NUTRITIONAL ASSESSMENT AND FACTORS INFLUENCING NUTRITIONAL STATUS OF UNDER 5 YEARS OF CHILDREN OF DALIT COMMUNITY OF KHATYAD RURAL MUNICIPALITY, MUGU

SUBMITTED BY:

PREM LAXMI BANIYA

KARNALI ACADEMY OF HEALTH SCIENCES, JUMLA, NEPAL

SUBMITTEDTO:

NEPAL HEALTH RESEARCH COUNCIL, RAMSHAH PATH

KATHMANDU, NEPAL

LETTER OF APPROVAL

Government of Nepal

Nepal Health Research Council (NHRC)

Estd. 1991

Ref. No.: 2242

16th March 2023

Ms. Prem Laxmi Baniya

Shreekot-3, Mugu Nepal

Subject: Approval letter for Grant

Dear Ms. Prem Laxmi Baniya,

We would like to express our congratulations on the approval of the Provincial Health Research Grant FY 2079/080 offered by Nepal Health Research Council (NHRC). Our approved amount is Nrs 1,00,000 for the purpose of your research entitled **"Nutritional assessment and factors influencing nutritional status of under 5 years of children of dalit community of Khatyad rural municipality, Mugu ".** Please proceed further with the ethical approval process.

We hope that your research is a success and results in benefitting the entire society.

If any further discussion is needed in regard to this matter, please do not hesitate to contact Capacity Building Section.

.....

Dr. Pradeep Gyanwali

Member-Secretory (Executive Chief)

NHRC

Tel: +977 1 4254220, Ramshah Path, PO Box: 7626, Kathmandu, Nepal
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LETTER OF ETHICAL CLEARANCE

Government of Nepal
Nepal Health Research Council (NHRC)
Estd. 1991

Ref. No.: 2568

31 March 2023

Ms. Prem Laxmi Baniya
Principal Investigator
Karnali Academy of Health Sciences
Jumla

Ref: Approval of research protocol

Dear Ms. Baniya,

This is to certify that the following protocol and related documents have been reviewed and granted approval through the expedited review process for its implementation.

Protocol Registration No/ Submitted Date	108/2023 P 24 February 2023	**Sponsor Protocol No**	NA
Principal Investigator/s	Ms. Prem Laxmi Baniya	**Sponsor Institution**	NHRC Grant
Title	Nutritional Assessment and Factors Influencing Nutritional Status of Under 5 Years of Children of Dalit Community of Khatyad Rural Municipality, Mugu		
Protocol Version No	NA	**Version Date**	NA
Other Documents	1. Informed consent form 2. Data collection tools 3. Work plan	**Risk Category**	Minimal risk
Co-Investigator/s	1. Mr. Bishnu Dutta Acharya 2. Mr. Nishan Lama 3. Mr. Naresh Prasad Joshi 4. Ms. Prasansha Thapa		
Study Site	Khatyad Rural Municipality, Mugu		
Type of Review	√ **Expedited** ☐ Full Board **Review Date:** 31 March 2023	**Timeline of study** March 2023 to December 2023 **Duration of Approval** 31 March 2023 to March 2024 **This approval will be valid for one year**	**Frequency of continuing review** NA
Total budget of research	**NRs 1,00,000.00**		
Ethical review processing fee	**Waived as the researcher had received by NHRC Grant**		

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Estd. 1991

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Investigator Responsibilities

- Any amendments shall be approved from the ERB before implementing them
- Submit the support letter from the regulatory authorities in Nepal like DDA, FWD, DoHS, before implementing the study
- Submit progress report every 6 months
- Submit final report after completion of protocol procedures at the study site
- Comply with all relevant international and NHRC guidelines
- Abide by the principles of Good Clinical Practice and ethical conduct of the research

If you have any questions, please contact the Ethical Review M & E Section at NHRC.

Thanking you,

Dr. Pradip Gyanwali
Member Secretary

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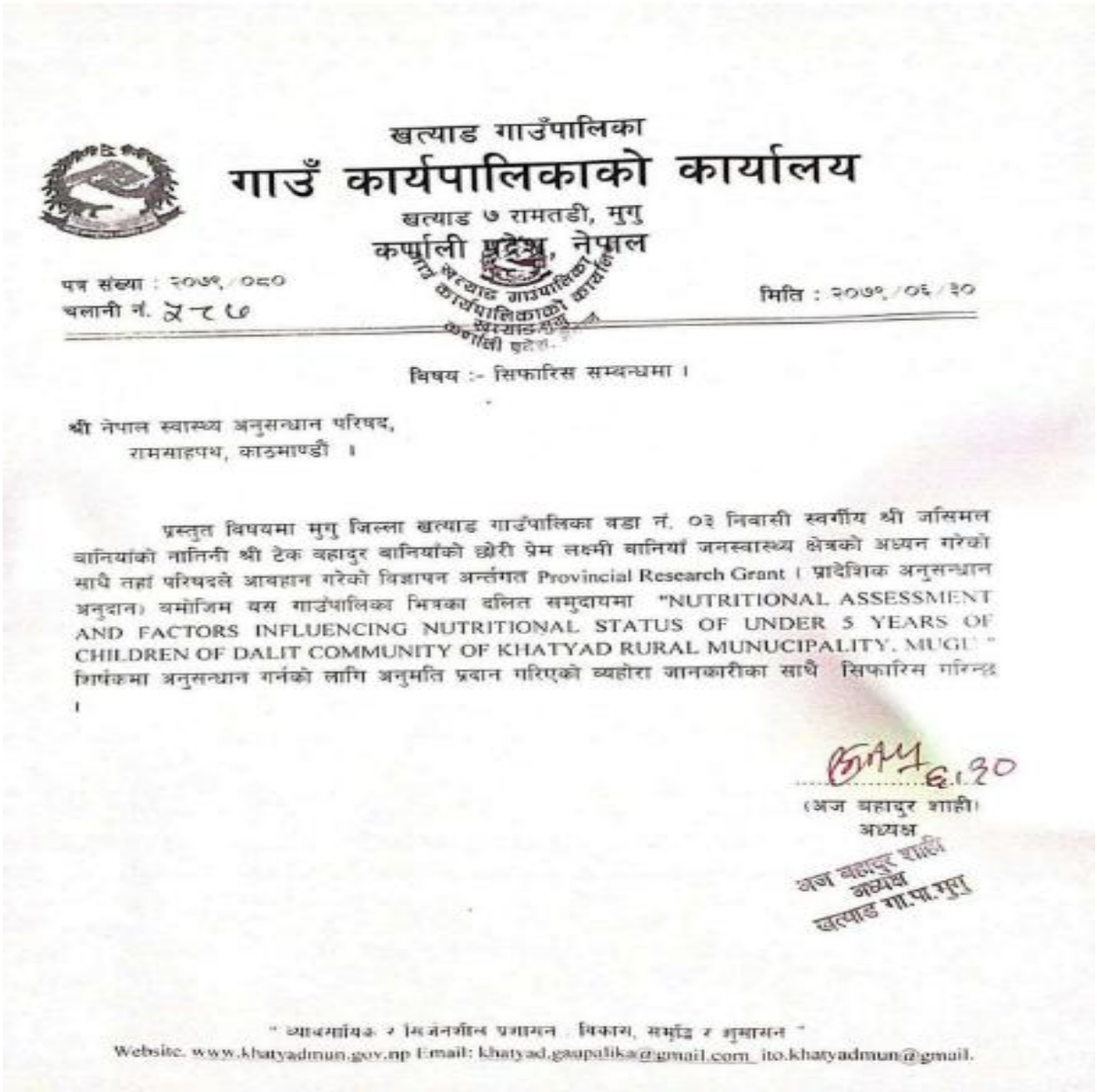
LETTER OF RECOMMENDATION



खत्याड गाउँपालिका

गाउँ कार्यपालिकाको कार्यालय

खत्याड ७ रामतडी, मुगु

कर्णाली प्रदेश, नेपाल

पत्र संख्या : २०७९/०८० मिति : २०७९/०६/३०

चलानी नं. २८८७

विषय :- सिफारिस सम्बन्धमा ।

श्री नेपाल स्वास्थ्य अनुसन्धान परिषद,
रामसाहपथ, काठमाण्डौं ।

प्रस्तुत विषयमा मुगु जिल्ला खत्याड गाउँपालिका वडा नं. ०३ निवासी स्वर्गीय श्री जसिमल बानियाँको नातिनी श्री टेक बहादुर बानियाँको छोरी प्रेम लक्ष्मी बानियाँ जनस्वास्थ्य क्षेत्रको अध्यन गरेको साथै तहाँ परिषदले आवहान गरेको विज्ञापन अर्न्तगत Provincial Research Grant । प्रादेशिक अनुसन्धान अनुदान। बमोजिम यस गाउँपालिका भित्रका दलित समुदायमा "NUTRITIONAL ASSESSMENT AND FACTORS INFLUENCING NUTRITIONAL STATUS OF UNDER 5 YEARS OF CHILDREN OF DALIT COMMUNITY OF KHATYAD RURAL MUNUCIPALITY, MUGU " शिर्षकमा अनुसन्धान गर्नको लागि अनुमति प्रदान गरिएको व्यहोरा जानकारीका साथै सिफारिस गरिन्छ ।

६.१.३०

(अज बहादुर शाही)
अध्यक्ष

अज बहादुर शाही
अध्यक्ष
खत्याड गा.पा.मुगु

" आधारभूत र गुणस्तरीय प्रशासन , विकास, समृद्धि र सुशासन "
Website. www.khatyadmun.gov.np Email: khatyad.gaupalika@gmail.com ito.khatyadmun@gmail.

