6 Significance**

The findings of this study will be helpful to

- a) Provide information regarding the nutritional status of children between 6-59 months of age to the governmental and non-governmental organization (NGO) which will be helpful to initiate corrective measures for the problem.
- b) Make people aware about the current real situation of nutritional status in their surroundings.
- c) Act as guide for the development of proper nutritional program in this community by undertaking the discovered facts.
- d) Act as tool to discover the problems related to nutrition and feeding practices of this community.



## **1.7 Limitation of the study**

- a) Dietary diversity during 24 hours which is the immediate determinant of nutritional status of children was not included in the study
- b) The study is cross-sectional in design and it does not represent seasonal variation of nutritional outcomes particularly to wasting status.
- c) Facts finding information about family income, child weight at birth, age at first pregnancy, age of child etc may not be given accurately.

## **Part-II**

### **Literature Review**

#### **2.1 Nutrition status**

Malnutrition is not a simple syndrome. The poorly nourished individual, as a rule, suffer from a complexity of deficiencies. The great diversity of body function that may be ill-affected by inadequate nutrition complicates the process of assessing nutritional status. (Wilson, Fisher, & Fungua, 1971).

Nutritional status has been defined as the condition of the body resulting from the intake, absorption and utilization of food. It can be measure directly (M. Burk, 1984). Nutritional status is the condition of health of the individual as influenced by the utilization of the nutrients. It can be determine only by the correlation of information obtained through a careful medical and dietary history, through physical examination and appropriate laboratory investigation (B. Srilakshmi, 2014b).

The prevalence of poor nutrition status on developing country is mainly due to the low income, low production of food, low productivity of crops and livestock, unequal distribution of food, low literacy, socio-culture and poor environmental sanitation (Nabarro,1984) . The poor nutritional status has both direct and indirect effect on learning skills, mental performance as well as a working capacity (Schmitt, 1979) resistance to disease. Broadly speaking the development of nation depends on the nutritional status of its people (S. B. Katwal, 1989).

##### **2.1.1 Factor Affecting the Nutritional Status**

The factors affecting nutritional status are mother's food security, breast feeding practices, types of food given to young children, feeding frequency, status of women and child nutrition and last but not the least who feeds the child and how the child eats (NMISC, 2010).

Among the underlying determinants of chronic malnutrition, we considered as a proxy measure of current or recent socioeconomic status (SES), the asset index, household size, the nutritional status of the mother (measured by her BMI), health knowledge and care practices measured by mother's education, mother's marital status, birth interval and place

of delivery of children (Kandala, Madungu, Emina, Nzita, & Cappuccio, 2011). Also , factors influencing the nutritional status are food availability and its distribution system , consumption , income , and purchasing power , price of commodities , illiteracy , family size , sociocultural and religious beliefs, environmental sanitation and health facilities play very integral roles in the nutritional status of the people in developing countries (Eusebio, 1988).

### **2.1.2 Food availability**

Food availability is a factor of production capacity, amount of imports and amount that is normally used at a given period in time and of the availability of storage. Food availability is also influenced by the availability of seeds, pest infestation, weather condition, availability of pasture, land acreage under cultivation, labour and insecurity issues. The amount of food used by households, traded or stored all influence availability at the household level.

Good health depends on the adequate food supply and consumption. This is turn, on a sound agriculture policy and good system of food distribution. The food distribution determines the state of health and the incidence of disease among population. If the food supply is inadequate than the physiological needs, malnutrition and under nutrition could result (Yadav, 1994). Increased production of food groups making the national diet balance is one of the most important measures of achieving, nutritional adequacy. Where the national diet are deficient in nutrient, adverse consequences manifest themselves, for example, there is high prevalence of anemia due to iron deficiency ,blindness among children due to vitamin A deficiency etc. Thus, the real solution to overcome the deficiencies disease is to consume diet rich in these nutrients (H. R. Katwal, 1992). For the achievement of nutrition adequacy, increased production of food groups making the national diet balanced is one of the most important measures. Adverse consequences are manifested themselves if the national diet are deficient in nutrients. Vitamin A deficiency followed by iron deficiency, blindness among children, Protein Energy Malnutrition (PEM) and so on which could be overcome by supplying or consuming diets rich in these nutrients (Rajiv, 2002).

## 2.2 Nutritional Requirements

Nutritional Requirements refers to the amount of food, energy and nutrient needed on an average per day by specific group and sex categories to meet the needs of healthy individuals for normal functioning of the body for work and growth (Burk, 1984). The energy supplies seem to occur important in those developing countries where the staple commodities are either very low in protein content or the protein is of very low quality. Most of the people of developing countries depend upon starchy food and derived their 80% of total calories from them. The people of those country are able to obtain about 87% of calorie intake and 79% of gross protein intake and they receive only 6.4% of their calories and 8.9% of their protein from the consumption of meat, egg , milk and milk fats combined (Yadav, 1994).

The recommended daily allowance of nutrients for pre-school children (1-6 years) is shown in the table below:

**Table 2.1** ICMR Recommended Dietary Allowance for pre-school children-2010

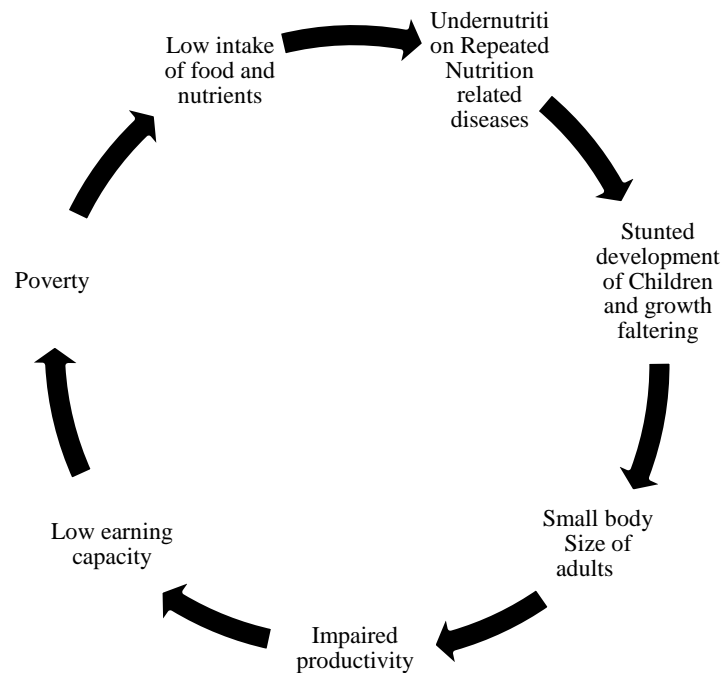
NUTRIENTS	YEARS	
	1-3	4-6
Calories (Kcal)	1240	1690
Protein (g)	22	30
Fat(g)	25	25
Calcium(mg)	400	400
Iron(mg)	12	18
Vitamin A( µg)	400	400
Thiamine(mg)	0.6	0.9
Riboflavin(mg)	0.7	1
Nicotinic acid(mg)	8	11
Pyridoxine(mg)	0.9	0.9
Ascorbic acid(mg)	40	40
Folic acid(µg)	30	40
Vitamin B12(µg)	0.2-1	0.2-1

(B Srilakshmi, 2014)

### 2.3 Nutrition, Health promotion and Human Development

Nutrition and health education has been defined as educational measures for including desirable behavioral changes for the ultimate improvement in the nutritional and health status of individual. This is one of the most commonly implemented measures, not only of the health sector, but of other sector concerned with development of human resources. Growth is influenced by nutrition. Frequent attacks of infectious diseases affect their growth and increase the requirements of various nutrients (Srilakshmi, 2014).

As we know nutritional status of individual has direct impact upon ones development and as a whole on the productivity too. It is hampered because of under nutrition and good nutrition is not possible with low productivity as it results in low living standard. Thus the developing and under developed countries generally have a vicious cycle of poverty resulting in malnutrition (Dahal, 2002).



**Fig: 2.1** The vicious cycle of poverty

Source: (National Nutrition Policy Government of India, 1993)

### 2.4 Malnutrition

Malnutrition can be defined as a pathological condition of varying degree of severity and diverse clinical manifestations, resulting from the deficient assimilation of components of

nutrient complex. The disease affects the physiological patterns of tissues, reduces the defensive capabilities to withstand different environmental conditions and lowers both the efficiency and ability in work and shortens life (Gomez, Galvan, Craviato, & Fronk, 1955). Malnutrition has been defined as a pathological state resulting from relative or absolute deficiency of one or more nutrients. This state is clinically manifested or detected only by biochemical, anthropometric or physiological tests (Derrick Brian Jelliffe, 1966).

Nepal suffers from extensive malnutrition, ranking in the top 10 countries with the highest prevalence of stunting (less than -2 SD scores) and the top 20 countries by number of stunted children less than five years of age worldwide (Unicef, 2009). Malnutrition is one of the biggest health problems that the world currently faces and is associated with more than 41% of the deaths that occur annually in children from 6 to 24 months of age in developing countries which total approximately 2.3 million. World Health Organization in 2001 reported that 54% of all childhood mortality was attributable, directly or indirectly, to malnutrition (Akorede & Abiola, 2013).

According to United Nation (UN) report (2007), 46% of children under the age of five years suffer from under nutrition. Malnutrition is the direct or indirect cause for 50% of the total deaths among children (B. Srilakshmi, 2014a).

#### **2.4.1 Forms of Malnutrition**

According to WHO (WHO, 1996a), there are four forms of malnutrition. They are as follows:-

##### **2.4.1.1 Under Nutrition**

This is the condition which results when insufficient food is eaten over an extended period of time. In extreme cases, it is called starvation.

##### **2.4.1.2 Over Nutrition**

This is the pathological state resulting from the consumption of excessive quantity of food over an extended period of time. The high incidence of obesity and diabetes in western societies is attributed to over nutrition.

### **2.4.1.3 Specific Deficiency**

It is the pathological state resulting from a relative or absolute lack of an individual nutrient.

### **2.4.1.4 Imbalance**

It is the pathological state resulting from a disproportion among essential nutrient with or without the absolute deficiency of any nutrient.