DECLARATION

I hereby declare that this research entitled **" Nutritional Assessment and Factors Influencing Nutritional Status Of Under 5 Years Of Children Of Dalit Community Of Khatyad Rural Municipality, Mugu "** has been prepared by me and my team members. This research project is being funded by Nepal Government, Nepal Health Research Council.

……..……..

Ms. Prem Laxmi Baniya
Karnali Academy of Health Sciences, Jumla,
Karnali Province, Nepal

ACKNOWLEDGEMENTS

We are deeply grateful to all those who contributed to the success of this research project on "**Nutritional assessment and factors influencing nutritional status of under 5 years of children of Khatyad Rural Municipipality , Mugu"** and I would like to express my gratefulness for entrusting me for this work. First of all, I would like to express my heartfelt gratitude to Nepal Health Research Council for providing this platform where I can obtain this research project.We would also like to thank Nepal Health Research Center provided financial support for this research, including. Without their generous contributions, this project would not have been possible

I would like to express my gratitude towards my supervisor Mr. Nishant Lama for guidance, support, inspiration and appreciable contribution during the completion of this Project.

The help and co-operation of the authorities of Khatyad Rural Municipality, Mugu is also acknowledged. I am also thankful to all the respondents for all their worthy response and cooperation that made them a big part of this study.

We would also like to express our gratitude to the members of our research team, and co-investigators, who provided valuable input, insights, and assistance at every stage of the project. Their contributions were critical to the success of this research, and we are deeply grateful for their hard work and dedication.

Overall, this research project would not have been possible without the support and contributions of so many people. We are deeply grateful to all of those who helped to make this project a reality, and we hope that our findings will make a meaningful contribution to the field.

LIST OF ACRONYMS

FAO-Food and Agricultural Organization

HFIAS-Household food insecurity Access Scale

MSNP-Multi Sectorial Nutritional Plan

MUAC-Mid upper arm circumference

NDHS-National Demographic Health Survey

PEM-Protein Energy Malnutrition

SDG-Sustainable Development Goal

WHA-World Health Assembly

FCHV-Female Community Health Volunteer

FTIs-Faecally Transmitted Infection

IMAM-Integrated Management of Acute Malnutrition

MAM-Moderate Acute Malnutrition

OTC-Outpatient Therapeutic Care

SAM-Severe Acute Malnutrition

UNICEF-United Nation International Childrens Emergency Fund

WASH-Water, Sanitation and Hygiene

ABSTRACT

Background

Nutritional status is a primary public health concern in the global scenario mainly in low-income countries. Malnutrition consists of under nutrition, overweight, obesity, and micro-nutrient deficiencies among children or lactate mothers mainly in developing countries like Nepal. Evidence suggests that multiple micro-nutrient supplementation reduces the risk of stillbirths and low-birth weight. In Nepal Karnali province Dalit community are most deprived ethnic groups due to underline poverty, unemployment, illiteracy, and lack of health services.

Methods

A descriptive cross-sectional study was conducted among 199 children and mothers of Khatyad Rural Municipality using the survey questionnaire, and anthropometric measurement.

Results:

. Overall, there were 25.1%, 15.1%, 24.6%, and 9.5% cases of (severe) stunting, wasting, underweight, and malnutrition, respectively. The mean number the children of the family was 2.43, the number of children below 5 years of age was found 1.29. Similarly, the majority of mother give birth before 20 years (89.4 %) as compared to after 20 years (19.1 Almost every child had colostrum feed, Ante-natal check visit and 83.4 % had post-natal check visit too. Among the respondents 87.9 % of mothers delivered their child at a health facility. Almost all the households (92 %) had a toilet facility.According to MUAC, 11.1 % of the sample children were moderately malnourished and 9.5 % of them were severely malnourished.

Conclusion:

Dalit community children of Khatyad Rural Municipality were found with low nutritional status and it is being directly affected by maternal education level, socio-economic status of family, types of family, access to health service, and occupation.

Key Words: Nutritional status, factors influencing, Dalit community, Khatyad rural municipality.

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CHAPTER I: INTRODUCTION

Introduction of study

Nutritional status is a primary public health concerned in the global scenario mainly in low-income countries.[1] Malnutrition consists of under nutrition, overweight, obesity, and micronutrient deficiencies among children or women mainly developing countries. [2] Under–nutrition continues to be a major public health problem in most developing countries, including Nepal. [3] Children up to 5 years of age are vulnerable to under-nutritional status is one of the indicators of the overall well-being and human resources development of a population.[4] Evidence suggests that multiple micronutrient supplementation reduces the risk of stillbirths and low-birth weight.[2] In low-income countries where malnutrition is still a problem, anthropometric indicators such as weight-for-height (wasting), height-for-age (stunting) and weight-for-age (underweight) are important in evaluating the health and nutritional status of children.[1, 3, 5-7] In Nepal Dalit community are most deprived ethnic groups due to underline poverty, unemployment, illiteracy and lack of health services in Himalayan region.

Under–nutrition continues to be a major public health problem in most developing countries, including Nepal. [3] This study was conducted to identify the prevalence and factors influencing nutritional status of under 5 years' children of Dalit Community, Khatyad rural municipality, Mugu using the closed ended questions.

The analytical cross-sectional study was carried out and primary data was collected from 199 under five years children using anthropometric tools and mothers of the same sampled children were asked with semi structured questionnaires for identifying the influencing factors of nutritional status. Confidentiality of the participants was maintained. The result of this study will help in making plans and polices to local government, program designers and policy makers.

Background

When the children are well nourished together with their families and communities, they can come on to be stronger and more resilient in the face of crisis and can become an architects of a sustainable future.[1] Nutritional status of children is an indicator that assess the health status of entire population or can be defined as the result obtained after the use of nutritional assessment method, which is considered as one of the major predictors of child survival.[8, 9] Malnutrition has been a major public health problem in most of the developing countries whereas, Protein Energy Malnutrition (PEM) is more common among children below 5 years of age.[9]

Anthropometric measurement is the method used for defining the nutritional status of the children.[8] In low income countries were malnutrition is still a major public health issues, anthropometric indicators such as stunting, wasting and underweight are important in evaluating the health as well as nutritional status of children.[5] Anthropometric comprise for height, weight as well as skinfold thickness.[10] Sources of poor anthropometric outcomes are found to be complex that are ranging from biological and social to environment factors.[5]

Child malnutrition is considered to be the single biggest contributor of mortality and morbidity among under five children in the low income countries in compare to the high income countries.[11] Undernourishment has permanent consequences for cognitive, physical and metabolic development as well as it also has effect on development that results in child's inability to learn and process information into adults.[12] Z score between -2to +2 is classified as adequate, Z score between -2 to-3 as moderate and Z score <-3 is considered to be severely malnourished .[13] Furthermore, it is to be noted that adult obesity and its related diseases are usually the track back to childhood obesity.[14] Some of the factors that influence the nutritional status are absolute poverty, poor health and sanitary condition, limited knowledge of nutritional matters among certain households, fluctuating incomes, offering wrong food, infant feeding practices, exclusive breastfeeding, complementary feeding, feeding of colostrum , inadequate breastfeeding and as well as severe and repeated infectious diseases.[15]

Rational of the research

The nutritional scenario in the Himalayan region is exemplary worse according to the previous studies. However, there are no published evidence to prove the nutritional status of Dalit community children. According to the data published by Ministry of Health and population 2017/2018, Karnali Province mugu poses the lowest nutritional status. But based on ethnicity there is lack of evidence to prove the nutritional condition of Dalit community of Khatyad rural municipality. So, this study helped in identifying the situation, its influencing factors as well as it will also help in making plans and polices to local government, program designers and policy makers.

General objectives

- To identify the nutritional status and its influencing factors of under 5 years children of Dalit Community, Khatyad rural municipality, Mugu

Specific objectives

- To identify the prevalence of stunting, wasting, underweight and overweight of under 5 year children through nutritional assessment.
- To identify demographic, socio-economic, child feeding practice, health services utilization and sanitation factors influencing nutritional status of under 5 children.

Research question

What is the existing nutritional conditions of children under 5 years of Dalit community of khatyad rural municipality?

Operational definition of terms

Family Income: Income is money that an individual receives in exchange of providing goods or services or through investing capital. Income is used to fund day to day expenditures of the family.

Exclusive breastfeeding: Exclusive breastfeeding means feeding infant only with breast milk without any additional food or drink, not even water.

Frequency of feeding: The number of times the child is fed as per requirement in addition to breastfeeding. According to WHO, initially 2-3 times a day between 6-8 months, increasing to 3-4 times daily between 9-11 months and 12-24 months with additional nutritional snacks offered 1-2 times per day as desired.

Supplementary feeding: Supplementary feeding is a preparation intended to supplement the diet and provide nutrients, such as vitamins, minerals, fiber, fatty acids or amino acids that may be missing or may not be consumed in sufficient quantities in a child's diet.
Complementary feeding: When the breast milk does not fulfill the need of the babies after six months, additional food is required which is called complementary feeding.

ANC: Antenatal care or prenatal care is a preventive healthcare to reduce the risk of stillbirth and pregnancy complications.
PNC: Postnatal care is the care given to both the mother and neonates immediately after the birth and for the six weeks of life.
Immunization: Immunization is the process by which an individual's immune system becomes fortified against an agent (known as immunogen)
Vitamin A: Vitamin A capsule distributed by Government of Nepal in Vitamin A program.
Deworming tablets: Deworming tablets are the tablets that are given as anthelmintic drug to humans to get rid of helminthic parasites such as roundworm, flukes and tapeworm.
Sanitation: The condition which is related to clean and safe drinking water, adequate treatment and disposal of human excreta and sewage and also that protects human health by providing a clean environment.

CHAPTER II: LITERATURE REVIEW

Malnutrition or undernourishment is the consequences of several factors like poor food quality, insufficient food intake and also the severe and repeated infectious diseases. [6] It is also found that morbidity of children living in poverty has a strong relationship with malnutrition and an inadequate food. [6]

As per the findings of Nepal Demographic Health Survey (NDHS)-2016, 36% of children below five years are stunted. The survey also showed that 27% of children below 5 years are underweight and 10% of children below 5 years are wasted.[16]

A cross sectional study was conducted in Kapilvastu district, Nepal. Total 450 children i.e. 15 children from each VDC were chosen conveniently. Better socio-economic status, mother's age 20-35 years, birth order up to second, gap more than two year between two pregnancies, recommended exclusive breast feeding, early recommended supplementary foods, complete immunization and timely care seeking had positive effect on children health, which were also statistically significant. Considering the weight-for-height, height-for-age, BMI-for-age and MUAC-for-age; 5% to 60 [9]

A cross sectional study was conducted among 633 children of 6-12 years living in Humbo district, southern Ethiopia. Prevalence of stunting was 57%, about, 3.5% were severely stunted, 27.3% moderately stunted and 26.4% mildly stunted, and the mean (SD) was −1.1 (±1.2). About 7 (1.1 %) boys and 15 (2.4%) girls were severely stunted. Age groups 10–12 years had significantly higher rate of stunting than others. Age (AOR=1.7, 95% CI=1.1–2.6), big family size (AOR=4.6, 95% CI=2.2–9.5) and field disposal of wastes (AOR=2.7, 95% CI=1.2–5.8) were factors significantly associated with stunting. [17]

Another cross sectional study was conducted among 3747 children less than six years of 47 villages in Ambala, Haryana. At the cut-off level of <-2.00 SD of Z-scores, 48.8% children were stunted, 49.6% were underweight and 9.1% were wasted whereas 47.6% children had neither wasting nor stunting. Prevalence of severe stunting, underweight, and wasting (Z-score <-3 SD)

was 18.1%, 11.5% and 0.6%, respectively. Under-nutrition showed a significant rise after 12 months of age ($p < 0.0001$). Stunting and underweight were significantly more among girls compared to boys ($p < 0.01$) but wasting was not significantly different in them. Compared to the conventional MAC cut off levels of<13.5 cm and <12.5 cm, sensitivity and specificity in our setting were optimum at <13.5 cm for detection of wasting and <14.0 cm for diagnosis of underweight and stunting, and <13.0 cm for detection of severe wasting and <13.5 cm for diagnosis of severe underweight and severe stunting.[8]

A study on Nutritional Status and risk factors of overweight and obesity for children aged 9-15 years was conducted in Chengdu, Southwest China. The multistage random cluster sampling was used, 7194 children were recruited and among them 1,282 (17.8%) has excess body weight (14.5%) and 3.3% obesity. This study also showed that the combined prevalence gradually decrease with age and were more prevalent among boys than girls ($P<0.05$). [14]

A prospective study on nutritional assessment of children at Nepal Medical College Teaching Hospital was conducted. Out of 512 children, 59 (11.5 %), 50 (9.80 %) and 14 (2.7 %) children were found with acute, chronic and acute on chronic Malnutrition. According to this study illiteracy ,large family size, not exclusive breastfeeding, delayed weaning and low socio economic status are the major contributor for 28.9%undernourished children . [18]

A cross-sectional survey was conducted in a rural locality of North West Ethiopia called Gumbrit. The overall prevalence of malnutrition in the community was high with 28.5% of the children being underweight, 24% stunted and 17.7% wasted. Among the socio-economic variables included in the study only family income was significantly associated with malnutrition. [19]

Another cross sectional study conducted in a Hill community of Nepal among 240 under 5 children. Seventeen %of under- 5 children were moderately and 10.4% were severely underweight. Similarly, 22.9%, and 17.5% were found to be moderately and severely stunted respectively. Less than 10 % were found to be moderately and severely wasted. Older age group of children, education level of mother, not exclusive breast feeding practice had significant ($p < 0.05$) effect on stunting. More than 50% children were affected with stunting, underweight and wasting at the same time. [11]

A cohort study on 256 malnourished children was conducted in the pediatric department of hospital. The case fatality rate was 10.6% (excluding death before 24 hour) which is lower than

usually reported for hospital rehabilitation of severely malnourished children. The case fatality rates in hospital of children with protein energy malnutrition vary from 9 to 51%. [20]

A cross sectional population based study was conducted among 664 mothers and 790 children using canonical correlation analysis. Three canonical functions were selected, concentrating 89.9 % of the variability of the relationship among the groups. In the first canonical function, weight/age (-0.73) and height/age (-0.99) of the children were directly related to the mother's height (-0.82), prenatal appointments (-0.43), geographical area of the residence (-0.41), and household income per capita (-0.42). Inverse relationship between the variables related to the children and people/room (0.44) showed that the larger the number of people/room, the poorer their nutritional status. Rural residents were found to have the worse nutritional conditions. In the second canonical function, the BMI of the mother (-0.48) was related to BMI/age and retinol of the children, indicating that as women gained weight so did their children. Underweight women tended to have children with vitamin A deficiency. In the third canonical function, hemoglobin (-0.72) and retinol serum levels (-0.40) of the children were directly related to the mother's hemoglobin levels (-0.43). [21]

A cross sectional study was conducted among 217 (138 males and 79 females) in four selected AW areas of urban Allahabad. Among all under five children surveyed, 36.4% underweight (<2SD weight- for -age), 51.6% stunted (<2SD height-for- age), and 10.6% wasted (<2SD weight- for- height). Proportions of underweight (45.5%) and stunting (81.8%) were found maximum among children aged 13- 24 months. Wasting was most prevalent (18.2%) among children aged 37-48 months. Initiation of breast-feeding after six hours of birth, deprivation from colostrum and improper complementary feeding were found significant ($P<0.05$) risk factors for underweight. Wasting was not significantly associated ($P>0.10$) with any infant feeding practice studied. ICDS benefits received by children failed to improve the nutritional status of children. [22]

A study was conducted among 355 children in Akure South local government, ondo state, NIGERIA who were systematically selected from a sample frame. The prevalence of stunted, wasted and underweight children was 12.5, 14.8, and 8.5% respectively. A few of the children (2.6%) had a MUAC less than 12.5 cm while 3.4% had between 13.5cm (Acute malnutrition) and 94.1% had MUAC above 13.5cm. A clinical symptom of Protein Energy Malnutrition (PEM) was observed in 2.3% of the children while eye (conjunctiva) pallor was noticed in 9.3% and pallor (palm) in 7.0% of the children. Mothers' education affected the health status of the

children; 81.8% of the mothers with no education did not give colostrum to their children, 16.7% of the mothers exclusively breastfed and majority (60.0%) of those that did not exclusively breastfeed had little or no education. Household size had a negative correlation with the nutritional status of the children (underweight) ($r = -0.14$; $p<0.05$). Household income was positively correlated with nutritional status of the infants (Stunting) ($r = 0.18$; $p<0.05$). There was a positive correlation between Mothers 'education and hygienic practice (food preservation) ($r = 0.12$; $p<0.05$). Level of mothers education was positively correlated with nutritional status of the children (stunting) ($r = 0.23$; $p<0.05$). There was a positive correlation between infants nutritional status (under-weight) and hygienic practices (food preservation) ($r = 0.15$; $p<0.05$). [23]

In province number 5, total 2444 children with SAM were admitted in outpatient's therapeutic programme across all the 12 districts. Among them, 2416 were discharged with 1717 with complete recovery. Among all discharged SAM cases, 71 %were recovered, less than 1 %(5 cases) died and 20.7 %were defaulter, which are beyond the SPHERE standards of effectiveness of IMAM Program: recovery rate >75 percent, defaulter rate <15 %and death rate <10 %except for death rate. [24]

CHAPTER III: METHODOLOGY

Study design:

Study design was cross sectional analytical study.

Research method

This was mixed quantitative and qualitative method.

Research design

Analytical cross-sectional study was be carried out in Khatyad rural municipality, Mugu. Primary data was collected from 199 U5 children using anthropometric tools and mothers of the same sampled children was asked with semi structured questionnaires for identifying the influencing factors of nutritional status. Confidentiality of the participants was maintained. The result of this study will help in making plans and polices to local government, program designers and policy makers.