## **2.4.2 Nutrition deficiency disorder**

### **2.4.2.1 Protein energy malnutrition**

Protein energy malnutrition, also known as starvation, is defined as a diet with insufficient amounts of all the major macronutrients: proteins, carbohydrates and fats. A starving person becomes skeletally thin and weak and is in danger of death. Protein energy malnutrition usually is seen during famines in Third-World countries and in eating disorders in Western societies (WFP, 2016).

PEM is 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 infections (United Nations Children's Fund & WHO, 2009). According to a survey protein energy malnutrition in Nepal is 43% (MoHP, 2012).

#### **2.4.2.1.1 Kwashiorkor**

Dr. Ciceley Millons (1953) first introduce the word Kwashiorkor, given to the disease by people of gold coast in Africa in 1935. The term Kwashiorkor means, the disease which the child gets when the next baby born i.e. sickness of the disposal child (Derrick Brian Jelliffe, 1966).

#### **2.4.2.1.2 Marasmus**

This is common form of PEM. It is a child version to starvation. It usually occurs in a second six months of life. The cause is the diet very low in calories and incidentally in protein and other essential nutrients. The symptoms include, severe wasting of muscle mass, shrunken eyeball, depressed cheeks, and ribs becomes prominent etc. It mainly occurs 6 to 18 months of age (Davidson, 1992).

#### **2.4.2.1.3 Marasmic kwashiorkor**

When the incidence of PEM is high, a large number of cases show some of the features of both marasmus and kwashiorkor (Passmore & Eastwood, 1986).

#### **2.4.2.2 Vitamin A Deficiency**

Vitamin A deficiency is one of the most common vitamin deficiency in children throughout the developing world (Mason et.al.2001). Sixty-nine percentage of children in Southeast Asia have vitamin A deficiency (Ramakrishnan, 2002).

Deficiency of vitamin A can lead to blindness (Xerophthalmia) (Ramakrishnan, 2002), disease mobilization of iron from stores and impair the immune system. Vitamin A is integral to the mucosal lining of small intestine that protects the body from bacteria; thus vitamin A deficiency is associated with higher risk of diseases, such as measles and malaria (Bhaskaram, 2002).

Vitamin A supplementation is most effective when received twice a year and it administered in bi-annual dose to children under the age of five in many developing countries (Bhaskaram, 2002).

Nepal Micronutrient Status Surveys 1998 has revealed that 32% children below 5 years of age and 17% women are being affected by vitamin A deficiency (New ERA, 1998). Only forty-seven percent of children age 6-23 months consumed foods rich in vitamin A daily and the 2011 NDHS data reveals that vitamin A supplements for children under age 5 shows that 90 percent of children age 6-59 months were given vitamin A supplements in the six months before the survey where as 40% of women receive a vitamin A dose during the postpartum. A slight difference can be seen among women who receive postpartum vitamin A by urban (46%) and rural residence (40%).

The proportion of children receiving a vitamin A supplement increases with age from 70 percent at 6-8 months to 93 percent at 24-35 months before declining to 91 percent at 48-59 months. Children in rural areas are more likely to receive vitamin A supplements (91 percent) than those in urban areas (86 percent). There is only a slight difference in the proportion of children receiving vitamin A supplements by ecological zone and sub region.



Similarly, mother's education and wealth do not have an impact on use of vitamin A supplementation (MoHP, 2012).

#### **2.4.2.3 Anemia**

Anemia, characterized by a low level of hemoglobin in the blood, is a major health problem in Nepal, especially among young children and pregnant women. Anemia may be an underlying cause of maternal mortality, spontaneous abortions, premature births, and low birth weight (LBW). The most common cause of anemia is inadequate dietary intake of nutrients necessary for synthesis of hemoglobin, such as iron, folic acid, and vitamin B12.

According to the report of the WHO, approximately 60% of the pregnant women in developing countries were anemic, and iron deficiency anemia (IDA) was associated with about 20% of premature births, LBW, and maternal deaths (World Health Organization, 2011). The situation in Nepal is also not good. A recent widespread study in Nepal revealed that nearly half (46.2%) of children aged 6-59 months, two thirds (69%) of young children aged 6-23 months, 35% of women aged 15-49 years, and 47.6% of pregnant women were found to be anemic (MoHP, 2012).

#### **2.4.2.4 Iodine Deficiency Disorder**

Iodine deficiency disorders (IDD) is a more precise term than "goitre" because the latter only refers to the size of the thyroid gland. The former on the other hand, also includes a condition associated with iodine deficiency. Among this are still births, abortions and congenital anomalies, endemic cretinism, characterized most commonly by mental deficiency deaf mutism and spastic diplegia. For a lesser degree of neurological defects related to fetal iodine deficiency, and impaired mental function in children and adults with goitre and decreased circulating thyroxine. Correcting iodine deficiency in the mother before pregnancy prevents iodine deficiency disorders in infants and children (Westcott & Stott, 1977).

The iodine deficiency disease, goiter, occurs in those areas where iodine content is low that insufficient iodine is obtained through food and water. Iodized water can thus prevent goiter in districts where this disease is common.

#### **2.4.2.5 Zinc Deficiency**

The mineral zinc is necessary for proper function of your immune system. Zinc also helps cells divide and grow and assists the body in healing wounds. Deficiency symptoms include frequent infections, hair loss, poor appetite, problems in tasting and smelling and long healing times for wounds. Zinc deficiency can be stopped or prevented by eating nuts, legumes, yeast and whole grains. Zinc is also found in beef, pork and lamb (WFP, 2011).

### **2.5 Nutritional Situation**

#### **2.5.1 Incidence of Under-nutrition**

Malnutrition is associated with more than half of all child deaths worldwide. Undernourished children are more likely to die from common childhood ailments and, for those who survive, have recurring sicknesses and faltering growth. Three quarters of the children who die from causes related to malnutrition are only mildly or moderately malnourished—showing no outward sign of their vulnerability. One of the MDGs is to halve the proportion of people who suffer from hunger between 1990 and 2015. A reduction in the prevalence of malnutrition will also assist the MDG on reducing child mortality (CBS, 2012).

Nationally, 41 percent of children under age 5 are stunted, and 16 percent are severely stunted. Analysis by age group shows that stunting is highest (53 percent) in children age 36-47 months and lowest (14 percent) in children age 9-11 months. Severe stunting shows a similar pattern, with the highest proportion of severe stunting in children age 36-47 months (23 percent) and the lowest in those age 6-11 months (4 percent). Stunting is slightly higher in male children (41 percent) than in female children (40 percent) (MoHP, 2012).

Nutritional status of children less than age 5 as measured by weight-for-height, overall 11 percent of children are wasted and 3 percent are severely wasted. Analysis by age group shows that wasting is highest (25 percent) in children age 9-11 months and lowest (7 percent) in children age 36-47 months. Male children are more likely to be wasted (12 percent) than female children (10 percent) (MoHP, 2012).

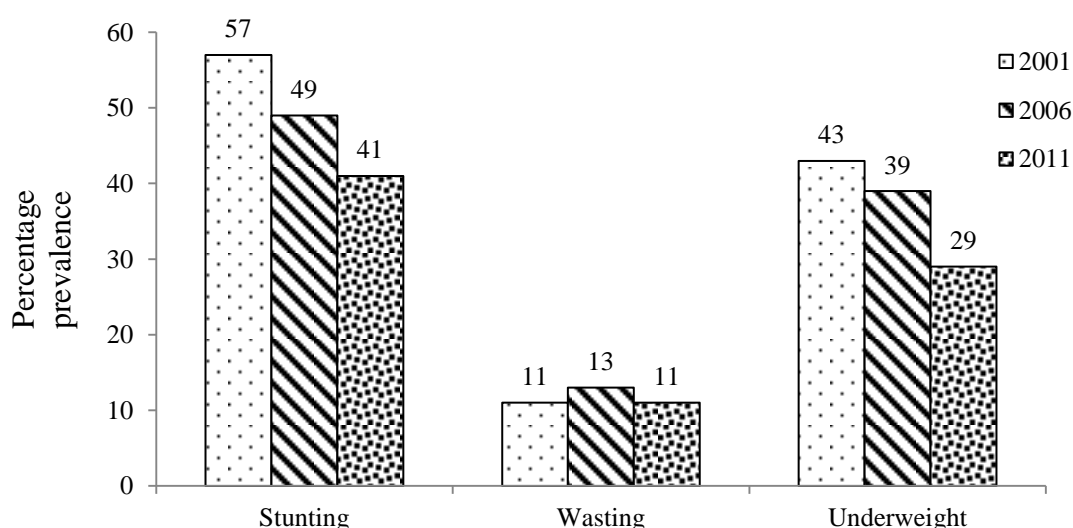
29 percent of children under age 5 are underweight (low weight-for-age), and 8 percent are severely underweight. The proportion of underweight children is highest (37 percent)

among those age 18-23 months and lowest (18 percent) among those under 6 months. Male children are slightly more likely to be underweight (30 percent) than female children (28 percent) (MoHP, 2012).

### 2.5.2 Trends in Children’s Nutritional Status

Trends in the nutritional status of children for the period 2001 to 2011 are shown in Figure 11.2. For the purpose of assessing trends, the data from the 2001 NDHS were recalculated using the WHO child growth standards adopted in 2006, as both the 2006 NDHS and 2011 NDHS are based on this reference population (MoHP, 2012).

In general, the nutritional status of children in Nepal has improved over the past 15 years and is close to achieving the Millennium Development Goal (MDG) target of reducing the percentage of underweight children age 6-59 months to 29 percent by 2015 (National Planning Commission, 2010a). Figure 2.5.2.1 shows a downward trend in stunting and underweight over time. The percentage of stunted children declined by 14 percent between 2001 and 2006 and declined by an additional 16 percent between 2006 and 2011. A similar pattern is observed for the percentage of underweight children, which dropped by 9 percent between 2001 and 2006 and by 26 percent between 2006 and 2011. Similarly, the percentage of wasting declined by 15 percent between 2006 and 2011 (MoHP, 2012).



**Fig: 2.2** Trends in Nutritional Status of Children under Five Years (MoHP, 2012)

### 2.5.3 Nutritional Status in 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 2011 has provided the data on prevalence of malnutrition under 5 years of child.

The percentage of prevalence of malnutrition below 5 years of age is illustrated in given diagram.

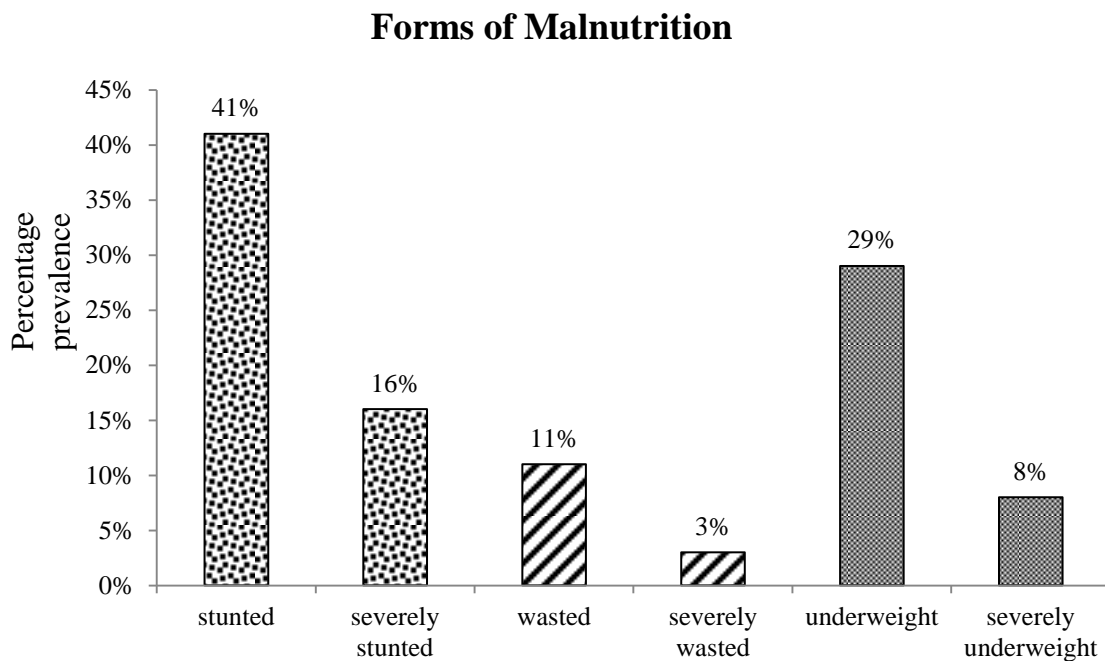


Figure 2.3: Prevalence of Malnutrition in Nepal (MoHP, 2012)

### 2.6 Breastfeeding

World Health Organization (WHO) defines breastfeeding as when the child has received breast milk either direct or from the breast or expressed (WHO, 1996b). Breast feeding is recognized worldwide as being beneficial to mother and baby. Breast milk is considered as best source of nutrient and protective antibodies for the baby. Breast milk goes through various transitional stage ;colostrum's is the first stage that occur during gestation to a few days after delivery .It is creamy, yellow, colored and is much thicker than milk that is produced in later stage (WHO, 1996b)

Colostrum is richer in protein, vitamins, minerals and all the important antibodies compared to milk in later gestation. The antibodies help to protect the baby from illness causing bacteria in the environment. Colostrum is a mild laxative which helps the baby the meconium: the tar like stool of the first day and helps to prevent jaundices (WHO & UNICEF, 1993). Breast milk then goes through a transitional stage and finally mature milk which again changes its composition during the course of lactation (WHO & UNICEF, 1993). Breastfeeding meets all necessary nutrient and fluid needs of infants and changing needs of the child until four to six months of age (WHO & UNICEF, 1993).

## **2.7 Weaning process in Nepal**

Breastfeeding in the first years of life protects children from infection, provides an ideal source of nutrients, and is economical and safe. However, many mothers stop breastfeeding too soon and there are often pressures to switch to infant formula, which can contribute to growth faltering and micronutrient malnutrition and is unsafe if clean water is not readily available. WHO/UNICEF provide the following feeding recommendations (NMICS, 2012). Exclusive breastfeeding for first six months of life.

- a) Continued breastfeeding for two years or more Safe, appropriate and adequate complementary foods beginning at six months of age.
- b) Frequency of complementary feeding: two times per day for 6–8-month-olds; three times per day for 9–11-month-olds.
- c) It is also recommended that breastfeeding be initiated within one hour of birth.

According to Nepal Demographic Health Survey 2011, 70 percent of children under age 6 months are exclusively breastfed, and 66 percent of children 6-8 months (breastfed and non-breastfed) are introduced to complementary foods at an appropriate time. Ninety- three percent of all children are still breastfeeding at age 1, and the same proportion are still breastfeeding at age 2. Four out of five Nepalese children ages 0-23 months are breastfed appropriately according to their age. This includes exclusive breastfeeding for children age 0-5 months and continued breastfeeding along with complementary foods for children age 6-23 months. Four-fifths of children under 6 months are predominantly breastfed. This percentage includes children who are exclusively breastfed and those who receive breast milk and only plain water or non-milk liquids such as juice. Finally, 6 percent of children under age 2 are bottle fed (MoHP., 2012).

### 2.7.1 Weaning pattern

Weaning means to provide supplementary food to the child apart from mother's milk. Most of the mother starts to work in the field after one month of their baby birth and they have less time to feed their infants. If the baby is hungry while mother is absent the baby may be fed with "jaulo", milk etc. This provides the temporary relief although it is inappropriate for the infants less than four months (Vaidya, 1988). The mother's milk supply may also be diminished by her work loads and nutrition compensation (Vaidya, 1988).

Weaning that began too early involves the risk of infection, weaning that too late leaves the infants with an inadequate intake of nutrients and, thus is harmful to the growth and development of child. Thus, both early and late supplementation is harmful for child health (Abote, 1987). Among many facilities in Nepal, the fifth or sixth months of the life are marked by the rice feeding ceremony i.e. *Pasni* in which the baby is offered rice or *Kheer* according to the economic condition of the family for the first time. After this ceremony the baby can take supplementary foods. But the mother will continue to give breast milk beyond the first year. This late introduction causes serious under-nutrition at this age (Bhandari & Chhetri, 2013).

### 2.7.2 Weaning practice

Children are nutritionally the most vulnerable member of the childhood especially the second year of life is notoriously fraught with risk. The young child is "transitional" as regards diet immunity to infections and psychological dependence. Rapid growth with high nutrient needs, particularly of proteins for swiftly increasing muscle tissues. It is the time when several meals a day are required and when the foods should be easily digestible (Derrick Brian Jelliffe, 1966). During the weaning period, good food sources of energy, protein, calcium and iron are particularly important. On the basis of body weight children should require twice as much protein, calcium and iron as do adults (Vaidya, 1988).

Common traditional weaning foods include:

#### a) Porridge (*lito*):-

As mentioned earlier, after *pasni* the child can take supplementary food and the infants are fed with *Litto*. *Litto* is a traditional blend rice porridge made with green vegetables is also given to infants, but it is specially given to convalescing young children. *Sattu*

an infant food particularly made from roasted maize is used especially in the Terai (Vaidya, 1988). Another traditional food which has been shown by scientists to be very nutritious, is a porridge made from the finely ground flour of roasted cereal grains and pulses. In Nepal this is known as super-flour porridge or *sarbottam pitho ko lito* (Nidhi, 2006).

**b) Jaulo:-**

They are made from rice and turmeric or rice and salt. They are poor weaning foods with little protein or nutrients, so adding pulses, green leafy vegetables or fruit to these foods is encouraged (Nidhi, 2006).

**c) Dhiro:-**

They are made from maize flour (or millet or wheat). In an under developed country like Nepal the average family food, *Dal Bhat* in small quantities and in diluted form is given to the infants child, especially in the hills among low income group families, is *Dhindo*.

**d) Khichari:-**

Some of these traditional foods are high in energy and nutrients and should be encouraged. These are made with a mix of rice, pulses and vegetables (Nidhi, 2006).

### **2.7.3 Exclusive breastfeeding**

Exclusively breastfeeding is extremely important in developing country where limited access to clean water increases the risk of diarrheal diseases if the replacement feeding is used (WHO, 1996b). Other factors which render exclusive breast feeding is very important in developing countries include high rates of HIV , poverty and food insecurity as in lack of enough nutritious food children and mothers (WHO, 1996b). Some of the known benefits of breastfeeding are more likely to happen when the infant is exclusively breastfed .Lower rates of cancers and diabetes during childhood are specific to infants who were exclusively breastfed (Mbwana, 2012).On top of that, infants who receive complementary foods below six months are reported to have higher rates of gastrointestinal infection compared to infants who are exclusively breastfed (Khadivzadeh & Parsai, 2004). Exclusive

breastfeeding for six months has been shown to provide all the nutrients the baby requires and not affecting their growth, development and health (Kramer et al., 2003).

## **2.8 Assessment of nutritional status**

There are two methods for assessing nutritional status.

### **1. Direct method**

This method deals with the individual and measures the objective criteria. Direct methods of nutritional survey summarized as:

- Anthropometric methods
- Biochemical or laboratory methods
- Clinical methods
- Dietary evaluation methods

### **2. Indirect method**

This method uses community indices that reflect community nutritional status or needs.

- Ecological variables including agricultural crop production, food balance sheet, health and educational services.
- Socio-economic factors eg. family size, occupation, per capita income, population density, education, customs and social habits
- Vital health statistics particularly infant and under 5 mortality: morbidity related to PEM, anemia, goiter, diarrhea, measles and parasitic infections.

## **2.9 Indicator in nutritional status**

A variety of indicators, which can be used for the purpose of assessing nutritional status, are currently available. Of the many possible indicators of nutritional status only few are suitable for the evaluation of field program. The only indicator of nutritional status that are applicable in a large scale and for which a suitable experience if available are those based on anthropometric indicators are best applicable in the evaluation of nutritional status (Keller, 1982).



WHO, listed nutritional status lowering indicators based on body dimensions, birth weight, weight for height, height for age, weight for age, arm circumference, reported in 1976. The measurement of weight and height is relatively simple and reliable and their changes and distribution over ages are well documented for healthy well-nourished reference populations. The simplest of these indicators are weight-for age (Keller, 1982; RAPA., 1984/4) . It is widely used for both the assessment of child population and the monitoring of individual development.