Study sites

Study area for the research was Khatyad rural municipality, Mugu because in karnali provience there are still 55% stunted children according to the NDHS 2016. [25]

Sample size

According to the NDHS 2016 the prevalence of Stunting is 36%, Wasting 10% and underweight is 27%. By taking the highest prevalence i.e. of Stunting and maximum allowable error 8%. The sample size was calculated using the formula as follow:

Sample size calculation $n=\frac{Z^2 \times p \times q}{d^2}$

Where,

Z=standard normal deviate

p=prevalence =36 % (prevalence of stunting according to NDHS 2016) [25]

q= (1-p)

d=allowable error

$n=\frac{Z^2 \times p \times q}{d^2}$

$n=\frac{(1.96)^2 \times (0.36) \times (1-0.36)}{(0.06)^2}$

$=\frac{3.8416 \times 0.36 \times 0.64}{0.0049}$

$=\frac{0.8851}{0.0049}$

=180.6326+18.0632 (10% probable error)

=198.6958≈199

=199

Sampling technique

Purposive sampling was used for selecting study area and for the selection of sample units systematic random sampling was used. First, the vitamin A resister helped to identify the total number of households having U5 year's children in the Khatyad rural municipality. Then k (sampling interval) was calculated.

k=Population size (N)/sample size (n)

Within the sampling interval, we selected a first sample by randomness and then other samples wasselected by adding K in previously selected interval.

Expected time and duration of the study

The expected time duration of study was around six months to one year. Karnali province covers most of the remote Himalayan districts where there is poor access of transportation. Reaching individual door to door of the study participants usually takes two to three days. But the study is covered in the given deadline.

Inclusion criteria

- Dalit community mother having children of Under 5 years of age of Khatyad rural municipality, Mugu.
- Children of 6-59 months of Khatyad community of Khatyad rural municipality, Mugu.

Exclusion criteria

- Mentally ill mothers of under 5 year's children
- Mothers of children U5 years of age having verbal difficulties.
- Infant below 6 months of age.
- Guest mother and children were excluded.
- Mother and children absent during data collection visit were excluded.

Study Variables

Dependent variables:

Nutritional status

- Stunting
- Wasting
- Underweight
- Overweight
- Normal

Independent variables:

1. Socio- demographic characteristics
    - Age of mother
    - Age/ Sex of child
    - Birth order
    - Type of family
2. Socio-economic characteristics
    - Education of mother
    - Education of head of the family
    - Occupation of mother
    - Occupation of head of the family
    - Family Income

3. Child feeding practice
    - Exclusive breast feeding
    - Frequency of feeding
    - Supplementary feeding
    - Complementary feeding
4. Health services utilization
    - ANC
    - PNC
    - Immunization
    - Vitamin A
    - Deworming tablets
5. Household food security
    - Mild food insecurity
    - Moderate food insecurity
    - Severe food insecurity
6. Water Sanitation and Hygiene

Validity and reliability

Validity: Validity can be defined as the accuracy with which the scale measure what it claims to measure.

i. Face Validity: It will pertain whether test will look valid or not. For the face validity the instrument such as MUAC tape, height measuring tape and weighing machine was requested to judge by the supervisor in order to see whether it actually measures for what it is constructed.

ii. **Population validity**: The findings of the research was generalized to the population.

iii. Ecological validity: The methods, materials and setting of the study was approximated to the real world that was examined.

iv. Content validity: For the content validity, the study will identify the child feeding practice among the children under 6-59 months.

v. Internal validity: The study design will closely follow the principle of cause and effect. i.e. the principle of nutritional assessment and factors influencing nutritional status .

vi. External validity: The result will not only be valid for the studied population but can also be generalized to other Madhesi community as well.

Reliability:

Reliability refers to a way of assessing the quality of the measurement procedure used to collect data.

i. Inter-Rater or Inter-Observer Reliability: If assessed by the different raters/observer there wasconsistent estimation of the same phenomena.

ii.**Test-Retest Reliability**: The analytical cross sectional descriptive study wasused so the study cannot give the test-retest reliability.

iii Parallel-Forms Reliability: Pre-testing wasdone using both the UNICEF standard stadiometer and normal height measuring tape simultaneously. The test that gives the most consistent results wasused, while the other (provided it is sufficiently consistent) wasused as a backup.

iv. Internal Consistency Reliability: For internal consistency reliability estimation, we will use single measurement instrument on one occasion to estimate reliability.

Ethical consideration

- Approval letter was taken from Khatyad Rural Municipality..
- Approval letter was given by NHRC.
- Informed consent was taken from respondent before beginning the data collection.
- Confidentiality was maintained unless no legal issue.
- The study was done maintaining the privacy and there was no emotional violation during the study.
- Participants were not forced for the participation for the study .i.e. voluntarily participation and they are able to withdrawal at any time.

Limitation of study

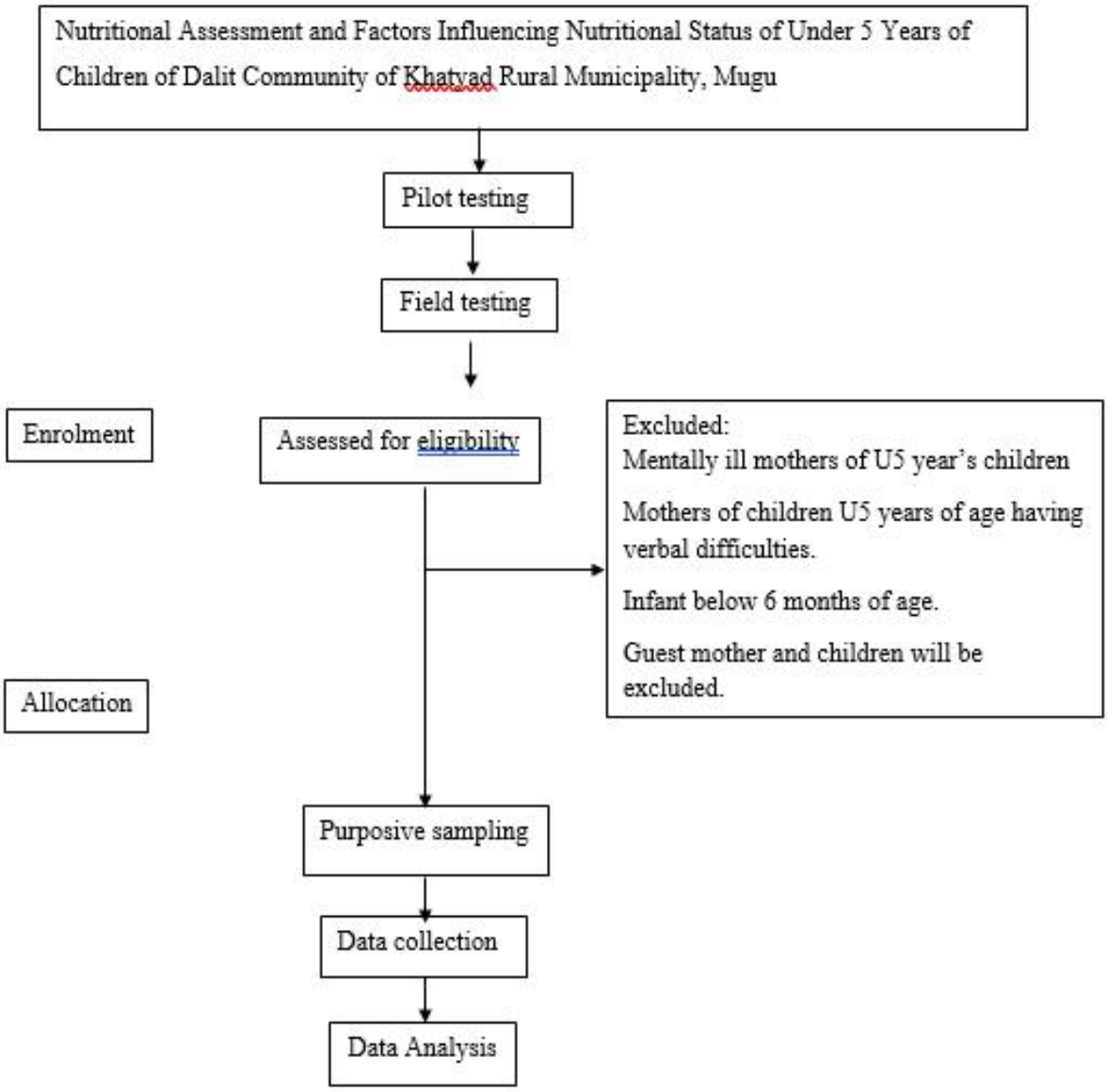
- Cross-sectional study was conducted so it may not represent seasonal variation of child feeding practice.
- Study site was purposively selected hence the generalization of the study should be done with caution.
- Biochemical, clinical and dietary information were not be taken.

Statical analysis

Filled questionnaires were checked for completeness and consistency of responses. Data collected was compiled, edited, coded and re-checking was done to minimize errors. Collected data was first entered to SPSS and then the entered data wasexported to Statistical package for social science (SPSS) version 26. Quantitative analysis was be done. Charts, graphs, tables and necessary diagrams was also be used to associate the nutritional assessment and its influencing factors.

Figure. 1

FLOW CHART OF PROCEDURE



CHAPTER IV

FINDINGS

In this chapter, Univariate analysis (socio-demographic, socio-economic, health service utilization, water sanitation and hygiene, child feeding practice and household food insecurity status) in the first part and bivariate analysis i. e the association of different factors with stunting, wasting, underweight and overweight are presented in second part from the data collected from Khatyad Rural Municipality, Mugu.

DESCRIPTIVE ANALYSIS

Univariate analysis is shown in this part of the findings.