Weight is the measure of total body mass but gives no indication of its structure, a tall thin child may have same mass as a short, well-proportioned one, a fact that introduces a considerable error in to the classification of malnutrition by weight for age particularly in the categories of mild‘ and moderate‘ malnutrition. Therefore, a refinement that has long been used by anthropologist was introduced into the nutritional anthropometry of children (Scoane & Lathan, 1971). By relating the weight to the attained height a distinction was made between chronic and acute malnutrition (Scoane & Lathan, 1971) or between; stunting ( low-height-for-age), and wasting‘ (low-weight-for-height), (Waterlow. & J, 1972). The three indicators weight-for-age , height-for-age, and weight-for-height have since found wide acceptance and application and probably more is known today about these indicators in different population and different health situations than any of other indicators that have been prepared in the past (Keller, 1982).

An essential component of these indicators and their use is the reference population. It provide the indicator value of the population that are considered normal i.e., healthy and without significant deficiencies, and against which measured indicator value are compared while the indicator weight-for-height is apparently independent of age during childhood (Waterlow. & J, 1972). In the case of dependent indicators weight-for-age and height-for age, it has been argued the major difference in growth potential between ethnic groups would require local references population. It has however, been shown that with few exception growth of different ethnic groups under favorable conditions is almost identical (Bondal, 1996).

### **2.9.1 Anthropometric measurement**

Anthropometry is the study of the measurement of the human body in terms of the dimensions of bone, muscle, and adipose (fat) tissue. The word “anthropometry” is derived

from the Greek word “anthropo” meaning “human” and the Greek word “metron” meaning “measure” (Ulijaszek, 1994).

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, 1996)

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:

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

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)

### 2.9.1.1 Weight for age

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).

**Table 2.2** Definition of malnutrition according to weight-for-age index (W/A), expressed as a Z-score

Definition	Index
Normal	>-2 z-score
Underweight	-3 z-score $\leq$ W/A < -2 z-score
Severe underweight	< -3 z-score

### 2.9.1.2 Height for age

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 2.3** Definition of chronic malnutrition according to height-for-age index (H/A), expressed as a Z-score

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

### 2.9.1.3. Weight for height

Weight is the anthropometric measurement most in use. Its potential value, especially for children, is appreciated not only by health personnel, by often by less educated parents, for whom it is useful as a source of health education. In developing regions, the prevalence of protein-calorie malnutrition appears to be best indicated by weight deficiency in all age-groups and by growth failure in children. Weighing is the key anthropometric measurement. Weight estimations can be made on isolated occasions, as in many surveys, or repeated at intervals under special conditions, as at child-welfare clinics, schools, parental clinics, or in longitudinal studies. These serial measurements give a better index of actual growth or growth failure (Derreck B 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 anthropometry usually only the total height (or length) is measured (Derreck B 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 (United Nations Children's Fund & WHO, 2009).

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

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 2.4** Definition of acute malnutrition according to weight-for-height index (W/H), expressed as a Z-score

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

#### 2.9.1.4. 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 (Derreck B Jelliffe, 1966). Both MUAC cut-offs recommended by WHO and used at national level are as in the Table 2.4 below.

**Table 2.5** WHO and national MUAC cut-off points for children 6-59 months

<b>National cut-offs</b>	<b>WHO recommended cut-offs</b>	<b>Classification</b>
	> 135 mm	Normal
	125-135 mm	At risk of malnutrition
110-124 mm	115-124 mm	Moderate malnutrition
<110 mm	<115 mm	Severe malnutrition

## Part-III

### Materials and methods

#### 3.1 Research design

An area survey of under five year children of Budhnagar VDC of Morang district consist of two important approaches that are likely to be important in field based nutritional survey of research design. They as follows

- a) Anthropometric measurement of 6-59 months children.
- b) General survey of situation of household belongs to the children with the help of Questionnaire.

#### 3.2 Study area

Study area was conducted on Budhnagar VDC of Morang District, Nepal which was located near border area of India. The VDC was about 10 Km south east from Biratnagar Sub-Metropolitan Office.

#### 3.3 Study variables

Study variables are:

**a) Dependent variables:** - Anthropometric measurement were used

- Weight for age (Underweight)
- Height for age (Stunting)
- Weight for height (Wasting)

**b) Independent variables:** -

Independent variables of the study were:

- i. Socio-economic and demographic variables: head of household, ethnicity, family size, income, occupation, education
- ii. Child characteristics: age, sex, birth order, breastfeeding status and morbidity status.
- iii. Child care practices: Feeding, hygiene
- iv. Maternal characteristics: age, iron supplementary intake, number of children born,
- v. Environmental health condition: water supply, sanitation and housing condition.

### 3.4 Study population

Children under five years of age were included as target population of the study.

Inclusion and exclusion criteria are

- **Inclusion criteria:**

Children aged 6-59 months who live in VDC will be included in the study.

- **Exclusion criteria: -**

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

### 3.5 Study unit

In the survey, the unit was taken between 6 to 59 months children of Budhnagar, VDC.

### 3.6 Sampling technique

#### 3.6.1 Sample size

The sample size is determine using a single proportion formula by assuming 50% of prevalence of malnutrition in Budhnagar, VDC, 95% confidence interval (CI), 8 % desired precision, some children may be unavailable so 10% non-response rate is added to the total sample size. A Z-value 1.96 is used at 95% CI and d of 8 %. (N= sample size, P= prevalence, d= margin of error).

$$\begin{aligned} N &= Z^2 P (1-P)/d^2 \\ &= (1.96)^2 * 0.5 * 0.5 / (0.08)^2 \\ &= 3.8416 * 0.25 / (0.0064) \\ &= 150.0625 \\ &= 150 \end{aligned}$$

Now, as some children and household may refuse or may unavailable so considering non-response rate as 10%. The adjusted sample size is calculated below: -

$$N_o = N_1 + 10\% \text{ of } N_1$$

$$N_o = 150 + 0.1 * 150$$

$$N_o = 150 + 15$$

$$N_o = 165$$

$$N_o = 165$$

### **3.6.2 Criteria for sample selection**

Initially location is selected by using the simple random sampling (lottery method). Children who are 6-59 months living in the Budhnagar VDC are selected for the sample. Questionnaire is asked to the child or mother of the selected child. If mother is unreachable, person responsible for the caring of child is selected for the questionnaire.

### **3.7 Data collection tools**

Data collection tools Instruments and equipment's necessary for the conduction of the survey are:

- a) Child weighing machine: - Weighing machine with the capacity of 100kg and having the least count of 0.1Kg. (1piece)
- b) Height measuring scale (stadiometer):- 1 Piece
- c) MUAC Tape: - For measuring mid-upper arm circumference. (1piece)
- d) Questionnaire: - A well designed and pretested set of questionnaire to collect household information.

### **3.8 Pretesting**

The prepared sets of questionnaire and anthropometric instrument were pre-tested among few parents/caretakers of 6-59 months children who are under sampling plan. Pre-testing was conducted in order to maintain accuracy and clarity of questionnaire, to check the consistency in interpretation of questions by respondents and to identify ambiguous item. After review of instruments all suggested changes were made before being administered in the actual study.

### **3.9 Validity and reliability**

To ascertain the degree to which the data collection instruments will measure what they purported 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 were also drawn from the available literature in nutrition education for young children. The questionnaire was also pre-tested prior to data collection to ascertain content and face validity.

Reliability refers to quality control measure of data collected. Questionnaire was checked daily for completeness, consistency and clarity as mentioned earlier. In addition, the academic supervisor had checked the collected questionnaires during the process of data entry and analysis.

### **3.10 Data collection technique**

Primary data was collected using semi-structured questionnaire and anthropometric measurement. Interview was conducted with parents/care takers of the children to fill the questionnaire.

Secondary data was obtained from Village Development Committee office, Nepal Demographic Health Survey (NDHS 2011), Budhnagar Health Post, and key informants like Female Community Health Volunteers (FCHV), local leaders etc.

There were two sets of tools to gather the information. Part I is the structured interview schedule to generate data pertinent to factors associated with nutritional status of children and Part II is a form, consisting of child information anthropometric measurements was recorded in it. Form was developed to record the measurements of height, weight, Mid Upper Arm Circumference and structured pre-tested interview schedule was used to collect information from the respondents. The questionnaires comprised mainly of details on household profiles like age, sex, education level and occupation of household members and household size. Data on sources of income was also collected. Anthropometric measurements taken for children aged (6-59) months included:

- **Date of birth:**

The date of birth for each child was inquired from the caretaker/mother and recorded in months.

- **Length/height:**

The length of each child aged 6 - 24 months was measured lying flat and centrally on measuring boards placed on a hard flat surface on the ground. The length was

read to the nearest 0.1 cm (head and feet against the base of the board and foot piece respectively) (Mekides Wondemeneh & Belachew, 2015).

The height of children aged above 24 months was measured standing straight on measuring board placed on hard flat surface with line of sight perpendicular to the horizontal surface. Children were made to stand bare foot on height board and with feet parallel and joined together and with heels and buttock touching the wall. It was made sure that that head was held erect and hands were hung closely at the 33 sides. The child's height was measured to the nearest one decimal place.

- **Weight:**

Weight was measured by electronic digital weight scale and read to the nearest 0.1k.g with minimum/lightly/clothing and no shoes. Calibration was done before and after weighing every child by setting it to zero. In case of children age below two years and those who were unable to stand alone, their weight was obtained from the difference between weights of mother as she/he holds the child and the weight of the mother alone (Mekides Wondemeneh & Belachew, 2015).

- **MUAC:**

Shakir's tape was used. MUAC was taken on the left hand midway between the elbow and shoulder joint so that the hand was simply relaxed and hanging by the side.

### **3.11 Data management**

Collected data was managed carefully and safety of raw information had a paramount importance. Thus collected data was coded by giving numbers starting from 001 and end at 165 then these were stored safely. Thus stored data was utilized for the purpose of analysis.

### **3.12 Data analysis**

Quantitative data was firstly cleaned, coded and was entered in Statistical software. Similarly qualitative data were transcribed and coded by assigning labels to various categories. The verified test parameters were used to establish the relationships between the variables and nutritional status of students. SPSS 20 and WHO anthro 3.2.2 version were used to analyze the data and chi square test was used to find the associated factors for malnutrition.

### **3.13 Logistical and ethical consideration**

Ethical clearance was obtained from the office of Village Development Committee of Budhnagar VDC. Also clearance to conduct the research will be obtained from the parents of respective children who will be selected for conducting the research.

The study participants will be provided with oral consent prior to the study. Respondents will be assured that the data collected will be for the purpose of the study and will be treated with the uttermost confidentiality.

## Part-IV

### Result and discussion

Survey was conducted to find the prevalence and the factors associated with nutritional status in Budhnagar VDC. The total number of households in the study was 165. The response rate of survey was 100%. The results obtained from the study are described as follows in various headings.

#### 4.1 Socio-economic and Demographic Characteristics

A total of 165 under-five children were included in the study with a response rate of 100%. Survey shows that 37.6% percentages were living in nuclear family, followed by joint family 62.4%.

**Table 4.1:** Socio-economic and Demographic characteristics of children age 6-59 months in Budhnagar VDC.

Variables	Frequency	Percent
<b>Main Occupation of Family</b>		
Agriculture	78	47.3
Service	7	4.2
Labor and Foreign employment	57	34.5
Business	23	13.9
<b>Family Type</b>		
Single	62	37.6
Joint	103	62.4
<b>Family Size</b>		
Less than 5	48	29.1
5 or more than 5	117	70.9

Survey shows 47.3% of the family head engaged in agriculture, followed by labor and foreign employment 34.5%, business 13.9% and service 4.2% respectively. Annual income of the family shows that 100% of the family shows the annual income in the range 1 lakh to 2 lakhs.

The population composition comprised of Hindu and cast distribution showed mixed composition which comprised of Rajbansi, Ram, Yadav, Mandal, Amat and Malha.

#### 4.2 Child characteristics and Caring practices

**Table 4.2:** Child characteristics and Caring practices of children age 6-59 months in Budhnagar VDC

<b>Variables</b>	<b>Frequency</b>	<b>Percent</b>
<b>Gender</b>		
Male	83	50.3
Female	82	49.7
<b>Birth Order</b>		
First child	62	37.6
Second child	78	47.3
Third child	25	15.2
<b>Present Status of Breast Feeding</b>		
Yes	49	29.7
No	116	70.3
<b>Time of initiation of breastfeeding</b>		
Within 1 hour	136	82.4
Within 8 hours	29	17.6
<b>Birth Weight</b>		
Less than 2.5 kg	13	7.9
More than 2.5 kg	148	89.7
Don't know	4	2.4
<b>Age spacing</b>		
Less than 3	149	90.3
3 to 5	12	7.3
Above 5	4	2.4

Majority of the children were males 83 (50.3%) and females 82 (49.7%). The children of age 6-59 months were categorized according to WHO standard in 5 groups and shows that age group 48-59 month had the highest 53 (32.12%) percentage followed by 24-35 months 48 (29.09%), 36-47 month 39 (23.63%), 12-23 month 18 (10.90%) and the least was 6-11

month 7 (4.24%). Out of total population 78 (47.3%) were second Child followed by first child 38 (37.6%) and third child 25 (15.2%).

Out of total respondents, 82.4% were initiated for breastfeeding during the first hour of birth and remaining 17.6% were breastfed within 8 hours. All the children were breastfed exclusively for the first 6 months and 29.7% children were currently on breast feeding. All the children were given vitamin A during the last vitamin A capsule campaign.

Among the total respondent, 148 (89.7%) children were above 2.5 kg at their birth time were as 13 (7.9%) were below 2.5 kg at their birth time and the remaining 4 (2.4%) did not reveal. Out of total children who had elder brother or sister, 90.3% percent had age gap of 3 years whereas 7.3% had age gap of 3-5 years and remaining 2.4% had age gap of more than 5 year.

### **4.3 Mothers characteristics**

Survey shows that 153 (92.7%) of the mothers were literate whereas 10 (6.1%) were having primary level and 2 (1.2%) were having secondary level.

Among total population, most of the family mothers occupation was found to be house wife with 161 (97.6%) percentage followed by business 3(1.8%) and Service 1 (0.6%).

Out of total population, 163 (98.8%) of mothers had no knowledge about *Sarbottam pitho* and homemade *lito* was not given to most of the children during complementary feeding whereas 161 (97.6%) of mothers had no knowledge about Malnutrition and 4 (2.4%) of mothers had knowledge about Malnutrition.

Survey shows that maximum women become pregnant at the age of less than 20 year with 103 (62.4%), followed by age group 20-25 with 61 (37%) and least at age group of more than 25 years with 1 (0.6%).

Out of total population, 146 (88.5%) had eaten iron tablet completely during their pregnancy and lactation period but 19 (11.5%) women had left eating iron tablet. Mothers were given extra food during pregnancy and lactation.

The distribution of mother's age shows that age range of 25-30 has highest 71 (43%) and 20-25 had 64 (38.8%) whereas above 30 year had 18 (10.9%) while the lowest were less than 20 years was found to be 12 (7.3%) percentage of children. Survey shows that the

entire family members were conscious about the nutritional and medical care during pregnancy. All the major maternal characteristics under study are listed below in table 4.3.

**Table 4.3:** Mothers Characteristics of children age 6-59 months in Budhnagar VDC

<b>Variables</b>	<b>Frequency</b>	<b>Percent</b>
<b>Mother Education</b>		
Illiterate	153	92.7
Primary level	10	6.1
Secondary Level	2	1.2
<b>Mother Occupation</b>		
Service	1	0.6
Business	3	1.8
House wife	161	97.6
<b>Knowledge about sarbottam pitho</b>		
Yes	2	1.2
No	163	98.8
<b>Knowledge about malnutrition</b>		
Yes	4	2.4
No	161	97.6
<b>Age at first pregnancy</b>		
Less than 20	103	62.4
20 to 25	61	37
More than 25	1	0.6
<b>Age Group of Mother</b>		
Less than 20	12	7.3
20-25	64	38.8
25-30	71	43
30 and above	18	10.9

#### 4.4 Environmental and hygienic Practice of the Household

Survey shows that all the surveyed people use pump water as source of drinking water without purification. 100% people use toilet in the survey area and all use soap water for washing hand after toilet.

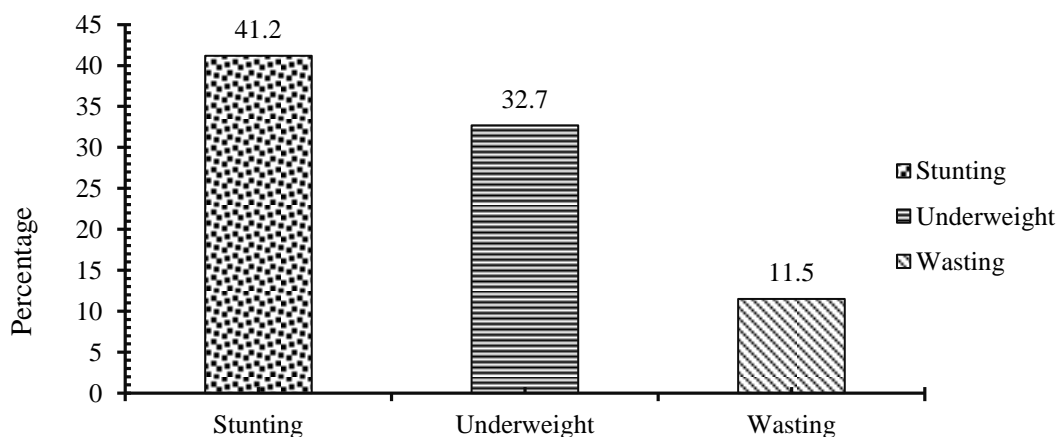
Among total population, 113 (68.5%) people dispose waste materials by burial process whereas 52 (31.5%) dispose by Incineration process. All the major environmental and hygienic characteristics under study are shown in table 4.4.

**Table 4.4:** Environmental and hygienic Practice of children age 6-59 months in Budhnagar VDC

Variables	Frequency	Percent
<b>Waste Management</b>		
Burial	52	31.5
Incineration	113	68.5

#### 4.5 Prevalence of Malnutrition

The magnitude of under nutrition among children age 6-59 month were 41.2%, 32.7%, and 11.5% for stunting wasting and underweight respectively. The result of prevalence of malnutrition among the children is shown in the Figure 4.1.



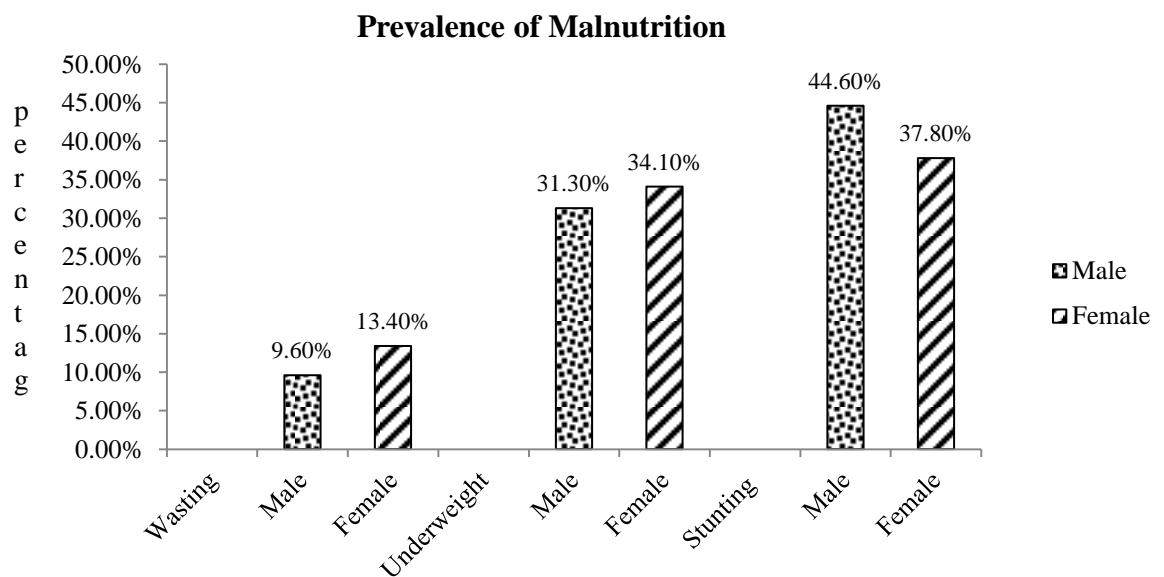
**Figure 4.1:** Prevalence of Malnutrition among under-five aged children, based in z-score of WHO in Budhnagar VDC (n=165)



From the result of survey, we found that prevalence of wasting was seen higher in female 11(13.4%) in comparison with male 8(9.6%).