Table. 1: Socio- demographic Characteristics of the respondent

Characteristics	Frequency	Percentage (%)
Mother's Age		
Lower Reproductive Years (15-30 years)	161	80.9
Upper Reproductive Years (≥31-49 years)	38	19.1
Sex of Child		
Male	97	48.7
Female	102	51.3
Age of child		
<27.3 months	122	61.3
≥27.3 months	77	38.7
Mean Age in Month ± SD = 27.3±1.47		
Type of Family		
Nuclear	37	18.6
Joint	162	81.4

Table 1 shows the descriptive analysis of socio-demographic characteristics of the study population. The mean age of children was 27.3± 1.47. From the total participants 97 (48.7%) were male and 102 (51.3%) females. Majority of the children were from <27.3 months 122 (61.3%) followed by >27 months 77 (38.7). Meanwhile in mother first pregnancy, majority of the mother were of < 20 years 178 (89.4%) and just 21 mothers (10.6%) were of more than 20 years. More than one third of the children stay with joint family 162 (81.4%)

Table 2. Description of the socio-economic characteristic of the participants

Characteristics	**Frequency**	**Percentage (%)**
Education of Mother		
≥SLC	74	37.2
<SLC	103	51.8
Illiterate	22	11.1
Occupation of Mother		
Skilled	38	19.1
Unskilled	110	55.3
Unemployed	51	25.6
Education of head of family		
Graduate	1	0.5
Intermediate or Diploma	10	5.0
High School Certificate	18	9.0
Middle School Certificate	48	24.1
Primary School Certificate	110	55.3
Illiterate	12	6.0
Occupation of mother		
Semi-professional	1	0.5
Skilled worker	4	2.0
Semi-skilled worker	33	16.6

Unskilled worker	110	55.3
Unemployed	51	25.6
Occupation of the Head of family		
Professionals	1	0.5
Semi-professional	1	0.5
Skilled worker	34	17.1
Semi-skilled worker	68	34.2
Unskilled worker	76	38.2
Unemployed	19	9.5
Monthly Income of the family		
≥Rs. 15,000 (≥Minimum Monthly Income of Nepalese	183	92.0
<Rs. 15,000 (<Minimum Monthly Income of Nepalese)	16	8.0

Table 2 shows the descriptive analysis of the socioeconomic status of the respondent.
Most of the mothers were literate with under School leaving certificate 103 (51.8%) and 74 mothers had passed school leaving certificate. Similarly, 110 (55.3%) mothers were involved in unskilled work and 51 (9.5%) were unemployed. As like that the head of the family were also mainly involved in unskilled work 76 (38.2%) as compared to other occupations.

Table 3: Child Feeding Practices

Characteristics	Frequency	Percentage (%)
Colostrum Feeding		
Yes	196	98.5
No	3	1.5
Breastfeeding Initiated Time		
Before 1 hour of birth	161	80.9
After 1 hour of birth	38	19.1
Feeding anything other than breast milk		
Yes	72	36.2
No	127	63.8
Frequency of Feeding Solid Food (additional food)		
<3 times	45	22.6
≥3 times	154	77.4
Food Groups Consumed		
Grains, roots and tubers	181	91.0
Legumes	3	1.5
Animal products	10	5.0
Vegetables and fruits	5	2.5
Food Groups Consumed based on nutrients rich		
Macro nutrient rich	184	92.5
Micro nutrient rich	15	7.5

Table 3 shows descriptive analysis of child feeding practice of respondent. All most all the mothers fed the child with colostrum 196 (98.5%) after the child birth. More than half of the mother only rely on feeding breast milk 127 (63%). The frequency of child feeding with solid

food was 154 (77.4%). The frequency of feeding solid food more than three times a day were 154 (77.4%) and they mostly have given priority in grains, roots, and tubers 181(91%).

Table 4: Health Service Utilization related factor of respondent

Characteristics	Frequency	Percentage (%)
Mother's Age at First Pregnancy		
< 20 years	178	89.4
≥20 years	21	10.6
ANC visit		
Done	193	97.0
Not done	6	3.0
Frequency of ANC visit		
<4 times	23	11.6
≥4 times	176	88.4
Nutrition Counselling Done in ANC Visit		
Yes	181	91.0
No	18	9.0
Place of Delivery		
Institutional Delivery	175	87.9
Home Delivery	24	12.1
PNC Visit		
Done	166	83.4
Not done	33	16.6
Child Immunization		
Done	191	96.0
Not done	8	4.0

Table 4 shows the descriptive analysis of the health service utilization of the respondent.
In health service utilization ANC visit was done by 193 (97%) with a frequency of more than 4 times visit 176 (88.4%). Mothers had given priority in the institutional delivery 175 (87.9%) and postnatal care visit was done by 191 (96%).

Table 5: Household Food Security

Characteristics	Frequency	Percentage (%)
Food Secure	103	51.8
Food Insecure	96	48.2

Table 5 shows the descriptive analysis of the respondent in household food security. In household food security majority of respondent was food secure by 103(51.8%) than food insecure.

Table 6: Water Sanitation and Hygiene

Characteristics	Frequency	Percentage
Drinking water is treated		
Yes	17	8.5
No	182	91.5
Toilet Facility in House		
Yes	183	92.0
No	16	8.0
Excreta Disposal of Child		
Safely Disposed in Toilet	126	63.3
Unsafely Disposed in Open place	73	36.7

Table 6 shows the descriptive analysis of drinking water and stool disposal of the child. Most of the respondent was not treat the water which is 182(91.5%) followed by treated drinking water. Majority of respondent disposed excreta in toilet was 126(63.3%) and 73 (36.7%) were unsafely disposed in open place.

Table 7: Nutritional Status of Children

Nutritional Status of Children	Frequency	Percentage (%)
Weight For Age		
Normal Weight	48	24.1
Moderate Underweight	102	51.3
Sever Underweight	49	24.6
Height For Age		
Normal Height	53	26.6
Moderate Stunting	96	48.2
Severe Stunting	50	25.1
Weight for Height		
Normal Weight for Height	98	49.2
Moderate Wasting (MAM)	71	35.7
Severe Wasting (SAM)	30	15.1
Mid Upper Arm Circumference		
Normal	158	79.4
Moderate Wasting (MAM)	22	11.1
Severe Wasting (SAM)	19	9.5

Table 7 shows the nutritional status of children. Most of the participated children were of moderate underweight 102 (51.3%) and remaining were in normal weight 48 (24.1%) and severe underweight 49 (24.6). Encase of height of children moderate stunting was seen in 96 (48.2%), normal height 53 (26.6%), and remaining 50 (24.1%) were in severe stunting. Similarly, in the weight for height there were 98 (49.2%) normal, moderate wasting 71 (35.7%), and severe

wasting 30 (15.1%). In the girth measurement of mid upper arm circumference 158 (79.4%) fall in the normal category, 22 911.1%) in moderate wasting, and severe wasting 19 (9.5%).

ALYTICAL ANALYSIS

This part of the report include the bivariate association between the study variables such as demographic characteristics, socioeconomic characteristics, health service utilization, child feeding practice and house food security with outcome variable (stunting, wasting, overweight and malnourished). In the case of bivariate analysis where the cell value is 5 or less than 5 Fisher Exact test is applied.

Table 8: Demographic Factors Influencing Nutritional Status of Children (Weight for age and Height for Age

Characteristics	Weight for Age (WFA)			p-value	Height for Age (HFA)			p-value
	Normal WFA	Moderate Under Weight	Severe Under Weight		Normal HFA	Moderate Stunting	Severe Stunting	
Mother's Age								
Lower Reproductive Years	38 (23.6%)	86 (53.4%)	37 (23.0%)	0.410	39 (24.2%)	81 (50.3%)	41 (25.5%)	0.269
Upper Reproductive Years	10 (26.3%)	16 (42.1%)	12 (31.6%)		14 (36.8%)	15 (39.5%)	9 (23.7%)	
Mother's Age at First Pregnancy								
< 20 years	40 (22.5%)	95 (53.4%)	43 (24.2%)	0.172	42 (23.6%)	91 (51.1%)	45 (25.3%)	0.012*
≥20 years	8 (38.1%)	7 (33.3%)	6 (28.6%)		11 (52.4%)	5 (23.8%)	5 (23.8%)	
Sex of Child								

Male	23 (23.7%)	51 (52.6%)	23 (23.7%)	0.932	19 (19.6%)	41 (42.3%)	37 (38.1%)	0.001*
Female	25 (24.5%)	51 (50.0%)	26 (25.5%)		34 (33.3%)	55 (53.9%)	13 (12.7%)	
Order of a child								
≤2nd order	28 (25.5%)	54 (49.1%)	28 (25.5%)	0.788	30 (27.3%)	55 (50.0%)	25 (22.7%)	0.684
≥3rd order	20 (22.5%)	48 (53.9%)	21 (23.6%)		23 (25.8%)	41 (46.1%)	25 (28.1%)	
Age of child								
<27.3 months	30 (24.6%)	62 (50.8%)	30 (24.6%)	0.980	32 (26.2%)	58 (47.5%)	32 (26.2%)	0.903
≥27.3 months	18 (23.4%)	40 (51.9%)	19 (24.7%)		21 (27.3%)	38 (49.4%)	18 (23.4%)	
Type of Family								
Nuclear	11 (29.7%)	19 (51.4%)	7 (18.9%)	0.551	14 (37.8%)	15 (40.5%)	8 (21.6%)	0.232
Joint	37 (22.8%)	83 (51.2%)	42 (25.9%)		39 (24.1%)	81 (50.0%)	42 (25.9%)	

The bivariant analysis of the variables in table 6 shows that in the mother age, mothers age at first pregnancy, sex of child, age of child and types of family had clearly shown the p-value >0.05 which indicates that it is not statistically significant and indicates strong evidence for null hypothesis. Whereas in case of height for age two variables' mothers age at first pregnancy and gender of child the p-value is <0.05 which means there is statistically significant association.