**Table 4.5:** Prevalence of malnutrition on the basis of sex

<b>Under Nutrition</b>	<b>Malnourished</b>	<b>Normal</b>
<b>Wasting</b>		
Male	8(9.6%)	75(90.4%)
Female	11(13.4%)	71(86.6%)
<b>Underweight</b>		
Male	26(31.3%)	57(68.7%)
Female	28(34.1%)	54(65.9%)
<b>Stunting</b>		
Male	37(44.6%)	46(55.4%)
Female	31(37.8%)	51(62.2%)

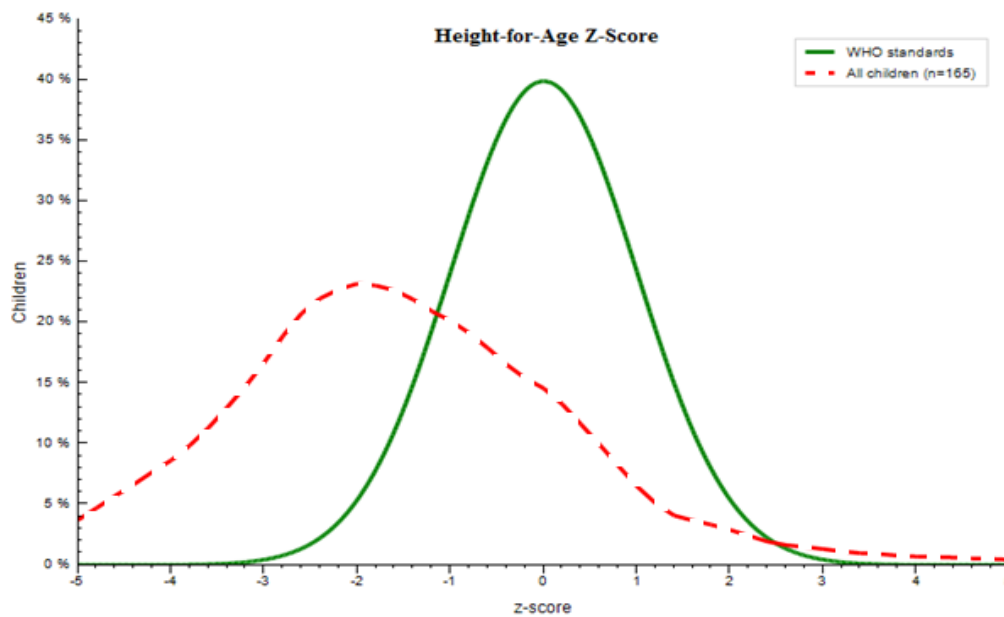


**Figure 4.2:** Prevalence of Malnutrition among under-five children by sex, based in z-score of WHO in Budhnagar VDC (n=165)

Out of total population, the result shows that the prevalence of Stunting was found higher in 24-35 months age group 29(60.5%) with 8(16.7%) Moderate stunting and 21(43.8%) Severely Stunting whereas lower percentage was found in 6-11 months age group 1(14.3%) with 1(14.3%) moderate stunting and no any severe stunting.

**Table 4.6:** Prevalence of Malnutrition on the basis of Height for Age among under-five age children by age based on z- score values of WHO in Budhnagar VDC (n=165)

Age group (Year)	HAZ class		
	Normal	Moderate	Severe
6 - 11	6(85.7%)	1(14.3%)	Nil
12 – 23	12(66.7%)	5(27.8%)	1(5.6%)
24 - 35	19(39.6%)	8(16.7%)	21(43.8%)
36 – 47	22(56.4%)	11(28.2%)	6(15.4%)
48 – 59	38(71.7%)	11(20.8%)	4(7.5%)
<b>Total</b>	<b>97(58.8%)</b>	<b>36(21.8%)</b>	<b>32(19.4%)</b>

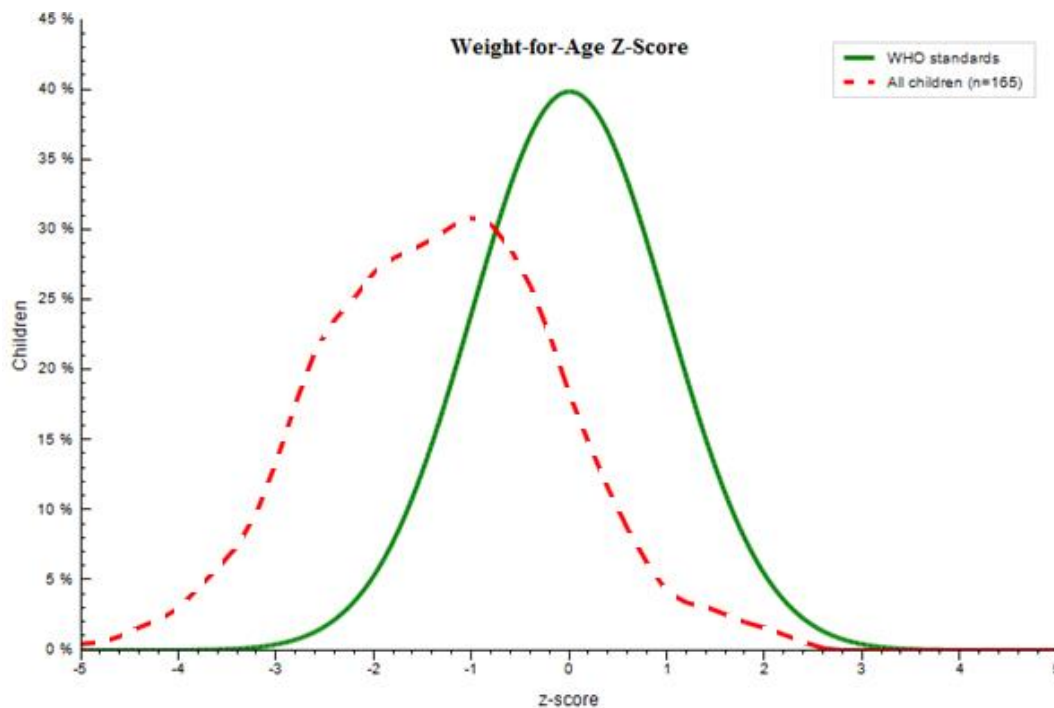


**Figure 4.3:** Height-for-Age. Regarding Height for Age, 21.8% were below -2 SD (z-score) and 19.4% were below -3 SD.

Out of total population, the prevalence of Underweight was found higher in 24-35 months age group 22(45.8%) with 12(25.0%) moderate and 10(20.8%) severe underweight whereas least underweight was found in 6-11 months age group with 1(14.3%) of moderate underweight and no any severe underweight cases.

**Table 4.7:** Prevalence of Malnutrition on the basis of Weight for Age among under-five age children by age based on z- score values of WHO in Budhnagar VDC (n=165)

Age group (Year)	WAZ class		
	Normal	Moderate	Severe
6 - 11	6(85.7%)	1(14.3%)	Nil
12 – 23	14(77.8%)	4(22.2)	Nil
24 - 35	26(54.2%)	12(25.0%)	10(20.8%)
36 – 47	28(71.8%)	9(23.1%)	2(5.1%)
48 – 59	37(69.8%)	14(26.4%)	2(3.8%)
<b>Total</b>	<b>111(67.3%)</b>	<b>40(24.2%)</b>	<b>14(8.5%)</b>

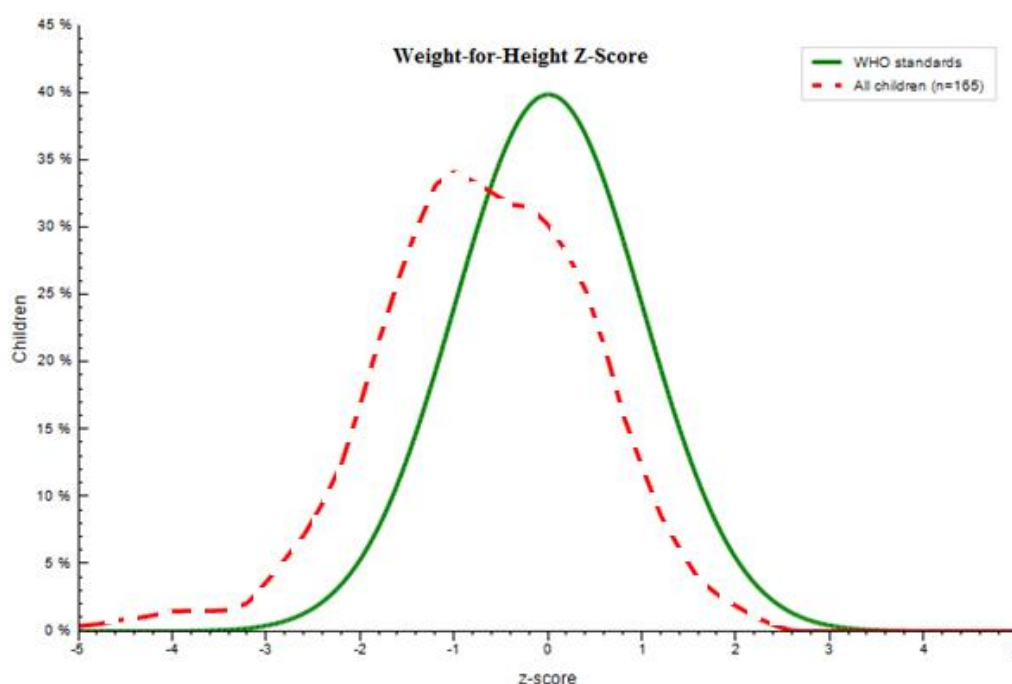


**Figure 4.4:** Weight-for-Age. Regarding Weight for Age, 24.2% were below -2 SD and 8.5% were below -3 SD.

Out of total population, the prevalence of Wasting was found higher in 6-11 months age group 2(28.6%) with 2(28.6%) moderate and no any severe wasting was found whereas least underweight was found in 24-35 months age group with 3(6.3%) with 1(2.1%) of moderate wasting and 2(4.2%) of severe wasting.