Table 9: Demographic Factor Influencing Weight for Height and MUAC of Children								
Characteristics	Weight for Height			p-value	MUAC			p-value
	Normal WFA	MAM	SAM		Normal MUAC	MAM	SAM	
Mother's Age								
Lower Reproductive Years	81 (50.3%)	56 (34.8%)	24 (14.9%)	0.819	125 (77.6%)	19 (11.8%)	17 (10.6%)	0.437
Upper Reproductive Years	17 (44.7%)	15 (39.5%)	6 (15.8%)		33 (86.8%)	3 (7.9%)	2 (5.3%)	
Mother's Age at First Pregnancy								
< 20 years	87 (48.9%)	68 (38.2%)	23 (12.9%)	0.016	140 (78.7%)	21 (11.8%)	17 (9.6%)	0.619
≥20 years	11 (52.4%)	3 (14.3%)	7 (33.3%)		18 (85.7%)	1 (4.8%)	2 (9.5%)	
Sex of Child								
Male	53 (54.6%)	30 (30.9%)	14 (14.4%)	0.306	81 (83.5%)	8 (8.2%)	8 (8.2%)	0.352
Female	45 (44.1%)	41 (40.2%)	16 (15.7%)		77 (75.5%)	14 (13.7%)	11 (10.8%)	
Order of a child								
≤2nd order	50 (45.5%)	40 (36.4%)	20 (18.2%)	0.313	87 (79.1%)	10 (9.1%)	13 (11.8%)	0.335
≥3rd order	48 (53.9%)	31 (34.8%)	10 (11.2%)		71 (79.8%)	12 (13.5%)	6 (6.7%)	

Age of child								
<27.3 months	58 (47.5%)	45 (36.9%)	19 (15.6%)	0.832	86 (70.5%)	18 (14.8%)	18 (14.8%)	0.001*
≥27.3 months	40 (51.9%)	26 (33.8%)	11 (14.3%)		72 (93.5%)	4 (5.2%)	1 (1.3%)	
Type of Family								
Nuclear	18 (48.6%)	14 (37.8%)	5 (13.5%)	0.934	27 (73.0%)	5 (13.5%)	5 (13.5%)	0.540
Joint	80 (49.4%)	57 (35.2%)	25 (15.4%)		131 (80.9%)	17 (10.5%)	14 (8.6%)	

The bivariant analysis of the variables in Table 9 shows weight for height and MUAC of the children that in the mother age, mothers age at first pregnancy, sex of child, age of child and types of family showed the p-value >0.05 which indicates that it is not statistically association and indicates strong evidence for null hypothesis. However, age of child with MUAC shows p-value <0.05 which means there is statistically significant association.

Table 10: Socio-Economic Factors Influencing Weight for Age and Height for Age								
Characteristics	Weight for Age (WFA)			p-value	Height for Age (HFA)			p-value
	Normal WFA	Moderate Under Weight	Severe Under Weight		Normal HFA	Moderate Stunting	Severe Stunting	
Mother's Education								
≥SLC	15 (20.3%)	39 (52.7%)	20 (27.0%)	0.043*	17 (23.0%)	37 (50.0%)	20 (27.0%)	0.001*
<SLC	32 (31.1%)	51 (49.5%)	20 (19.4%)		34 (33.0%)	52 (50.5%)	17 (16.5%)	
Illiterate	1 (4.5%)	12 (54.5%)	9 (40.9%)		2 (9.1%)	7 (31.8%)	13 (59.1%)	
Mother's Occupation								
Skilled	9 (23.7%)	20 (52.6%)	9 (23.7%)	0.345	10 (26.3%)	21 (55.3%)	7 (18.4%)	0.014*
Unskilled	31 (28.2%)	56 (50.9%)	23 (20.9%)		34 (30.9%)	55 (50.0%)	21 (19.1%)	
Unemployed	8 (15.7%)	26 (51.0%)	17 (33.3%)		9 (17.6%)	20 (39.2%)	22 (43.1%)	
Monthly Family Income								
< Minimum Monthly Income of Nepalese (<Rs. 1500)	48 (26.2%)	91 (49.7%)	44 (24.0%)	0.010*	52 (28.4%)	87 (47.5%)	44 (24.0%)	0.083
≥Minimum	0 (.0%)	11	5		1 (6.2%)	9 (56.2%)	6 (37.5%)	

Monthly Income of Nepalese (≥Rs. 1500)		(68.8%)	(31.2%)					

Table 10 shows socioeconomic factor influencing weight for age and height for age with different variables. Mothers' education has shown the p-value <0.05 WFA and HFA. Likewise, mothers' occupation HFA and monthly income also shows the p-value <0.05. However, monthly income with HFA and mother occupation for weight didn't shows statistically significant association.

Table 11: Child Feeding Practice Influencing Weight for Age and Height for age								
Characteristics	Weight for Age (WFA)			p-value	Height for Age (HFA)			p-value
	Normal WFA	Moderate Under Weight	Severe Under Weight		Normal HFA	Moderate Stunting	Severe Stunting	
Child Feed with colostrum								
Yes	48(24.5%)	102(52.0%)	46(23.5%)		53(27.0%)	94(48.0%)	49(25.0%)	
No	0(0%)	2(100%)	1(100%)	0.053*	0(0%)	2(1000%)	1(100%)	0.273
Breast Feeding initiated time								
Before 1 hour of birth	83(51.6)	57(35.4%)	21(13.0%)		44(27.3%)	74 (46.0%)	43(26.7%)	
After 1 hour of birth	31 (28.2%)	56 (50.9%)	23 (20.9%)	0.198	9(23.7%)	22(57.9%)	7(18.4%)	0.387
Feeding other things along with breast milk								
Yes	22(30.6%)	34(47.2%)	16(22.2%)		44(27.3%)	74(46.0%)	43 (26.7%)	
No	26(20.5%)	68(53.5%)	33(26.0%)	0.278	9 (23.7%)	22 (57.9%)	7(18.4%)	0.387
Frequency of feeding of solid Food								
More than 3 times	11(24.4%)	23(51.1%)	11(24.4%)	0.998	9 (20.0%)	25 (55.6%)	11 (24.4%)	0.446

Less than 3 times	37(24.0 %)	79 (51.3%)	38 (24.7%)		44 (28.6%)	71 (46.1%)	39 (25.3%)	
Food Groups Consumed								
Grains,Root and tubers	45 (24.9%)	94 (51.9%)	42 (23.2%)	0.806	50 (27.6%)	86 (47.5%)	45 (24.9%)	0.555
Legumes	1 (33.3%)	1 (33.3%)	1 (33.3%)		0 (0%)	2 (66.7%)	1 (33.3%)	
Animal Product	1 (10%)	5 (50.0%)	4 (40.0%)		1 (10.0%)	7(70.0%)	2 (20.0%)	
Vegetables and fruits	1 (20%)	2 (40.0%)	2 (40.0%)		2 (40.0%)	1 (20.0%)	2 (40.0%)	
Food Groups Consumed based on nutrients rich								
Macronutrient rich	46 (25.0%)	95 (51.6%)	43 (23.4%)	0.300	50 (27.2%)	88 (47.8%)	46 (25.0%)	0.831
Micronutrient rich	2 (13.3%)	7(46.7%)	6 (40.0%0		3 (20.0%)	8 (53.3%)	4 (26.7%)	

Table 11 shows that Child feeding weight for age and height for age with different variables. Child feed with colostrum has shown the p-value < 0.05 with WFA. Likewise Breast feeding initiated time, Feeding other things along with breast milk, frequency of feeding of solid food, food groups consumed and food groups consumed based on nutrients rich also shows the p-value >0.05 which means there is not statistically significant association.

Table 12: Health Service Utilization influencing Weight for Age and Height for Age								
Characteristics	Weight for Age (WFA)			p-value	Height for Age (HFA)			p-value
	Normal WFA	Moderate Under Weight	Severe Under Weight		Normal HFA	Moderate Stunting	Severe Stunting	
ANC Visit								
Done	46 (23.8%)	99 (51.3%)	48 (24.9%)	0.828	52(26.9%)	91(47.2%)	50(25.9%)	0.186
Not Done	2 (33.3%)	3 (50.0%)	1 (16.7%)		1(16.7%)	5(83.3%)	0(0%)	
Frequency of ANC visit								
More than 4 times	6 (26.1%)	13(56.5%)	4 (17.4%)	0.693	3 (13.0%)	10 (43.5%)	10 (43.5%)	0.067
Less than 4 times	42 (23.9%)	89 (50.6%)	45 (25.6%)		50 (28.4%)	86 (48.9%)	40 (22.7%)	
Nutritional Counselling Done in ANC visit								
Yes	46 (25.4%)	92 (50.8%)	43 (23.8%)	0.355	47 (26.0%)	88 (48.6%)	46 (25.4%)	0.795
No	2 (11.1%)	10(55.65)	6 (33.3%)		6 933.3%)	8 (44.4%)	4 (22.2%)	
Place of Delivery								
Institutional Delivery	45 (25.7%)	88 (50.3%)	42 (24.0%)	0.364	48 (27.4%)	88 (50.3%)	39 (22.3	0.044

							%)	
Home Delivery	3 (12.5%)	14 (58.3%)	7 (29.2%)		5 (20.8%)	8 (33.3%)	11 (45.8 %)	
PNC Visit								
Done	44 (26.5%)	84 (50.6%)	38 (22.9%)	0.160	49 (29.5%)	80 (48.2%)	37 (22.3 %)	0.042
Not done	4 (12.1%)	18 (54.5%)	11 (33.3%)		4 (12.1%)	16 (48.5%)	13 (39.4 %)	
Child Immunization								
Done	47 (24.6%)	95 (49.7%)	49 (25.7%)	0.098	51 (26.7%)	91 (47.6%)	49 (25.7 %)	0.641
Not Done	1 (12.5%)	7 (87.5%)	0 (0%)		2 (25.0%)	5 (62.5%)	1 (12.5 %)	

Table 12 shows that Health Service Utilization influencing weight for age and height for age with different variables. ANC visit has shown p- value < 0.05 WFA and HFA. Likewise, Frequency of ANC visit, Nutritional Counselling Done in ANC visit, and Child Immunization which means there is not statistically significance. Where Place of Delivery and PNC visit has shown p-value > 0.05 which means there is no statistically significant association.

Table 13: Household food security influencing weight for Age and height for Age								
Characteristics	**Weight for Age (WFA)**			**p-value**	**Height for Age (HFA)**			**p-value**
	Normal WFA	Moderate Under Weight	Severe Under Weight		Normal HFA	Moderate Stunting	Severe Stunting	
Food Secure	23 (22.3%)	52 (50.5%)	28 (27.2%)	0.645	26 (25.2%)	55 (53.4%)	22 (21.4%)	0.281
Food Insecure	25 (26.0%)	50 (52.1%)	21 (21.9%)		27 (28.1%)	41 (42.7%)	28 (29.2%)	

Table 13 shows Household food Security influencing weight for age and height for age with variables. Food security has shown the p-value >0 .05 which means there is not statistically significant.

Table 14: Water Sanitation and Hygiene influencing weight for Age and height for Age								
Characteristics	**Weight for Age (WFA)**			**p-value**	**Height for Age (HFA)**			**p-value**
	Normal WFA	Moderate Under Weight	Severe Under Weight		Normal HFA	Moderate Stunting	Severe Stunting	
Drinking water is treated								
Yes	2 (11.8%)	9 (52.9%)	6 (35.3%)	0.359	3 (17.6%)	10 (58.8%)	4 (23.5%)	0.602
No	46 (25.3%)	93 (51.1%)	43 (23.6%)		50 (27.5%)	86 (47.3%)	46 (25.3%)	

Toilet Facility in house								
Yes	47 (25.7%)	94 (51.4%)	42 (23.0%)	0.087	53 (29.0%)	86 (47.0%)	44 (24.0%)	0.040
No	1 (6.3%)	8 (50.0%)	7 (43.8%)		0 (0%)	10 (62.5%)	6 (37.5%)	
Excreta Disposal of child								
Safely disposed in toilet	37 (29.4%)	62 (49.2%)	27 (21.4%)	0.060	37(29.4%)	50 (39.7%)	39 (31.0%)	0.004
Unsafely disposed in open place	11 (15.1%)	40 (54.8%)	22 (30.1%)		16 (21.9%)	46 (63.0%)	11 (15.1%)	

Table 14 shows that Water Sanitation and Hygiene influencing weight for age and height for age with different variables.Drinking water is treated has shown p-value > 0.05 which is not statistically significant association. Likewise, Toilet facility in house and Excreta disposal of child has shown p-value < 0.05 with height for age which means there is statistically significant association.

CHAPTER V: DISCUSSION

This cross-sectional analytical study was conducted to determine nutritional assessment and factors influencing nutritional status of under 5 years of children of Khatyad rural municipality, Mugu district karnali province. Data were collected by self-administered questionnaire and anthropometric measured was used. The questionnaire was prepared on the basis of previous studies and pre-test before the data collection. Respondent were from different backgrounds i.e religions, Caste ,socioeconomic status .The nutritional status of children was assessed by the indicator of Height-for-age, Height –for-weight, Weight-for-height and MUAC. The major findings of the study are discussed here briefly.

Prevalence of stunted, wasted, underweight/Overweight and Malnourished children

One of the key findings of this study is that more than half of the children (58.7 %) in the study population are stunted and is higher than the results of a survey conducted in rural Nepal (Dolakha and kavrey districts) i.e 39.9 percent. [26] The result for wasting in this study is higher (22.%) as compared to previously done study in rural areas of Dolakha and kavre districts (7 %). [26] In this study, children were of moderate underweight 102 (51.3%) and remining were normal weight 48 (24.1%). The prevalence of underweight was higher than the study conducted in rural Nepal (18.9 percent). [26]

The variation in the nutritional status may be due to the geographical distribution and also may be because of the determinants which were not the scope of present study as this study was only conducted in one rural municipality with limited sample size so causal relationship could not be established.

According to MUAC 11.1 % of the sample children were moderately malnourished and 9.5 % of them were severely malnourished. But as found in study conducted in Nigeria 2.3% were moderately malnourished and 0.3 % were severely malnourished this may be because Rural part of nepal is considered as under developed in compare to Nigeria.[23] But the cases of severe malnutrition in this study is similar with the study conducted in province 5 as the province 5 has 0.4% of acute malnutrition cases and this may be because of the same geographical pattern and also because of same food feeding practices. [27]

Socio-demographic characteristic

The respondent of the study was from the age group 6-59 months from Khatyad rural municipality, Mugu. The finding of the study shows the mean age of the children (6-59 Months) to be 27.3 and SD ±1.47. In the study, out of total respondents 51.3 % were female and 48.7 % were male. The findings showed that the majority of them followed joint family.

Socio-economic characteristics

In this study socioeconomic status was statistically associated with stunting and malnutrition but not with underweight /overweight and wasting which was found to be similar with one of the study conducted in Tenzenia. The remoteness and the poor economic status of the study area could be the reason for high stunting and malnutrition in the study area. [12]

Household food security

Household food insecurity was measured using the HFIAS tool which consists of nine occurrence questions. According to this study there was significant association between the nutritional status of children and the household food insecurity as same as in the study conducted in South Ethiopia. In this study 20 % of the respondents reported to have worried about food shortage during last four weeks; 22.6 % reported inability to eat the preferred food; 26.6 % reported to have eaten limited variety of food; 25.6 % food that they really do not want to eat and were unable to eat the preferred variety of food due to lack of adequate resources; 15.1 % reported that their household members have eaten smaller amount of food; 15.1 % missed the number of meals per day; 3 % reported that they have no food of any kind to eat; 3 % reported sleeping without eating food; and 1.5 % reported to have spent the day and night without eating any food which was found to have less food insecurity in compare to the study conducted in South Ethiopia as 64 % of the respondents reported to have worried about food shortage during the last four weeks; 66.1 % reported inability to eat the preferred food; 66.5 % reported to have eaten limited variety of food; 55.9 % eat food that they really do not want to eat and were unable to eat the preferred variety of food due to lack of adequate resources; 62.3 % reported that their household members have eaten smaller amount of food; 66.1% missed the number of meals per day; 32.3 % reported that they have no food of any kind to eat; 10.7 % reported sleeping without eating food; and 5.8 %reported to have spent the day and night without eating any food. (30) The reason for having less food insecurity in this study might be because of the food production capacity is higher in compare to South Ethiopia. Another reason may be fewer droughts and more farmland in compare to the study of South Ethiopia.

Health service utilization

In the study the mean age of mothers during the first pregnancy was 26.38 and among them every mothers had 4 times ANC checkup which was found higher than province 5 with 51.9 percent. This may be because of the strong FCHV program that flow the health-related information in the rural municipality. More than three fourths (88%) had institutional delivery and results being greater than that of the provincial data of institutional delivery (75.2 percent). The difference might be due to the higher accessibility of services. The respondent to have PNC visit was 95 % but the annual report of province 5 shows only 21.7 % institutional delivery. The PNC checkup was also significantly associated with malnutrition. In the study every child was immunized which was nearly similar to the provincial report i.e province had 98%. [28]

Water sanitation and hygiene

In this study almost every (99.5%) of the household used tube well for cooking and hand washing whereas only 0.5 % had used public tap but as in the study conducted in Bangladesh majority (71 %) used public taps and 27 %household had water piped into their dwelling while a very few used filtered water. The variation may be because there might not be public taps and people have to only depend on tube well for the drinking proposes. None of the respondent in the study treated water for drinking purpose and also in the study conducted in the Bangladesh more than three fourth (76 percent) of the families did not treat water for drinking. This may be because both the study population may have no any information about the treatment of water. In the study the toilet facility was significantly associated with malnutrition as similar to the study of Bagladesh. [29]

Child feeding practice

In this study every child was colostrum fed but, in the study, conducted in Salyan only 82.4 % were colostrum fed. This may be due to the geographical feasibility so that the health provider had delivered the health-related information. Respondent to start breastfeeding within 1 hour of time was 97 % which was found higher than the study conducted in Salyan. The reason for higher percentage of breastfeeding within 1 hour may be due to the strong mother's group that discuss about the information related to child health, maternal health and as well as family planning. [16]

CHAPTER VI: CONCLUSION

Conclusion

Overall, there were 25.1%, 15.1%, 24.6%, and 9.5% cases of (severe) stunting, wasting, underweight, and malnutrition, respectively. The mean age in month of the children was 27.3. Similarly, the majority of mother give birth before 20 years (89.4 %) as compared to after 20 years (19.1 Almost every child had colostrum feeding within 24 hours. Every mother had 4 times ANC visit and 83.4 % had PNC visit. All the mothers immunize their children as per the national guideline. Among the respondents 87.9 % of mothers delivered their child to a health facility. Almost all the households (92 %) had a toilet facility. None of the respondents purified water for drinking purposes. In this study socioeconomic status was directly associated with stunting and malnutrition.We also found there was significant association between the nutritional status of children and the household food insecurity. According to MUAC 11.1 % of the sample children were moderately malnourished and 9.5 % of them were severely malnourished. Wasting was found to be associated with the age of additional food and eating a smaller meal. Similarly, child age, socioeconomic status, PNC visit, toilet facility and no food of any kind in the household was positively associated with malnutrition.