**Table 4.8:** Prevalence of Malnutrition on the basis of weight for Height among under-five age children by age based on z- score values of WHO in Budhnagar VDC (n=165)

Age group (Year)	WHZ class		
	Normal	Moderate	Severe
6 - 11	5(71.4%)	2(28.6%)	Nil
12 – 23	16(88.9%)	2(11.1%)	Nil
24 - 35	45(93.8%)	1(2.1%)	2(4.2%)
36 – 47	33(84.6%)	6(15.4%)	Nil
48 – 59	47(88.7%)	4(7.5%)	2(3.8%)
<b>Total</b>	<b>146(88.5%)</b>	<b>15(9.1%)</b>	<b>4(2.4%)</b>



**Figure 4.5:** Weight-for-Height. Regarding Weight for height, 9.1% were below -2 SD (z-score) and 2.4 % were below -3 SD.

#### 4.6 Factors associated with Under Nutrition

Under nutrition was assessed by stunting, wasting, and underweight. Accordingly factor associated with these categories were assessed separately using chi-square test.

#### 4.6.1 Factors associated with Underweight

The survey shows that there was significant association of Underweight with Age of mother ( $P \leq 0.05$ ). Family Type, Iron intake, Birth Weight, Age at First Pregnancy, Family Annual Income, Mother Occupation, Mother Age Group, Family Head Occupation and Age of Children were found insignificant in the survey area.

Moreover the study supports this finding in which below 20 years mother's children were more likely to be underweight as compared with 20 and above year's mother's children. This could be due to illiteracy and less maturation of the mothers. This was found similar with the study conducted among children of Former-Kamaiyas in Nepal (Resham B. Khatri., Shiva R. Mishra., Vishnu Khanal., & Choulagai., 2015).

**Table 4.9:** Factors associated with Underweight of under five years of age in Budhnagar VDC (n=165)

Predictors		WAZ status		Chi-square	P-value
		Underweight	Normal		
Family type	Single	21(33.9%)	41(66.1%)	0.059	0.808
	Joint	33(32.0%)	70(68.0%)		
Family size	Less than 5	16(33.3%)	32(66.7%)	0.011	0.915
	5 or more than 5	38(32.5%)	79(67.5%)		
Age of mother	20 or <20	7(58.3%)	5(41.7%)	3.854	0.049*
	>20	47(30.7%)	106(69.3%)		
Birth order	1st child	18(29.0%)	44(71.0%)	0.616	0.433
	Other child	36(35.0%)	67(65.0%)		
Mother's education	Illiterate	51(33.3%)	102(66.7%)	0.351	0.554
	Literate	3(25.0%)	9(75.0%)		
Iron intake	Complete	48(32.9%)	98(67.1%)	0.013	0.91
	Incomplete	6(31.6%)	13(68.4%)		
Children age	< 24 months	5(20.0%)	20(80.6%)	2.168	0.141
	> 24 months	49(35.0%)	91(65.0%)		
Age at first pregnancy	20 or <20	32(31.1%)	71(68.9%)	0.343	0.558
	>20	22(35.5%)	40(64.5%)		
Gender	Male	26(31.3%)	57(68.7%)	0.149	0.699
	Female	28(34.1%)	54(65.9%)		

\* Statistically significant ( $P < 0.05$ )

#### 4.6.2 Factors associated with Wasting

The survey shows that there was significant association of wasting with Iron intake ( $P \leq 0.05$ ). Family Type, Birth Weight, Age at First Pregnancy, Family Annual Income, Mother Occupation, Mother Age Group, Family Head Occupation and Age of Children were found insignificant in the survey area. Factors associated with wasting were shown below.

**Table 4.10:** Factors associated with Wasting of under five years of age in Budhnagar VDC (n=165)

Predictors		WHZ status		Chi-square	P-value
		Wasted	Normal		
Family type	Single	7(11.3%)	55(88.7%)	0.005	0.944
	Joint	12(11.7%)	91(88.3%)		
Family size	Less than 5	2(4.2%)	46(95.8%)	3.588	0.058
	5 or more than 5	17(14.5%)	100(85.5%)		
Age of mother	20 or <20	1(8.3%)	11(91.7%)	0.129	0.72
	>20	18(11.8%)	135(88.2%)		
Birth order	1st child	7(11.3%)	55(88.7%)	0.005	0.944
	Other child	12(11.7%)	91(88.3%)		
Mother's education	Illiterate	18(11.8%)	135(88.2%)	0.129	0.72
	Literate	1(8.3%)	11(91.7%)		
Iron intake	Complete	14(9.6%)	132(90.4%)	4.614	0.032*
	Incomplete	5(26.3%)	14(73.7%)		
Children age	< 24 months	4(16.0%)	21(84.0%)	0.582	0.446
	> 24 months	15(10.7%)	125(89.3%)		
Age at first pregnancy	20 or <20	13(12.6%)	90(87.4%)	0.329	0.566
	>20	6(9.7%)	56(90.3%)		
Gender	Male	8(9.6%)	75(90.4%)	0.577	0.447
	Female	11(13.4%)	71(86.6%)		

\* Statistically significant ( $P < 0.05$ )

Iron intake has shown significant association with wasting. Survey shows that children are more vulnerable to wasting whose mothers took incomplete iron supplementation during their pregnancy and lactation period. This was found similar with the study conducted in under five year children in Kunchha, VDC (Dhungana, 2013). This may be due to deficiency of iron during the time of development of fetus into child. Also the child cannot get sufficient iron from their mother's milk as iron is an important micronutrient needed for the development of the baby. Hence, deficiency of iron supplementation causes wasting.

### 4.6.3 Factors associated with Stunting

There was significant association of stunting with and Age of Children ( $P \leq 0.05$ ). Birth Weight, Gender, Mothers Educational Status, Family Annual Income, Age at First Pregnancy, Mothers Occupation, Birth Order of Children, and Initiation of breastfeeding were found insignificant with stunting in the survey area.

**Table 4.11:** Factors associated with Stunting of under five years of age in Budhnagar VDC (n=165)

Predictors		HAZ status		Chi-square	P-value
		Stunted	Normal		
Family type	Single	26(41.9%)	36(58.1%)	0.021	0.884
	Joint	42(40.8%)	61(59.2%)		
Family size	Less than 5	24(50.0%)	24(50.0%)	2.158	0.142
	5 or more than 5	44(37.6%)	73(62.4%)		
Age of mother	20 or <20	8(66.7%)	4(33.3%)	3.461	0.063
	>20	60(39.2%)	93(60.8%)		
Birth order	1st child	26(41.9%)	36(51.8%)	0.021	0.884
	Other child	42(40.8%)	61(59.2%)		
Mother's education	Illiterate	62(40.5%)	91(59.5%)	0.413	0.521
	Literate	6(50.0%)	6(50.0%)		
Iron intake	Complete	62(42.5%)	84(57.5%)	0.822	0.364
	Incomplete	6(31.6%)	13(68.4%)		
Children age	< 24 months	7(28.0%)	18(72.0%)	2.92	0.045*
	> 24 months	61(43.6%)	79(56.4%)		
Age at first pregnancy	20 or <20	42(40.8%)	61(59.2%)	0.021	0.884
	>20	26(41.9%)	36(58.1%)		
Gender	Male	37(44.6%)	46(55.4%)	0.741	0.377
	Female	31(37.8%)	51(62.2%)		

\* Statistically significant ( $P < 0.05$ )

The survey shows that there is significant association of stunting with age of children. The prevalence of stunting increases as the age of child increases. Moreover our study supports this finding in which children with age group of 24-34 months were more likely to be stunted as compared with children in other groups. This was found similar with the study conducted in under five year children in Purunchour, VDC (Poudel, 2015). This could be due to poor weaning and complementary feeding practices resulting into

inadequate energy and protein intake. The poor feeding practice may be due to either lack of knowledge of mother or lack of adequate food.



## **Part-V**

### **Conclusion and Recommendation**

#### **5.1 Conclusion**

Conclusively, the results of this study indicate that under nutrition is a still major problem among 6-59 months children in Budhnagar VDC, Morang. Following points can be concluded from the study.

- a) The malnutrition rate among the children under five years in Budhnagar VDC was found similar with the National data of Nepal i.e. 41.2% stunted, 32.7% underweight and 11.5% wasted.
- b) The result of this study indicates that age of children, iron intake and age of mother are the risk factors that were associated with malnutrition in children in Budhnagar VDC.
- c) Factors like family annual income, age at first pregnancy, mother age group, weight at birth, mothers occupation, gender, educational status of mother considered to be important for nutritional status of under five were not statistically significant in my study.
- d) These findings are of great importance because they identify potential actions that can be used to improve the nutritional status of children.
- e) Interventions targeted to community management of acute malnutrition might be appropriate to manage wasting, which is an indication of acute malnutrition in study community.
- f) Comprehensive, integrated and multi-sectorial plan should be made for addressing the problem of malnutrition in long term.

## 5.2 Recommendation

Based on the result of study, following recommendation could be made to improve the nutritional status of under-five year's children in the survey area,

- a) The respective stakeholder should assess the nutritional status of children periodically based on nutritional indicators and effective intervention should be addressed that helps to reduce under nutrition and child death.
- b) Need for more attention on feeding and hygienic practices and also on complementary feeding through different strategies.
- c) There is the need for intervening nutritional and health education for mothers which provide better care in terms of good nutrition and better hygiene which helps to improve the nutritional status.
- d) Distribution of hygiene kit and filter for water purification should be done through effective intervention that helps to change the behavior of population of Budhnagar VDC.
- e) Appropriate intervention programs like supplementary feeding programs should be implemented to improve the nutritional status of severely acute malnourished children.
- f) Similar cross-sectional descriptive or longitudinal survey can be conducted to determine the magnitude and distribution of malnutrition and other probable causes of malnutrition.