Hence, all the variables are equally important in improving the nutritional status of the children under 5 years of age.

Funding

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ANNEX

DATA COLLECTION INSTRUMENT

Participants ID:
Date of interview:

1	**Socio-Demographic Questionnaire**	
1.1	Name of the participant:	
1.2	Address:	
1.3	Age of mother:	
1.4	No of children:	
1.5	No. of children below 5 years:	
1.6	Religion	1) Hindu 2) Buddhist 3) Muslim 4) Christian 5) Other(specify)
1.7	Marital Status	1) Together 2) Separated 3) Divorce 4) Widowed
1.8	Types of Family	1) Nuclear 2) Joint
1.9	Occupation of mother	1) Professionals 2) Semi-Professional 3) Arithmetic skill job 4) Skilled worker 5) Semi-skilled worker 6) Unskilled worker

		7) Unemployed
1.10	Education of mother	1) Post-graduate or professional degree 2) Graduate degree 3) Higher secondary certificate 4) High school certificate 5) Middle school certificate 6) Literate, less then middle school certificate 7) Illiterate
2	**Socio-economic related questionnaire**	
2.1	Do you have own farming land?	1) Yes 2) No(skip to Q no 2.3)
2.2	If yes how many months does it covers?	---------months
2.3	Occupation of the Head of the family	1) Professionals 2) Semi-Professional 3) Arithmetic skill jobs 4) Skilled worker 5) Semi-skilled worker 6) Unskilled worker 7) Unemployed
2.4	Education of the Head of the Family.	1) Post-graduate or professional degree 2) Graduate degree 3) Higher secondary certificate 4) High school certificate 5) Middle school certificate 6) Literate, less then middle school certificate 7) Illiterates
2.5	Total Monthly Income of the family:	1) Rs 47348 and above 2) Rs 23674-47347 3) Rs 17756-23673

		4) Rs 11837-17755 5) Rs 7102-11836 6) Rs 2391-7101 7) Less than 2390
3	**Child feeding related questionnaires**	
3.1	Had the child feed colostrum?	1) Yes 2) No
3.2	When did you start Breast Feeding to your child?	1) Before 1 hour 2) After 1 hour
3.3	Did you feed anything other than breast milk?	1) Yes 2) No
3.4	Do you still (currently) breastfeed to your child?	1) Yes 2) No
3.5	Does your baby eat or drink anything else besides breast milk?	1) Yes 2) No(skip Q no 4.1)
3.6	At what age did you gave him/her extra food than breast milk?	----------months
3.7	How many times/frequency did you feed solid and semi-solid foods to your child in last 24hours?	----------times
3.8	What food groups were included in last 24 hour child feeding? (From yesterday early morning to late night feeding)	1) Grains ,roots and tubers 2) Legumes and nuts 3) Dairy products 4) Flesh foods (meat and fish) 5) Eggs 6) Vitamin A rich fruits and vegetables 7) Other fruits and vegetables(specify)
4	**Health services utilization related questionnaires**	

4.1	Age of mother during first pregnancy	1) 20 years or less 2) 21-25 years 3) 26 years or more
4.2	Did you do your ANC checkup or not? (for last child)	1) Yes 2) No(skip to Q no 4.5)
4.3	If yes how many times?	----------times
4.4	Were you counseled about health and nutrition during visit?	1) Yes 2) No
4.5	Where did you delivered your last child?	1) Hospital 2) Health facility 3) Home 4) Others (specify)
4.6	Did you use Sutkeri Samargi Kit?	1) Yes 2) No
4.7	Did you checkup your baby after birth?	1) Yes 2) No
4.8	Is your child immunized?	1) Yes 2) No
5	**Water and Sanitation related questionnaire**	
5.1	What is the main source of water used by your household for other purposes such as cooking and hand washing?	1) Pipe water into dwelling 2) Public tap 3) Tubewell 4) Others(specify)
5.2	Do you treat your water in any way to make it safer to drink?	1) Yes 2) No (skip to Q no 5.4)
5.3	What do you usually do to the water to make it safer to drink?	1) Boil 2) Chlorine 3) Solar disinfection

		4) Filtration 5) Others(specify)
5.4	Do you have toilet facility in your house?	1) Yes 2) No (skip to Q no 5.7)
5.5	Do you share this facility with other household?	1) Yes 2) No
5.6	If yes how many households use this toilet facility?	
5.7	Where do you dispose the stool of your child?	1) Child uses latrine himself/herself 2) Put /rinse into the latrine 3) Put/rinse into drain or ditch 4) Throw into garbage 5) Left it open 6) Others (specify)
6	**Food Availability related questionnaire**	
6.1	In the past four weeks, did you worry that your household would not have enough food?	1) Yes 2) No(skip to Q.no 6.2)
6.1.1	How often did this happen?	1) Rarely(once or twice in the past four weeks) 1) Sometimes (three to ten times in the past four weeks) 2) Often (more than ten times in the past four weeks)
6.2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	1) Yes 2) No (skip to Q.no 6.3)
6.2.1	How often did this happen?	1) Rarely (once or twice in the past four weeks) 2) Sometimes (three to ten times in the past four weeks)

		3) Often (more than ten times in the past four weeks)
6.3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to lack of resources?	1) Yes 2) No (skip to Q no 6.4)
6.3.1	How often did this happen?	1) Rarely (once or twice in the past weeks) 2) Sometimes (three to ten times in the past four weeks) 3) Often (more than ten times in the past four weeks)
6.4	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources obtain other types of food?	1) Yes 2) No (skip to Q no 6.5)
6.4.1	How often did this happen?	1) Rarely (once or twice in the past weeks) 2) Sometimes (three to ten times in the past four weeks) 3) Often (more than ten times in the past four weeks)
6.5	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	1) Yes 2) No(skip to Q no 6.6)
6.5.1	How often did this happen?	1) Rarely (once or twice in the past weeks) 2) Sometimes (three to ten times in the past four weeks) 3) Often (more than ten times in the past four weeks)
6.6	In the past four weeks, did you or any other	1) Yes

	household member have to eat fewer meals in a day because there was not enough food?	2) No(skip to Q no 6.7)
6.6.1	How often did this happen?	1) Rarely (once or twice in the past weeks) 2) Sometimes (three to ten times in the past four weeks) 3) Often (more than ten times in the past four weeks)
6.7	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	1) Yes 2) No(skip to Q no 6.8)
6.7.1	How often did this happen?	1) Rarely (once or twice in the past weeks) 2) Sometimes (three to ten times in the past four weeks) 3) Often (more than ten times in the past four weeks)
6.8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	1) Yes 2) No(skip to Q no 6.9)
6.8.1	How often did it happen?	1) Rarely (once or twice in the past weeks) 2) Sometimes (three to ten times in the past four weeks) 3) Often (more than ten times in the past four weeks)
6.9	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	1) Yes 2) No
6.9.1	How often did it happen?	1) Rarely (once or twice in the past weeks) 2) Sometimes (three to ten times in the past

		four weeks) 3) Often (more than ten times in the past four weeks)

7. Anthropometric measurement of children below 5 years of age

Name	Age	Sex	Order	Height(cm)	Weight (kg)	MUAC

LETTER OF RECOMMENDATION

खत्याड गाउँपालिका

गाउँ कार्यपालिकाको कार्यालय

खत्याड ७ रामतडी, मुगु

कर्णाली प्रदेश, नेपाल

पत्र संख्या : २०७९/०८० मिति : २०७९/०६/३०

चलानी नं. ५२८७

विषय :- सिफारिस सम्बन्धमा ।

श्री नेपाल स्वास्थ्य अनुसन्धान परिषद,
रामसाहपथ, काठमाण्डौं ।

प्रस्तुत विषयमा मुगु जिल्ला खत्याड गाउँपालिका वडा नं. ०३ निवासी स्वर्गीय श्री जसिमल बानियांको नातिनी श्री टेक बहादुर बानियांको छोरी प्रेम लक्ष्मी बानियाँ जनस्वास्थ्य क्षेत्रको अध्यन गरेको साथै तहाँ परिषदले आवहान गरेको विज्ञापन अर्न्तगत Provincial Research Grant । प्रादेशिक अनुसन्धान अनुदान) बमोजिम यस गाउँपालिका भित्रका दलित समुदायमा "NUTRITIONAL ASSESSMENT AND FACTORS INFLUENCING NUTRITIONAL STATUS OF UNDER 5 YEARS OF CHILDREN OF DALIT COMMUNITY OF KHATYAD RURAL MUNUCIPALITY, MUGU" शिर्षकमा अनुसन्धान गर्नको लागि अनुमति प्रदान गरिएको व्यहोरा जानकारीका साथै सिफारिस गरिन्छ ।

६.१.३०

(अज बहादुर शाही)
अध्यक्ष

अज बहादुर शाही
अध्यक्ष
खत्याड गा.पा.मुगु

PHOTO GALLERY