## **Part-VI**

### **Summary**

Malnutrition is directly or indirectly associated with most child death and it is the main contributor to the burden of disease in the developing world.

A cross-sectional descriptive study was conducted to assess the factor associating with nutritional status of 6-59 months children in Budhnagar VDC, Morang. Anthropometric measurements were carried to find out the level of malnutrition among the 6-59 months children. The Structured Questionnaires was administered to collect various kind of information about the factors that are directly or in directly related to the cause of nutritional problems. The collected data or information obtained from the nutritional survey could be used by the governmental and non-governmental agencies working in the related field and plan for any appropriate intervention to improve the nutritional status of population.

4 wards were selected by simple random sampling method from the Budhnagar VDC. From 4 wards, 165 children were selected randomly for the study to monitor the nutritional status. Data collected was analyzed using WHO Anthro Version 3.2.2 and SPSS Version 20. Chi-Square-Test was used to analyze the factors associated with nutritional status.

Out of total population (N=165), 83 were males and 82 were females and are of different castes such as Ram, Rajbanshi, Yadav, Mandal, Amat and Malha.. All the families were Hindus living 37.6% in nuclear family followed by 62.4% joint family. 47.3% of family head were engaged in Agriculture followed by labour & foreign employee 34.5%, business 13.9% and service 4.2% respectively. Among total population, 92.7% of mothers were illiterate whereas 6.1% were having primary level and 1.2% were having secondary level.

Out of total population, 47.3% were second child followed by first child 37.6% and third child 15.2%. among total population, 82% were initiated for breast feeding during first hour of birth and 17.6% were breast fed within 8hr. All the children were breastfed exclusively for the first 6 months and were given Vitamin 'A' during last Vit A capsule campaign whereas 29.7% were currently on breast feeding. The study shows that, 89.7% were above 2.5kg at their birth time and 7.9% were below 2.5kg at their birth time and 2.4% did not reveal.

According to weight-for height, 11.5% were found to be wasted out of which 2.4% were found to be severely wasted. The highest prevalence of wasting was found in the age group 24-35 and least was found in 6-11 months age group children.

According to length/height-for-age, 41.2% were found to be stunted out of which 19.4% were found to be severely stunted. The highest prevalence of wasting was found in the age group 24-35 and least was found in 6-11 months age group children.

According to weight-for-age, 32.7% of the children were found to be underweight, out of which 8.5% were severely underweight. The prevalence of underweight was found to be highest in the age group 6-11 months and least was found in 24-35 months age group children.

Chi-square test analysis of the determinants of nutritional status indicated that, there was a significant association of stunting with children age ( $P<0.05$ ). The survey shows that there was significant association of wasting with iron intake ( $P<0.05$ ). There was significant association of underweight with age of mother ( $P<0.05$ ). Factors like family annual income, age at first pregnancy, mother age group, weight at birth, mothers occupation, gender, educational status of mother considered to be important for nutritional status of under five were not statistically significant in present study.

Results of this study indicate that malnutrition among 6-59 months children is still an important problem in Budhnagar VDC, Morang. Also, study confirmed that Child Age, Iron intake and Age of mothers were the risk factors associated with malnutrition in Budhnagar, VDC. The following result can be utilized by government as well as voluntary organization and the local government to initiate steps to tackle the existing malnutrition problems and encourage the people to try to improve their existing poor nutritional status by improving dietary pattern of the under five children as well as pregnant and lactating women. This result can also create awareness of the people about the real situation of that population responsible for the prevalence of malnutrition.

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## Appendices

### Survey Questionnaire

Code no.:-

Date of Interview: 2072/ /

#### A. General Information

1. Name of head of household:
2. Ward No.:
3. Respondent : Mother  Father  Other Family Members
4. Mother's Name:
5. Mother's Age:
6. Child Name:
7. DOB:

#### B. Family Description

8. No. of total family members:  
Female:                      Male:  
No. of children:                      Boys:                      Girls:  
No. of children below 5 year:
9. Type of family?  
1. Single                      2. Large                      3. Extended
10. House, currently you living is...  
1. Own                      2. On rent
11. What is your religion?  
1. Hindu    2. Buddhist    3. Christian    4. Muslim    5. Others
12. What is your caste?  
1. Brahmin    2. Chhettri    3. Janajati    4. Dalit    5. Madhesi  
6. Others
13. What is the main occupation of your family?  
1. Agriculture    2. Service    3. Labour    4. Business    5. Foreign  
employment    6. Others
14. What is the main income source of your family?  
1. Agriculture    2. Service    3. Labour    4. Business    5. Foreign  
employment    6. Others

15. How long is the family income sufficient to fulfill the needs of family members?
1. <3 months
  2. 3 – 6 months
  3. 6-12 months
  4. >12 months
  5. Can save some
16. Annual income of your family
1. < 1 lakh
  2. 1 to 3 lakh
  3. > 3 lakh
17. Mother's educational qualification
1. Illiterate
  2. Primary level
  3. Secondary level
  4. Higher secondary level and above
18. Father's educational qualification?
1. Illiterate
  2. Primary level
  3. Secondary level
  4. Higher secondary level and above
19. What is the occupation of mother?
1. Housewife
  2. Service
  3. Labour
  4. Business
  5. Others

### **C. Personal and environmental hygiene**

20. What is your source of drinking water?
1. Tube well
  2. River
  3. Well
  4. Drinking water tap
  5. Other
21. Do you purify drinking water?
1. No
  2. Yes
22. Do you have toilet facility in your house?
1. No
  2. Yes
23. What cooking fuel do you use for cooking?
1. Fire wood
  2. Dung gas
  3. Dried animal dung
  4. Stove
  5. LPG
  6. Others
24. How do you manage garbage coming out from your house?
- .....

### **D. Questions to be asked for mother of under 5 children**

25. No. of under 5 year children:
26. In your absence, who is responsible to take care of your child?
1. Mother/Father in-law
  2. Husband
  3. Brother/Sister of child
  4. Other family member
  5. Relatives
  6. Neighbour/Friend
  7. Leave alone in home
  8. Self
  9. Others

27. Birth order of child under study:.....
28. Birth spacing: ..... months/years
29. Do your child have any type of medical complications?
1. yes            2. No
30. If yes, then type of medical complication?
1. chronic illness    2. Diarrhea    3. Malnourished    4. All of the above
31. Do your child have any type of acute illness?
1. yes            2. No
- If yes, then type of illness .....
32. Where do you take your children for treatment during illness?
1. Nearby health post            2. Pharmacy    3. FCHV    4. Traditional healer
5. Don't take anywhere            6. Others

### **E. Nutrition and Breast feeding related information**

33. Did you breast fed your child on the day of birth?
1. No            2. Yes
34. Did you breast fed your child?
1. No            2. Yes
35. If not, what is the reason?
1. Lack of tradition    2. It harms    3. It is unhygienic    4. Child cannot swallow    5. Others
36. If Yes then when did you initiate breast feeding?
1. Within 1 hour of birth    2. Within 8 hours of birth    3. Within 24 hour of birth    4. Cannot remember    5. Others
37. Did you feed colostrum to your baby?
1. Yes            2. No            3. Cannot remember
38. What did you feed to your baby before feeding colostrum milk?
1. Nothing    2. Honey and Ghee    3. Cow's milk    4. Alcohol    5. Others
39. Are you breast feeding your child ?
1. Yes            2. No
40. If yes, then how many times do you breast feed your child? .....  
times/day

41. How long a child should be breast fed or how long did you breast feed your child? ..... months/years
42. Did you exclusively breast fed your baby for six months?  
1. Yes            2. No
43. Did you feed commercial or formula milk to your baby?  
1. Yes            2. No
44. Are you feeding food other than breast milk to your baby?  
1. Yes            2. No
45. When did you start giving foods other than breast milk to your child?  
1. 4 months    2. 5 months    3. 6 months    4. 7 months    5. More than 7 months
46. How many times do you feed food other than breast milk to your child?  
..... times/day
47. What do you feed to your child?  
1. Lito 2. Jaulo            3. Supper flour porridge            4. Same as other family members            5. Others
48. Do you know about “supper flour porridge”?  
1. Yes            2. No
49. Do you feed supper flour porridge to your baby?  
1. Yes            2. No
50. If yes then from where did you obtain it?  
1. Market            2. Prepare at home            3. Sometimes from market and sometimes prepare at home
51. What is the proportion of cereals and pulses in supper flour porridge?  
1. 1:1            2. 1:2            3. 2:1            4. No fixed ratio
52. What type of food do your child like to have?  
1. Home made            2. Fast food and Junk food
53. Do you know about malnutrition?  
1. Yes            2. No
54. If yes, What is the main cause of malnutrition?  
1. Inadequate balanced diet            2. Being touched by pregnant women  
3. Curse of god            4. Others
55. What type of salt do you use in your home?  
1. Rock Salt    2. Packaged Salt            3. Aayo Nun

56. Do you use iodized salt?

1. No            2. Yes

57. Did you give “Vit.A” capsule and “De-worming” tablet to your baby?

1. No            2. Yes

58. Do you feed green leafy vegetables to your child?

1. Always 2. Sometimes      3. When available 4. Never 5. Other

### F. Child and Maternal Health Related Information

59. Mother’s age when she got married? ..... year

60. Mother’s age when she was pregnant for first time? .....year

61. Type of birth?

1. Natural                      2. Caesarian

62. Weight of child during birth?

1. less than 2.5 Kg      2. More than 2.5 Kg    3. Don’t know

63. Do pregnant mother require additional nutrients?

1. No            2. Yes

64. How do you manage food for pregnant women in your family?

1. Give more food than usual  
2. Give less food than usual  
3. Give same amount of food as before

65. Did you take iron and folate tablet during pregnancy?

1. No            2. Yes

66. If yes, how long did you take it? .....

### G. Anthropometric measurements

Age (months)	Sex (M/F)	Weight (Kg)	Height (Cm)	MUAC (mm)	Oedema (Y/N)

Survey Photo





**Consent letter**

**INFORMED CONSENT**

Namaste!

I Mr. Pratik Dangol, 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 is **“Assessing the nutritional status and its associated factors of 6 – 59 months of children in Budhnagar VDC”**.

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: \_\_\_\_\_

Date:

Date:

Place:

Place:

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:

Date:

Contact address: