

**HEALTH STATUS OF PRIMARY SCHOOL CHILDREN IN
TEACHING DISTRICTS (DHANKUTA AND SUNSARI) OF
B.P.KOIRALA INSTITUTE OF HEALTH SCIENCES.**



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DHARAN

A RESEARCH STUDY
ON HEALTH STATUS OF PRIMARY SCHOOL CHILDREN

TO
NEPAL HEALTH RESEARCH COUNCIL
RAMSHAHAPATHA, KATHMANDU
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"There are barriers of religion, of caste, of color, of party, of nation, of language, of customs, and of rich and poor. Fortunately children don't know much about this barriers which separate. They play or work with each other, and it is only when they grow up that they begin to learn about these barriers from their elders".

Jawaharlal Nehru



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DEDICATION

Dedicated to my parents

Mr. Moti Ratna Shakya and Mrs. Pran Shova Shakya

for

their inspiration and blessing contributing to be what I am today.

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Dr. Sagar R. Shakya

Junior Resident

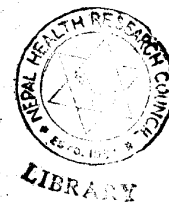
B. P. Koirala Institute of Health Sciences

Dharan, Nepal

Sept. 2003

IEC	=	Information, Education and Communication.
MOH	=	Ministry of Health
MR	=	Mitral Regurgitation
MS	=	Mitral Stenosis
MUAC	=	Mid Upper Arm Circumference
NCHS	=	National Centre of Health Statistics
NHRC	=	Nepal Health Research Council
NMSS	=	Nepal Micronutrient Status Survey 1990.
PCD	=	Partnership of Child Development
PEM	=	Protein Energy Malnutrition
PS	=	Pulmonary Stenosis
TR	=	Tricuspid Regurgitation
TS	=	Tricuspid Stenosis
SPSS	=	Statistical Package of Social Science.
SHP	=	Sub Health Post
UNDP	=	United Nation Development Program
UNICEF	=	United Nation International Children Fund
VDCs	=	Village Development Committees
WHC	=	White House Conference
WHO	=	World Health Organization

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ABBREVIATION



ARI	=	Acute Respiratory Infection.
AR	=	Aortic Regurgitation
AS	=	Aortic Stenosis
ASHA	=	American School Health Association
BPKIHS	=	B.P. Koirala Institute of Health Sciences
CWIN	=	Child Workers in Nepal Concerned Centre
DCAHD	=	Department of Child and Adolescent Health Development
DHO	=	District Health Officer
ECDC	=	Early Childhood Development Centre
HFA	=	Health For All by 2000.
HMG	=	His Majesty Government
HOCM	=	Hypertrophic Obstructive Cardiomyopathy
HTN	=	Hypertension
IAP	=	Indian Academy of Pediatrics.
ICMR	=	Indian Council of Medical Record.
ICDS	=	Integrated Child Development Service
IDD	=	Iodine Deficiency Disorder

TABLE OF CONTENTS

Chapters	Titles	NHRC Library Accession No. <u>438</u> Call No.	Page No.
	CERTIFICATES		i
	DECLARATION		ii
	DEDICATION		iii
	ACKNOWLEDGEMENT		iv
	ABBREVIATION		vi
	TABLE OF CONTENTS		viii
	LIST OF TABLES		ix
	LIST OF FIGURES		xii
Chapter I	INTRODUCTION		1
Chapter II	OBJECTIVES		4
Chapter III	REVIEW OF LITERATURE		6
Chapter IV	METHODS AND MATERIALS		44
Chapter V	LIMITATIONS		49
Chapter VI	RESULTS		50
Chapter VII	DISCUSSION		77
Chapter VIII	SUMMARY		88
Chapter IX	CONCLUSION		90
Chapter X	RECOMMENDATIONS		92
Chapter XI	REFERENCES		93
Chapter XII	APPENDIX		105





LIST OF TABLES

NHRC Library

Accession No. 135

Call No.

- | | |
|----------|---|
| Table 1 | Distribution of School Children by Education and Gender |
| Table 2 | Distribution of School Children by Age and Gender |
| Table 3 | Educational Status of School Children's Fathers |
| Table 4 | Occupational Status of School Children's Fathers |
| Table 5 | Educational Status of School children's Mothers |
| Table 6 | Occupational Status of School Children's Mothers |
| Table 7 | Personal Hygiene of School Children |
| Table 8 | Morbidity Pattern among School Children |
| Table 9 | Types of Skin Lesions among School Children |
| Table 10 | Distribution of Abnormal Postures and Rickets among School Children |
| Table 11 | Distribution of Eye, ENT and Dental Diseases among School Children |
| Table 12 | Lymphadenopathy among School Children |
| Table 13 | Lungs and Heart Diseases among School Children |
| Table 14 | Distribution of Behavior Disorders among School Children |
| Table 15 | Distribution of Anaemia among School Children |
| Table 16 | Distribution of Parasitic Infestation among School Children |
| Table 17 | Types of Parasitic Infestation among School Children |
| Table 18 | Mean weights of students by age were compared to Harward or Boston Standard (50 percentile) |
| Table 19 | Distribution of Mean heights, Mean weights of School Children and comparison with NCHS/ WHO Standards |
| Table 20 | Weight for Age as per IAP Classification |
| Table 21 | Wasting Vs Stunting per Waterlow classification |

LIST OF FIGURES



- Figure 1 Distribution of Caste/ Ethnicity among School Children
- Figure 2 Distribution of Parasitic Infestation and Anaemia among School Children
- Figure 3 Distribution of Skin Lesions among School Children
- Figure 4 Distribution of Abdominal Problems among School Children
- Figure 5 Height for Age (Stunting) comparison with NCHS/WHO standard
- Figure 6 Weight for Age (Under nutrition) comparison with NCHS/WHO standard
- Figure 7 Weight for Height (Wasting) as per Waterlow Classification

CHAPTER - I

INTRODUCTION

According to the Constitution of World Health Organization (1948)¹, "Healthy development of the child is of basic importance, the ability to live harmoniously in a changing total environment is essential to such development."

The Convention on the Rights of the Child adopted by the General Assembly of the United Nation in 1989 is a set of international standards and measures intended to protect and promote the well being of children in society.^{2,3} Under the Rights of Child three vital components are recognized: health, food and care. It was decided in 1997 that the main goal of WHO and governments should be the Health for All (HFA) by 2000. The essential principle of HFA is the concept of equity in the health i.e. all people should have an opportunity to enjoy good health.^{4,5} So for the good health, ongoing investments are needed. Only then, a child can grow and develop into a useful competent asset, participating as an adult member to the community. In conclusion, their healthy life depends upon their parents, teachers, schools and health care.³

At the White House Conference (WHC) on the care of the Dependent Children, it was proposed that "every needy child should receive the best medical and surgical attention".³ In 1940, the WHC

proposed adequate school health services including thorough medical and dental examination, immunization, and early detection of diseases, vision and hearing tests, prevention and control of diseases, health records and health services facilities.³

Nepal is facing the vicious cycle of PPE spiral i.e. poverty, population explosion and environmental degradation. However various types of government and nongovernmental sponsored school health programs have been launched from time to time but they still need improvement. There are concrete efforts to care to the under 5 through agencies, programs but care for the 5 to 15 years age group still remains to be provided regularly.⁶ The recent census shows that about 27% (6.23 million) of the total population (23.15 million, 2001) of Nepal comprises of children age 5 to 15 years. School children constitute a sizable portion of this age group.⁷

In 1998, UNICEF estimated that out of 625 million children of primary school age group, 79% were in school. It is also estimated that 70% of the children in the developing world complete at least four years of schooling.⁸ So their health status is a burning issue, stands before the World.

They are vulnerable to accident and injuries during sports and play. There are the more chance of transmission of contagious and air borne diseases due to close contact in school.^{3, 6}

Certain diseases (Rheumatic fever) and malnutrition are common in this age group. Early detection and prevention of these diseases are possible for healthy up bringing.^{5,6,9}

This age group is non earning, dependent to the family and easy accessible for the health assessment, care, education through teachers, text books. So making them health conscious, the whole family may be made conscious about health.^{6,9}

The age group 5 to 15 years is on the threshold of adulthood on whom the progress and welfare of the community depends. Therefore it is necessary to provide targeted services to improve their health status.

This study is an attempt to determine the health status and morbidity of primary school children from Grade I to Grade V in the hilly and the terai region of Eastern Nepal.

CHAPTER - II

OBJECTIVES

2.1. General Objective

To assess the health status of Primary School Children from Government Schools in teaching districts (Dhankuta and Sunsari) of B. P. Koirala Institute of Health Sciences, Dharan.

2.2. Specific Objectives

The specific objectives are as follows:

1. To find anthropometric measurements of school children up to Grade V.
2. To determine the common morbidity in school children from Dhankuta and Sunsari districts.
3. To know treatment preferences of the school teachers towards sick child during school hours.

2.3. Scope of the study

The study covers following areas:

1. Anthropometry (heights and weights of primary school students).
2. Distribution of school children by age in years, gender and grades.
3. Caste/ Ethnicity
4. Educational and occupational status of parents.
5. Personal hygiene and practices.
6. Morbidity patterns (skin diseases, anaemia, parasitic infestation, etc.).
7. Behavior disorders among primary school children.
8. Health and nutritional status of primary school children from selected schools.
9. Treatment preferences of teachers during sickness of child in school hours.

CHAPTER III

REVIEW OF LITERATURE

3.1. Health

Traditionally health has been viewed as an absence of disease and if one was free from disease then the person was considered healthy. Later many definitions of health have been offered from time to time.¹ But the widely accepted definition is that given by World Health Organization (WHO) 1948 in the preamble to its constitution, which is as follows: ^{1, 2}

"Health is a state of complete physical, mental and social well being and not merely and absence of disease or infirmity."

The Ottawa Charter prepared at the 2nd WHO International Conference in 1986 expanded on this concept and defined health as, "The extent to which an individual or group is able on the one hand, to realize aspirations and satisfy need, and on the other hand, to choose or cope with the environment. Health is therefore seen as a resource for everyday life, not the objective of living it as a positive concept emphasizing social and physical resources as well as physical capacity."¹⁰

Health is multidimensional and each dimension is influenced by numerous factors, some known and some may unknown. So it is very difficult to measure the total health status of people living in

certain area by all dimensions. So, certain indicators are used in health review like morbidity patterns, growth and development (height and weight) for nutritional status, socioeconomic conditions, behaviour status etc.

3.2. School Children

Over the past few decades, children are fortunately being recognized as people in their own right with their special requirements.⁹ Children are the future citizen on whom the progress and welfare of the community depends.¹¹ Health services for children should therefore be aimed for improving the future quality of human resources of the nation by enabling as many children as possible to reach adulthood with their potential uncompromised by illness, environmental hazards or unhealthy lifestyle.¹¹

School children are easily accessible. So school health services are emphasized world wide.

3.3. School Health Service

School health is an important branch of community health.⁵ It deals with the medical inspection and health protection of the school children in their school environment.^{3, 6}

Objective of the school health services are:^{3, 5}

1. the promotion of positive health,
2. the prevention of diseases,

3. early diagnosis, treatment and follow up of defects,
4. awakening health consciousness in children,
5. the provision of healthful environment.

International collaboration in school health has a history of more than 120 years.⁸ A health service, only for school children was first recognized in 1842 in Paris by the Municipal Health Authority.^{3,12,13} In 1880, the 3rd International Congress in Education in Brussels addressed school hygiene as one of the plenary topics. The agenda of international school conference included medical inspection in school children, individual health records, the hygiene of dormitories of students and teachers and prevention of contagious diseases in school.¹⁴

Over the years Nepal has also declared its time bound programs for the child health, illiteracy eradication including elimination of child labor, but the achievements made in areas related to child health have been rather poor. Among them school health program and health status of school children are neglected more.

A study done by Mook and Leslie in 1986 found that the probability of attending school was 5% for stunted children and 27% for normal nutritional status in Nepal.¹⁵

In Ghana, malnourished children entered school at a later age and completed fewer years of school than better nourished children.¹⁶ (Glewwe and Jacoby, 1994)

Thus poor health and nutritional deficiencies in primary school age children are among the causes of low school enrollment, high absenteeism, early dropout and poor classroom performance.¹⁷

3.4. Morbidity

Morbidity is defined as any departure, subjective or objective from a state of physiological well being. The term is used equivalent to such terms as sickness, disease and disability, etc.⁷

The common morbidity found in school children are: ^{18,19,20}

1. Nutritional Deficiency Diseases
2. Intestinal Parasites
3. Goitre
4. Disease due to Poor Hygiene
5. Skin Diseases
6. Heart/ Lung diseases
7. Diseases of Eye, Ear, Nose and Throat
8. Behaviour Disorder
9. Dental Caries
10. Lymphadenopathy

The Sunsari Health Interview Survey was done in Sunsari district in 1994. In this study it was found that in 5 to 14, 23.1% deaths were due to fever with other symptoms, 16.7% deaths due to injuries, 15.8% deaths due to abdominal problems, and 5.9% deaths due to acute respiratory infections. In the same population skin lesions were seen in 5.7% and the least common morbidity was menstrual disorder and high blood pressure (0.1%). There were no genital infections detected. The other diseases were reported as common cold (2.3%), diarrhoea (2.0%), sign of nutritional deficiency (2.3%), acute respiratory infection (ARI) (1.5%) and ear discharge with pain (2.2%).²¹

3.4.1. Nutritional Status

The word nutrition is derived from 'nutricus' meaning to suckle at the breast.⁶

Nutrition may be defined as the science of food and its relationship to health. The nutrient or food factor is used for specific dietary constituents such as proteins, vitamins and minerals. Good nutrition means maintaining a nutritional status that enables us to grow well and enjoy good health.^{7, 18}

The nutritional status of an individual is an often the result of many interrelated factors.²² It is influenced by the adequacy of food

intake both in terms of quality, quantity and also by the physical health of the individuals.²²

The nutritional assessment includes:⁵

1. Anthropometry
2. Clinical examination
3. Blood test for Haemoglobin
4. Stool for parasites and urine for protein and sugar
5. Assessment of dietary intake, vital statistics and others

Anthropometry

Growth and Development

The term growth refers to increase in the physical size of the body; the development is to increase skills and functions. Normal growth and development take place only if there is optimal nutrition, if there is freedom from recurrent episodes of infections and if there is freedom from adverse genetic and environmental influences.^{7,23}

Growth is assessed by standard procedures like weight and height.

Height

Height is a useful indicator for long term nutrition adequacy. In case of young and older children the subject is made to stand straight on a flat surface without shoes with their feet parallel and heels, buttocks, head, and shoulders touching the wall and arm hanging at

sides in a relaxed manner. The height can then be measured by non stretchable tape in centimetre.^{11, 23}

Weight

Weight is the simplest most common measurement for assessing growth and nutritional status. The subject should be bare foot with minimal clothing and has to stand straight to obtain accurate result in kilogram. The zero adjustment of scale has to be regularly checked.

Clinical Examination

Clinical examination is the simplest and the most practical method of ascertaining the nutritional status of a group of individuals. There is a number of physical signs and symptoms, some are specific and many are non specific associated with status of malnutrition.⁷ Many deficiency states have similar signs and symptoms. For example, glossitis may be observed in deficiency of riboflavin, of niacin, of folic acid and of vitamin B12 (cynocobalamine). Dry appearance of skin is a sign of xerosis. It may be due to vitamin A deficiency or may be due to a result of hot dry climate. Despite these draw backs certain deficiencies can be diagnosed such as scoliosis, kyphosis, lordosis, forward projection of sternum (pigeon breast), knock knee, coxa vera, prominent dome shaped costochondral junction (Rachitic rosate) are sign of vitamin D deficiency. Ptosis,

scoliosis, loss of reflexes, cholestatic diseases are signs and symptoms of vitamin E deficiency. Pellagra is due to Niacin deficiency, where as burning feet syndrome is due to Pantothenic acid deficiency.²³

Malnutrition

The low level of socio economic development related to poverty, ignorance, poor health and poor sanitary living condition have been major contributory factors to malnutrition. The four most important forms of malnutrition in Nepal today are:^{24,25}

1. Protein Energy Malnutrition (PEM)
2. Xerophthalmia due to vitamin A deficiency
3. Iron Deficiency Anemia
4. Parasitic Infestation
5. Urine Pathology
6. Iodine Deficiency Disorder (IDD)

Protein Energy Malnutrition

The term, Protein-Energy-Malnutrition refers to a class of clinical conditions that may result from varying degree of protein lack and energy (calorie) inadequacy. The great majority of cases of PEM, (nearly 80%) are mild and moderate cases. The incidence of severe cases is 1 to 2% in preschool age children. Classification of severe PEM is as followings:

1. Kwashiorkor: Kwashiorkor is a gross deficiency of protein through energy deficiency.
2. Nutritional marasmus: Nutritional marasmus is a gross deficiency of energy through protein deficiency.
3. Marasmic kwashiorkor: Marasmic kwashiorkor is an overlapping feature of kwashiorkor and marasmus with oedema. Other symptoms of kwashiorkor may or may not present
4. Pre kwashiorkor: Pre kwashiorkor is a quite poor nutritional status and some features of kwashiorkor like hair changes but absence of oedema.
5. Nutritional dwarfing: If PEM starts fairly early in life and goes on and on over a number of years without causing overt picture of kwashiorkor or marasmus, child's height as well as weight may be significantly low for his age. This is known as nutritional dwarfing.

Nutritional dwarfing is a common problem in developing countries but cases aren't frequently detected.

Malnutrition is widely common in the developing countries. But clinical signs and symptoms only can't estimate the frequency of PEM in community. So anthropometric measurements such as height, weight, mid arm circumferences are useful to detect under nutrition stunting and wasting with compare to the standard values.²³

Other Classification of PEM^{11, 26}

Weight for Age

As per Gomez classification

This is an international classification based on weight retardation. It locates the child on the basis of his or her weight in comparison with a normal child is in the 50th percentile of the Boston standards (Harvard Standard). Weight for age more than 90% is taken as normal that is no malnutrition. Weight for age between 75% to 90%, 60% to 75% and less than 60% are classified as Grade I, Grade II, and Grade III malnutrition respectively.

As per IAP Classification

This classification is modified one of Gomez classification, where cut off point of weight for age is taken as 80% for developing countries. Weights for age between 70% to 80%, 60% to 70%, 50% to 60% and below 50% are classified as Grade I, Grade II, Grade III and Grade IV respectively.

Height for Age

As per Waterlow Classification

The measurement of height assesses the effect of nutritional status on long term growth. According to Waterlow classification children with a height of more than 95% are termed normal. Marginal or Grade I, Moderate or Grade II, and Severe or Grade III stunting are

labeled when the height is 90% to 95%, 85% to 90% and less than 85% respectively for corresponding age. Nutritional stunting or dwarfing is known as low height for age, which is due to the past or chronic malnutrition.^{11, 23, 27}

Weight for Height

As per Waterlow Classification^{24,25,23,27}

It is proposed by Waterlow it reflects the present nutrition status rather than long-term nutritional health. According to this classification, children with weight for height more than 90% are termed as normal whereas 80% to 90%, 70% to 80% and less than 70% labeled as Grade I, Grade II, and Grade III wasting respectively.

Wasting Vs. Stunting as per Waterlow Classification

Waterlow classification defines two groups of malnutrition: malnutrition with retarded growth or stunting or shortness i.e. chronic malnutrition and malnutrition with a low weight for a normal height or wasting i.e. acute malnutrition.

Weight for Height	Height for Age	Label
>=80%	>=90%	Normal
	<90%	Stunted
<80%	>=90%	Wasted
	<90%	Wasted and Stunted

A child who is less than 70% of the expected weight is classified as severely wasted.

Comparison with Standard Values

For the purpose of comparison, Harvard or Boston Standards are used. Those are based on observations made on children in Boston from 1930 to 1956. Recently WHO reference values, based on extensive cross sectional data assembled by WHO. National Centre of Health Statistics (NCHS/ WHO) is used internationally. Malnutrition is defined by WHO as a weight for age below median minus two standard deviations of the NCHS reference population.^{28,29}

Xerophthalmia due to vitamin A deficiency

Xerophthalmia (dry eye) refers to all the ocular manifestations of vitamin A deficiency in human. It is the most widespread nutritional disorder leading to blindness particularly in South East Asia.⁵

The xerophthalmia comprises night blindness, conjunctival and corneal xerosis, Bitot's spots and keratomalacia. Night blindness is an inability to see in deep light due to impairment of dark adaptation because of lack of vitamin A.

Bitot's Spots

There are triangular pearly- white, yellowish foamy spots on the bulbar conjunctive on the either side or cornea, which are due to vitamin A deficiency in children.

Corneal and Conjunctival Xerosis

The cornea and conjunctive appear dull and dry. The cornea may appear opaque and ulcers may be seen in cornea.

Keratomalacia

It characterizes by liquefaction of the cornea and is an emergency. If eye collapses, vision is lost.^{5, 11, 23}

The Nepal Xerophthalmia Survey (Institute of Medicine 1981) and The Nepal Blindness Survey (Sewa Foundation 1981) were conducted. The findings of both surveys confirmed xerophthalmia as a public health problem according to WHO criteria. 2.2% of Bitot's spot was detected by the Nepal Blindness Survey, where as the Nepal Xerophthalmia survey found 2.3% of Bitot's spot in 1981.

According to Annual Report 2000/ 2001, Bitot's spot was about 1.9%, Night Blindness was about 1.2%, but prevalence in pre school children was 0.33% and 0.27% respectively. Clearly pre school children are benefiting from distribution of vitamin A capsules, yet among the older population, this public health problem remains same (1998 survey).³¹

Iron Deficiency Anaemia

Nutritional anaemia is a disease syndrome caused by malnutrition in its widest sense. It has been defined by WHO as a condition in which haemoglobin content of blood is lower than normal

as a result of deficiency of one or more nutrients regardless of cause of such deficiency. Anaemia is established if the Hb is below the cutoff points as follows: ⁶

Adult Male ≥ 16 yrs	<13 gm%	Anaemia
Adult Female ≥ 16 yrs (non pregnant)	<12 gm%	Anaemia
Adult Female (pregnant)	<11 gm%	Anaemia
Children (6 months to 6 yrs)	<11 gm%	Anaemia
Children (6 to 15 yrs)	<12 gm%	Anaemia

A Hb level of more than or equal to 10gm% to less than 12gm% has been define as mild anaemia and a level 7gm% to less than 10gm% as moderate anaemia whereas below 7gm% is severe anaemia (WHO reference).⁵ By far the most frequent cause of nutritional anaemia is Iron Deficiency and less frequently folate or vitamin B₁₂ deficiency.

The estimation of haemoglobin can be done by blood test using cynmethemoglobin method.

According to WHO Report 2002, about 2 billion people (especially young children, pregnant and lactating women) are suffering from iron deficiency anaemia about 0.8 million (1.5%) deaths is due to anaemia.

Nepal Micronutrient Status Survey conducted in 1998 reported that among preschool children, the overall rate of anaemia was higher

than for women, i.e. 78%. But primary school children were not given the data.³¹

3.4.2. Urine test for protein and sugar

Urine routine and microscopic examination is the third laboratory method to detect protein (albumin) and glucose in urine.

Parasitic Infestation

The second laboratory test is stool routine and microscopic examination. In stool, parasites and helminthes are examined.

The WHO estimates that more than one billion of the world's population is chronically infected with soil transmitted helminthes. The major soil transmitted helminthes are *Ascaris lumbricoides* (round worm), *Trichuris trichuira* (whip worm) and *Ancylostoma duodenale* (Hook worm).³² Fecal contamination is one of the most serious environmental problems in poor countries, where 3 million children die of enteric diseases each year due intestinal parasites.³³ *Ascaris* infects approximately 25% of the world's population annually.³⁶

Ascariasis leads to childhood under nutrition by mechanical and irritant action, decreasing intestinal absorption, competition for host's nutrition and alterations in intra-luminal conditions of the small bowel. Although the infection is often asymptomatic, it's effects may contribute substantially to child morbidity when associated with

malnutrition, pneumonia, enteric diseases and Vitamin 'A' deficiency.³⁵

Gupta R.S. et al, found in their study that 10.86% of children of rural areas and 6.14% of urban areas were suffering from worm infestation. Factor associated with high prevalence in rural areas are habit of walking bare foot, non availability of sanitary latrine and unhygienic conditions.³²

According to Annual Report 2000/2001, the prevalence of intestinal worms in Dhankuta was 4.87% and in Sunsari 2.85%. The total burden of worm infestation in Nepal was 2.82%.

3.4.3. Iodine Deficiency Disorders (IDD)

Iodine is a micro nutrient which is essential for normal growth and development. Its deficiency leads to physical and neurological abnormalities collectively known as Iodine Deficiency Disorder (IDD). They include goitre, hypothyroidism, retarded physical development and mental function, spontaneous abortion and still birth, cretinism, myxedematous cretinism and dwarfism. Endemic goitre is the most common and readily recognized.^{5,37,38}

Goitre and Cretinism continue to be serious health problem in South East Asia. The world's biggest goitre belt is the Himalayan Goitre Belt stretched from Kashmir to Nagahills of the east.⁵

The mean goitre rate calculated on the basis of the spot surveys between 1972 -1982 was 58% and cretinism was 3% (UNICEF/ Nepal 1982). In the survey 1985 – 86 carried out in 15 districts found the goitre rate be 40% and the cretinism rate 0.4% (Ministry of Health, 1987).²⁴

Gakkhav R et al (2001) studied 1205 school children between 5 to 15 years in Jabalpur from different schools, and found that there was low goitre prevalence i.e. 2.4%. Girls had higher prevalence (3.2%) than the boys (1.6%). All goitrous children has small goitre i.e. Grade I. There was no case of Grade II and Grade III. Thyroid hormone profile of the goitrous children was in euthyroid range.³⁷

The study conducted by Kamath R et al (2001) found that 30% of 722 school children of age group 8 to 10 years in Manipal were goitrous.

The prevalence of Grade I and Grade II was 20.4% and 0.8% respectively and females (31.2%) were more suffer of goitre than male (28.8%). Prevalence of goitre was significantly high (44.7%) among children of illiterate parents than children from literate parents (28.2%).³⁸

Mittal M et al (2000) found in their study, found that total goitre prevalence in the study are i.e. in the terai of North India was 38.18%, among 10 – 12 years age group children. As per grades suggested

by WHO (1992) 35.97% children suffered from **goitre** Grade I and 2.21% from Grade II. The prevalence of goitre in **girls** was 44.9% and the boys 30.9% totals of 41.43% children were **suffered** from Iodine Deficiency Disorder in the terai area.³⁹

3.4.4. Diseases due to Poor Hygiene

Hygiene – The word "Hygiene" is derived from "Hygiea", the goddess of health in Greek mythology.

Hygiene is define as, "The science of health and embrace all factors which contribute to healthful living".^{5,6}

The term personal hygiene includes bathing, clothing, washing hands and use of toilet, care of nail, feet and teeth, spitting, coughing, sneezing, personal appearances and cultivation of clean habits in the young.

The environmental hygiene has two aspects – domestic and community. Domestic hygiene comprises that of the home, use of soap, need for fresh air, light and ventilation, storage of foods, hygienic disposal of waste etc.

In the developing countries, the emphasis is on the improvement of the basis of sanitary services, consisting water supply, disposal of human excreta/ waste, vector control and food sanitation.⁵

Personal hygiene deals with the personal care of health so that a man is able to enjoy healthy life and should get satisfaction about his health.⁶

3.4.5. Skin Diseases

Some skin diseases found during examination are as followings

- Acne** – Acne is an inflammation of sebaceous glands of the face, back, chest causing unsightly skin condition.³

- Birthmarks** – These are abnormal condition of surface blood vessels creating discoloration or pigmentation of the skin.³

- Eczema** – Itchy inflamed skin, small blisters form and watery discharge appears, which dries into crusts or scales.³

- Impetigo** – Impetigo are bacterial infections of the upper epidermis. They are multiple, white, yellow, pustules which rupture living behind a raw reddish base. Bullous impetigo appears as large fluid filled blisters, which rupture to form superficial erosions.⁴⁰

- Cellulitis** – This implies infection at the dermis and subcutaneous tissue.⁴²
- Furuncles or Boils** – They are abscesses around the hair follicles due to bacteria.⁴²
- Infectious Dandruff** – Infection of sebaceous glands of the scalp.⁵
- Moles** – Densely packed skin cells pigmented either brown or black.³
- Pimples** – These are solid elevations on the skin due to obstruction of normal functioning of sebaceous glands.⁴²
- Pediculosis** – It is a common infestation in childhood due to human lice. Itching over head (scalp lice) and body (body lice) causes erosion, redness, crusting and secondary infection. Cervical lymph nodes may enlarge due to occult or obvious infection. Larval capsules which are cemented to the hair are called nits.⁴¹
- Scabies** – It is a parasite infestation caused by mites (*Sarcoptes scabies*). These mites

burrow moll like under the skin on the inner side of fingers, thighs, lower abdomen, groins, back of hands, trunks. Excessive itching, edemas, redness, papules, plaques, are symptoms of scabies.⁴¹

Tinea or Ringworms – These are a fungal infection on the body (Tinea corporis), head (T. capitis), groin (T. cruris) and nails (T. unguium). These are rounded, elevated, irregular, reddish patches spreading from red edges while healing in the centre.

Warts – Cauliflower type of growth of epidermal cells.

Pityriasis versicolor – It is a common disorder seen as brownish scaly hypopigmented maculae or patches over the front and back at trunk. It is can feel by yeast like micro organisms.⁴²

Vitiligo – A common skin disorder with failure of pigmentation due to destruction of melanocytes.^{42,43}

A study was conducted in Garhwal region on 1754 children aged 0 to 14 years in 1998 by Negi S. et al. During the study, it was revealed that infectious dermatoses were seen in 50.9%, while non infective and nutritional deficiency dermatoses were seen in 31.6% and 17.5% respectively. Pediculosis capitis was found in 22.6% pyoderma in 15.6% scabies in 5.1% and eczema in 8.1%.⁴⁴

Vikas B (1997) in his study of pediatric dermatoses in the rural area of the Central India found that 35.8% girls and 11.2 % boys were infected with Pediculosis capitis.⁴⁵

3.4.6. Lung and Heart Diseases

In community, all aspects of the lungs and heart diseases can't be studied. Advanced diagnosis instruments are required for the diagnosis of lungs and heart diseases. So, in community, only certain signs like wheezes (ronchi), crepitation, valvular heart murmurs can be identified with a help of stethoscope and with clinical manifestation co related with habit patterns.

Wheezes or ronchi – These are musical sounds associated with air way narrowing during auscultation of lung. The loudest most obvious wheeze is the stridor associated with laryngeal spasm or tracheal stenosis. The noise is often inspiratory and expiratory. Ronchi are predominantly expiratory in nature in bronchitis, asthma, emphysema.⁴⁶

Crackles and Crepitation – These are short **explosive** sounds often described as **bubbling or clicking** noises. A **series** of inspiratory crackles at the end of inspiration is typical of **pulmonary oedema** and **fibrosing alveolitis**.⁴⁶

Heart murmurs are due to turbulence in the **blood** flow at or near a valve or an abnormal communication within the **heart**.

Flow murmur – are most common in children and young people whenever there is an increased systolic volume such as anaemia, thyrotoxicosis and HTN, These are produced by **rapid flow** of blood through a normal valve.⁴⁶

Systolic murmurs are:

- 1) Pan systolic murmur (in mitral regurgitation or tricuspid regurgitation).
- 2) Ejection systolic murmur (in aortic stenosis, **pulmonary** stenosis)
- 3) Late systolic murmur (In HOCM, MVP).

Diastolic murmurs are:

- 1) Early diastolic murmur (in aortic regurgitation , **duel** pulmonary regurgitation), Graham Steel murmur (pulmonary **regurgitation** with pulmonary hypertension and mitral stenosis then early diastolic murmur is called Graham Steel Murmur),

2) Mid diastolic murmur in mitral stenosis and Rheumatic Heart Disease (Carey coomb's murmur: due to thickening of mitral valve leaflets) and

3) Austin flint murmur is an aortic regurgitation due to fluttering of the anterior mitral valve cusp caused by regurgitant stream.⁴⁶

3.4.7. Eyes, Ears, Nose & Throat: ¹¹

Conjunctivitis – Inflammation of the conjunctive of the eyeball

Ptosis – Drooping of upper eyelid below 2mm down to the upper limbus.

Mastoiditis – Extensive inflammation of the mastoid process

Tonsillitis – Inflammation of the tonsils

Discharge from Ear – Pus discharge from ear due to infection

Posture

Lordosis – Deviation of anterior posterior posture with an extreme curvature in the lumbar region.³

Kyphosis – Deviation of anterior posterior posture with an exaggerated curvature in the thoracic region.³

Scoliosis – Lateral curvature of the spine.³

Rickets – It is a disease caused by deficiency of Vitamin 'D' or an abnormality of its metabolism. Clinical and radiological findings of rickets are prominent costochondral junction with appearance of a rosary (rachitic rosary), forward

projection sternum (pegiion breast), Harrison's groove due to insertion of diaphragm, knock knee and bow leg.⁴⁷

3.4.8. Behavior Disorder

A large number of children suffer from behavioral problems at one time or the other during their development. Many of these problems are at a transient nature and are often not even noticed. However at times, the severity and their overall effect on the development of the child may be distressing.⁴⁸

Further children may exhibit these behaviors in one setting and not in other (e.g. home or school).

In the west, parents tend to seek advice for even minor problems like thumb sucking, while in developing countries, even major problems like childhood schizophrenia may go unattended.⁴⁹

A study was conducted by Gupta I et al (2001) on 957 school children using Rutter a scale which was to be completed by the school teachers in Ludhiana, India. In this study, conduct disorders (5.4%), hyperkinetic syndrome (12.9%), scholastic under achievement (17%) and enuresis (20.3%) were detected to be the main problems in children. Similarly based on the screening instrument and parental interview, 45.6% of children had behavior problems of which 36.5% had significant problems.⁴⁹

Sharma V D in his study (1997), "Behavioral problems in school students of Morang district", noted that 27% Nepalese were in school going age and approximately 36% of all this age group were suffering from psychological behavior problems.⁵⁰

Sacher R K et al (1996) in their research, "Long term impact of the non formal pre school education component of ICDS on the mental status of school going children", found that factors like sex, parental literacy, number of siblings and economic status did not seem to have any significant impact on the mental development of children. Preschool education is only the most important factor affecting mental and behavior development. Urban children of higher age groups i.e. 8 – 10 years had better mental status than similar groups of rural area.⁵¹

3.4.9. Dental Health Problems

Dental caries: Dental caries or tooth decay is a localized disease process that destroys tooth structure and produces cavities in teeth.

There are four factors necessary to produce dental caries; mouth bacteria, fermentable carbohydrates (sugars), dental plaque and a susceptible tooth surface.

The bacteria break sugars on acid which are adhered to the teeth with the dental plaque (combination of saliva, bacteria and food debris). The acid dissolves the enamel and develops caries.³

Gingivitis: Gingivitis is the inflammation of gums.³

Suksu N et al (2000), conducted a survey in primary school children age 11 – 13 years in urban and rural, Hat Yai district, Japan. In this study, 296 children from urbanized schools and 359 children from 4 rural schools were selected. The result showed that 72% urban and 57% rural children had caries experience. Gingivitis was more common in rural areas (97.3%) than in urban (72.7%).⁵²

3.5. Health Status of Primary school children

Worldwide

In Oman, a study for nutritional status was conducted among children 2 to 8 years in 1988, 1990 and 1991 by Musaiger AO. It revealed that under nutrition was wide spread among pre school and primary school children, 63% and 67% respectively based on weight for age. The prevalence at anaemia was 65% among preschool and 38% among school children.⁵³

In Benghazi, Libya, a survey was conducted for the growth pattern of primary school children in February to October 1993 by Alsharbati M et al. A sample of 2022 pupils (1160 boys and 862 girls) was randomly selected. The study concluded that the nutritional status of these children was good before the beginning of schooling, was negatively affected during school years. This could be due to

births in the family and consequent neglect or to the schools negative effects on the child.⁵⁴

Same type of study was carried out on 5289 primary school children (in Ankara, Turkey) between ages 5 to 11 years in Ankara, Turkey by Mebigil I et al (1994).. In this study, both boys and girls from the high socioeconomic group had superior body measurements compared to those of the low socioeconomic group. The difference between the mean weights for age values of two groups was statistically significant, whereas no statistically significance difference was found in the basis of height for age values among all age groups.⁵⁵

The health status of rural school children in Amazon Basin of Ecuador was conducted by Sebastian MS and Senti S in 1993-94. The prevalence of PEM, parasitic infections and pathology was investigated among 511 school children. The prevalence of stunting was 1.4%, of wasting 1.8% and 64% were infected with helminthes. In clinical examination; Pterigium (89.2%), upper respiratory infections (5.2%), septic skin lesions (4.4%), mycotic otitis (3.8%), tinea (3.4%) and bronchitis (2%) were found.⁵⁶

Tushikuka J C et al (1997) found in their study that a high prevalence of PEM was after associated with higher levels of parasite infestation.⁵⁷

Another study was carried out in Iran (Shiraz) by Ravanshad S et al (1999). Anthropometric indices were studied in 3534 (boys 2037, girls 1497) school children of age 6 to 18 years. The children were selected by proportional multi stage cluster random sampling. The measurements were compared with the NCHS value and the results were obtained that boys were taller and heavier than girls up to the age to 9. From age 10 up 13 years, the mean height and weight of girls was higher than boys of the same age.⁵⁸

Hall A reported that role of intestinal parasites on growth of children depends on several factors like parasitic burden and duration of infections, existing nutritional status, inadequate sanitation and poor personal hygiene.⁵⁹

Richmond P et al (1998) in their study, "Rheumatic fever in Kimberely Region of western Australia", noted carditis in 50%, polyarthritis in 59%, chorea in 22% and subcutaneous nodule in 1% of school children (2664) aged 5 to 14 years.⁶⁰

In Tanzania Lwambo N et al (2000) studied on 6800 children, aged 7 – 18 years. They found 42.5% of children were stunted and 43.0% were underweight with significantly more boys stunted and underweight than girls. In the study, anaemia (Hb<12g/ dl) was present in 62.6% children with the prevalence decreasing with age.

Stunting and anaemia were exceptionally common conditions of school children.⁶¹

A study on the growth status of refugee children in Massachusetts (1995 – 98) Geltman P et al found that, the 1767 children, 62% had caries, 21% had parasites in stool, 20% had anaemia. Stunting or chronic malnutrition was found almost exclusively among refugee children from developing regions, wasting was increased among African and Asian children whereas over weight is a real problem among children from European countries.⁶²

Frongia O et al, in the study, "Rapid Assessment of the Health Status of Primary School aged children in Benin, Africa", found that the prevalence of acute malnutrition was 6.2%, of goitre 28.7%, of anaemia 50.5%, of intestinal parasitism 60.4% among 296 children.⁶³

Fornando SD et al (2000) selected four primary schools at Sri Lanka for their study, "The Health Status of School Children in two rural communities in Sri Lanka". The study revealed that 80% children were anaemic, more boys were underweight than girls and hook worms infestation was more prevalent among children.⁶⁴

A community based cross sectional study (2001) was carried out in 579 rural primary school children from Kwazulu – Natal, South Africa, by Jinabhai CC et al. All students were selected between 8 to 10 years from 11 schools. The outcomes were 7.3% stunting, 0.7%

underweight, 3.1% obese, 16.5% anaemai, vitamin 'A' deficiency – 34.7% and 53.9% were infested with *Trichuris trichiura*, 27.3% with *Ascaris lumbricoides* and 24.3% with *Schistosoma haematobium*.⁶⁵

A cross sectional study of intestinal parasite infections among school children in Non province. Northern Thailand was conducted by Waikagul J. et al (2001). A total of 1010 fecal samples were examined and result was found 60% were helminthes infestation, 36.2% were protozoal. The prevalence of *Ascaris* was 21.7%, hookworm 18.5%, *Trichuris trichura* 16.3%, *Strongyloides stercoralis* 0.7% and *Enterobius vermicularis* 0.9%. The protozoal infections were *Entamoeba histolytica* 25.8%, *Giardia lamblia* 5.3%.⁶⁶

Same type of study was conducted in Dhaka, Bangladesh by Sarkar N R et al 2001. The randomized double blind community trail was conducted on *Ascaris* infested children (n=85) aged 2 to 12 years and was aimed to study the impact of deworming on nutritional status, the change of weight gain was significantly higher in children given antihelminitics than those given placebo (0.92 kg Vs 0.5kg).⁶⁷

Ananthphruti T. et al (2002) in Southern Thailand conducted a study about hookworm in school children from the 2940 stool samples, where 99.95 were found *Necator americana*.⁶⁸

In India

In India several studies were carried out to **identify** the health and nutritional status of primary school children. The results obtained were various. Some are given as followings:

A study was conducted by Kanade A.N. et al (1998) in Pune. 673 adolescent boys (8 – 18 years) were selected in the study. Six monthly measurements on weight and height were recorded and age assessment was done from school records. The obtained results were: 15% boys had normal on weight status (i.e. 85% - underweight) and 60% were stunted. The mean BMI values for broad age groups viz., <12 years, 12 – 14 years, 14 – 16 years were 13.81, 14.35, 15.43 respectively. More than 70% boys had in fact BMI values as low as 15, indicating frank under nutrition.⁶⁹

Seasonal pattern of morbidities in slum children in Lucknow was conducted by Awasthi S. et al in 1997. 1061 children were enrolled in the study. The obtained results were: the annual Incidence Rate (IR) per 200 child years for respiratory, diarrhea, skin diseases and pneumonia were 167, 79.9, 30.6 and 9.6 respectively. The IR of pneumonia were lowest in the winter months while those of diarrhea and skin diseases were highest in summer (March – June) and monsoon (July to September).⁷⁰

Verma M. et al in 1998 studied prevalence of anaemia among urban school children of Punjab. 2000 school children of 5 – 15 years were selected from urban schools of Ludhiana. Haemoglobin was estimated using cyanmethemoglobin method and peripheral blood smear were examined. The result revealed that 51.5% were anaemia. Girls had a significantly higher prevalence of anaemia except of 5 years and 10 – 12 years age. More menarcheal girls were anaemia than non menarchal ones. Compared to non vegetarians (38%), more vegetarians (65.9%) were anaemia. The commonest blood picture seen was microcytic hypochromic (55.4%).⁷¹

Agrawal M. et al. (1999) had done survey for health status of school girls from affluent population of Mumbai. In this study, the revealed results were: out of 1144 girls, 62.2% girls had problems related to hygiene. In primary section, 61% had dental caries, 10.5% pediculosis, 24.1% helminthiasis, 9% of skin infections, and 3.6% of scabies. Further found that, 14.8% were suffering from under nutrition, 20% were anaemia, 3% were stunted and 8.1% were vitamin 'A' deficiency among primary school children. Others health problems included asthma (6.6%), Hypertension (2.2%), Otitis media (2.0%), splenomegaly (1.6%), cervical lymphadenopathy (1.1%), cardiac disease (0.5%), Behavior abnormalities were noted in 9.3% girls.⁷²

Nutritional status of adolescent school children was studied by Anand K. et al. (1999) in the rural North India. 505 students were selected and found: the prevalence of stunting varied from 33% to 55%, the prevalence of thinness among boys vary 31% to 52% and among girls 4% to 59%. The prevalence of anaemia in girls was 48.8%.⁷³

In South Gujrat, a survey was carried out by Thakor H.G. et al (2000) for physical growth standards for urban adolescents (10 – 15 years). 2250 school children were selected from 12 primary schools from Surat by stratified sampling method. Height, weight and age were calculated and compared with standards (NCHS and ICMR). The obtained results were followings: Girls in the present study exhibited the better nutritional status in terms of weight for age and the BMI than boys. While comparing with ICMR standards, a little slowing down of growth was observed in the both genders after 13 or 14 years of age.⁷⁴

Panda P. et al (2000) conducted a survey for health status of school children in Ludhiana city from a secondary school. A total of 776 students (462 boys and 314 girls) in the age groups of 5 years to 16 years were examined. The study revealed the prevalence of wasted (52.2%), stunted (26.3%) with boys and girls suffering almost equally. The 11 – 15 years were affected most. 72.4% children were

suffering from some sickness at the time of examination, 26% had anaemia (boys – 22.9% and girls 30.5%). The caries was found in 23.1%, tonsillitis in 14.4%, refractive error in 5.6% and skin diseases were 1.1% of all students.⁷⁵

Another study was conducted in Varanasi slums for nutritional status in 2001 by Mishra R.N. et al. They found that 75% of children were malnourished with 20% suffering from severe malnutrition among 520 children. Also it was concluded the gross deficiency in dietary intake in school children.⁷⁶

Singh M.B. et al (2001) carried out anthropometric assessment of the nutritional status in female school age children in Thar, desert of Rajasthan. In this study 1132 female children (5 to 18) years were enrolled and found that overall 29.9% girls had mild to moderate malnutrition where as 20.3% had chronic malnutrition.⁷⁷

Bhandari N. et al (2002) in their study, "Growth performance of affluent Indian children is similar to that in developed countries", found that about 6% were under weight, 3% were stunted and 4% were wasted among 341 children. The survey was conducted in South Delhi, one of the most affluent sections in the city. It was revealed from the study that the growth was significantly associated with education of parents and non vegetarian diet. But not associated with socioeconomic status.⁷⁸

Saibaba A et al (2002) studied the nutritional status of adolescent girls of urban slums and the impact of IEC on their nutritional status, knowledge and practices. 2500 adolescent girls were selected from Hyderabad and Secunderabad, Andhra Pradesh. In the study, findings were that Iron Deficiency anaemia was most common but the growth patterns were similar to NCHS values. After IEC intervention, resulted in improvement of nutritional knowledge and practices.⁷⁹

In Nepal

Surveys to identify health and nutritional status in Nepal were conducted by many INGOs / NGOs. But the studies were not enough done in the age groups 5 to 15 years.

A study was carried out in Terai by Pradhan E. et al in 1989, and found that 19.3% were stunted and 3.2% were wasted among younger infants while 43% were stunted and 10.9% were wasted among the older infants. Among preschool children 65.5% were stunted and 11.5% were wasted.⁸⁰

According to Sunsari Health Examination Survey 1996, conducted by B.P.K.I.H.S. revealed that gastrointestinal tract problems were the commonest (22.6%), among all health problems. Other problems were as followings: eye problem=16.8%,

musculoskeletal=10.9%, respiratory=10.9%, skin=9%, neurological=6.6%, ENT=4.1%, nutritional=3.8% gynecological=2.9%.⁸¹

Bhatia V. and Manandhar M. in 2000, conducted a survey of malnutrition in children under 5 years in Chisapain and Sutaiya Bank. 137 children were selected and assessed malnutrition. The results were: 46.4% were malnourished. The females were more malnourished than males.⁸²

Non-governmental organizations have been implementing 130 ECD (Early Childhood Development Centre) in 17 VDCs (Village Development committees) of Makawanpur district. These centres are responsible for health related learning for children. Aryal P.K. in 2001 had studied the health status of the ECD controlled children and non-ECD controlled children. It revealed that 42% of ECD children had good health and 18% ECD children had poor health. Similarly 12% of non ECD children had good health and 58% of non ECD children had poor health status.⁸³

A study on health needs assessment and school health programs in Nepal by Baidhya P. in 2001 revealed: pallor=30%, cyanosis=0.83%, dirty nails=29%, poor personal hygiene=21.4% and skin diseases=28% among school children (480) from Grade IV and Grade V from Gorkha, Chitwan and Kathmandu. Missing and cavities tooth (25.8%), unhealthy gums (8.9%), night blindness (0.4%),

impaired hearing (7.1%) and 14.8% were suffered from gastrointestinal problems.⁸⁴

According to Annual Health Report 2000/2001, the latest national nutrition survey (Nepal Micronutrient Status Survey) conducted in 1998, revealed that 54% of children below 5 years were stunted, 47% were underweight and 7% were wasted. There was no difference in undernutrition rates between girls and boys. The malnutrition was more in Mid- Western and Far-Western hills and mountain region.³¹

Manipal College of medical sciences conducted a survey for health status of primary school children of Pokhara valley, Nepal, in 2001. A total of 450 students (368 boys and 382 girls) were enrolled for the study. The mean weight and height of the children according to age and sex were compared with the median weight for age and height for age as per ICMR standards wasting and stunting was assessed as per Waterlow classification. The obtained results were the prevalence as wasting and stunting were low (10.3% and 15.7% respectively). The 6 to 10 years were affected more. Pediculosis, (32.6%) Dental caries (41.5%), worm infestation (33.7%) were most common. The 2% of children had anaemia and 6.5% had chronic ear discharges as revealed by this study.⁸⁵

CHAPTER - IV

MATERIALS AND METHODS

- Study Design** : Descriptive, Cross-sectional Study.
- Study Period** : June 2003 to September 2003
- Place of Study** : Two Teaching Districts of BPKIHS: Dhankuta and Sunsari
- Study Population** : All students from Grade I to Grade V were included from Government primary schools. The total population was 818 students.

Sampling

A simple random sampling technique (lottery method) was used to select five primary schools. Two primary schools were selected randomly out of total 26 schools in Dhankuta town of Dhankuta district. Similarly 3 primary schools were selected randomly out of 21 schools in Inaruwa town of Sunsari district. The students attending in primary government schools in Inaruwa were few in numbers. Therefore 3 schools were selected for this study. The primary school children from Grade I to Grade V were enumerated on the particular day whoever was present. For absentees, two visits were done to locate in school. The peer group and teachers were asked to find out the reason for not attending school. If sickness was the reason,

nature of diseases were recorded in study to minimize absenteeism due to sickness.

Tools

The questionnaire was developed and presented in the department. The feedback was included in the questionnaire. The pre-testing was done in a nearby school. The necessary changes were included in the questionnaire after presenting in the department. The questionnaire consisted of demographic information, anthropometry data and morbidity pattern etc. related to school children. The guideline was developed for the teacher' interview to know about their treatment preference of sick child during school hour.

Techniques

The survey was conducted by investigator himself with the help of two interns. The purpose of visit was explained to the Principal of school. Consent from the Principal of school was obtained. A brief health education session was given to the class teachers and students after completion of the survey.

Demographic Data

Each child was identified by name, sex, age and ethnicity or caste. Date of birth was obtained from the school records or as indicated by the teachers.

Anthropometry

Standard procedures were used to obtain weights and heights of the children.

Weight

A bathroom scale was used to measure the weights in kilograms. It was calibrated against known weights regularly. Zero error was checked for and removed if present everyday. Clothes were not removed as adequate privacy was not available. However the study was in summer session only light cloths were worn by the students. The weights were recorded to the nearest 100gms.

Height

Height in centimetres was marked on wall in the school with the help of measuring tape. The students were asked to remove their shoes and with heels together and head positioned in such a way that the line of vision was perpendicular to the body. A scale was brought down to the topmost point on the head of the student standing against the wall where the calibration was done. The heights were measured to the nearest 0.5 cm.

Health Examination

Each child underwent the clinical examination thoroughly including a careful history, physical examination and systemic examination. Abnormal body posture like lordosis, kyphosis, scoliosis

and rickets were identified. The personal and domestic hygiene were recorded by assessing the students and by interviewing them. If diseases were found then appropriate advices were given with prescribing medication. The parents were invited and given information about their children's health condition and if needed suggested to contact the nearest health institution. The deworming was done with all primary school children with tablets Albendazole 400mg.

Blood test for haemoglobin (Hb)

Blood test for hemoglobin (Hb) was done in 13% of sub sample. The test was done by trained laboratory assistants. Blood was taken from the fingertip; the blood flowed freely without any applied pressure a little blood was sucked into a capillary pipette until it reached 20 micro litre. Hb was determined using a Cyanmethaemoglobin. The obtained results were correlated with the clinical signs of anemia like pallor of palm, conjunctive and tongue.

Stool and Urine Examination

Stool examination for parasitic infestation and urine test for protein and sugar was done in the same 13% sub sample of students (112). Labeled plastic containers were distributed with instructions to bring stool samples and urine samples. On the same day the stool

and urine containers were collected and examined by the same laboratory assistant in health institutions.

Nutritional Status

Nutritional status was assessed by anthropometric parameters like height and weight compared to published standards (NCHS/WHO). The heights were measured in centimeter and weights in kilogram. Then weight for age (W/A) and height for age (H/A) and weight for height (W/H) were calculated to determine malnutrition, if any. Head to heel examination were done to detect vitamin and mineral deficiencies.

Behavioral Status

Behavioral problems were studied in those with the help of class teachers and co-students with suggestive of findings as nail biting, thumb sucking, and prefer to be alone, etc.

Statistical Analysis

Data entered in Microsoft Excel. Analysis was done with the help of SPSS statistical package and test of significance (p value, Chi-square test).

CHAPTER - V

LIMITATIONS

- ☞ This study examined the health status of school children examined only in towns. If the study was carried out in rural areas the result may be different from this study.
- ☞ There are no Standard norms of heights and weights for Nepalese children. To which, the results of this study could be compared. So, the comparison was done with NCHS / WHO, Boston (Harward), IAP and Waterlow Standards in the present study.
- ☞ Due to limited time, manpower and fund only five schools were taken for the study. Similarly only 13% of sub sample was investigated with blood for hemoglobin, stool for parasites and urine for sugar and protein.
- ☞ The diseases which needed special diagnostic methods could not be included in this study due to high cost.
- ☞ A large number of behavior problems are found in school children but we included only few of them like nail biting and thumb sucking. Because the teachers didn't know more about student's behavioral problems. The visit to the school children's families was out of the scope of this study.

CHAPTER - VI

RESULTS

I Demography

Distribution of Children by Grade and Gender

The total number of the primary school children in 5 selected schools of both towns was 863. Among them 818 were interviewed and examined for this study. The response rate was 94.8%.

The highest number 21.9% of students were present in class 4 during the study followed by class 3 (Table 1). The both genders were distributed equally in the primary classes of the sample population, 51.8% were boys and 48.2% girls. The ratio of boy and girl was 1.07:1.

Table 1. Distribution of School Children by Education and Gender

Grade	Gender				Total		Test*	
	Boys		Girls		No.	%	χ^2	p Value
	No.	%	No.	%				
I	80	50.6	78	49.4	158	19.3	0.83	0.93
II	85	49.4	87	50.6	172	21.0		
III	82	53.0	71	47.0	153	18.7		
IV	94	52.5	85	47.5	179	21.9		
V	83	53.2	73	46.8	156	19.1		
Total	424	51.8	394	48.2	818	100		

*d.f. = 1

Distribution of School Children by Age and Gender

The girls were more in the age group more than 10 years than boys (Table 2). This is statistically significant ($p=0.00001$).

Table 2. Distribution of School Children by Age and Gender

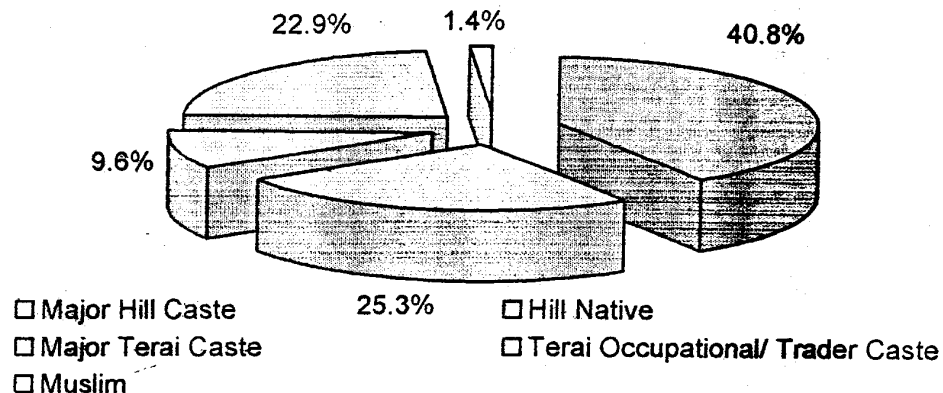
Age (in years)	Gender				Total		Test*	
	Boys		Girls		No.	%	χ^2	p Value
	No.	%	No.	%				
<10	225	53	134	34	359	44	23.68	0.00001
>=10	199	47	260	66	459	56		
Total	424	100	394	100	818	100		

*d.f. = 1

Caste/ Ethnicity

The Fig 1 shows that the percentage of Major Hill caste/ ethnicity was the highest (40.8%) followed by hill natives (25.3%) and Terai occupational and trader (22.9%). Statistically the distribution of caste/ ethnicity was highly significant ($\chi^2=473.04$, d.f.=4, $p=0.00001$).

Fig 1. Distribution of Caste/ Ethnicity among School Children



Educational Status of Fathers

The percentage of illiterate fathers was highest (28.2%) followed by SLC (matriculation) passed (Table 3). The percentages of illiterates in Dhankuta and Inaruwa in the study group were 24.8% and 32.7% respectively.

Table 3. Educational Status of School Children's Fathers

Education	Inaruwa		Dhankuta		Total	
	No.	%	No.	%	No.	%
Illiterate	116	32.7	115	24.8	231	28.2
Primary School Level	39	11.0	40	8.6	79	9.7
Secondary School Level	37	10.4	47	10.1	84	10.3
SLC* Passed	85	23.9	122	26.3	207	25.3
10 + 2 Level	34	9.6	70	15.2	104	12.7
Above 10 + 2 Level	29	8.2	69	15.0	98	12.0
Not Known	15	4.2	-	-	15	1.8
Total	355	100	463	100	818	100

* School Leaving Certificate (Matriculation)

Occupational Status of Fathers

The percentage of non-agricultural daily wages was the highest (27.6%) followed by service holder (Table 4). In Inaruwa, the commonest occupation of father was non-agricultural daily wages (32.7%) while service holders were more in Dhankuta (31.3%).

Table 4. Occupational Status of School Children's Fathers

Occupation	Inaruwa		Dhankuta		Total	
	No.	%	No.	%	No.	%
Agricultural / Agricultural Daily wages	67	18.9	119	25.7	186	22.7
Non - Agricultural Daily wages	116	32.7	110	23.8	226	27.6
Service	66	18.6	145	31.3	211	25.8
Business	81	22.8	76	16.4	157	19.2
Others	10	2.8	13	2.8	23	2.9
Not Known	15	4.2	-	-	15	1.8
Total	355	100	463	100	818	100

Educational Status of Mothers

Majority (63.7%) of mothers were illiterate followed by SLC passed (Table 5). In Inaruwa 74.3% were illiterate mothers while 55.5% illiterate mothers in Dhankuta.

Table 5. Educational Status of School children's Mothers

Education	Inaruwa		Dhankuta		Total	
	No.	%	No.	%	No.	%
Illiterate	264	74.3	257	55.5	521	63.7
Primary School Level	18	5.2	45	9.7	63	7.8
Secondary School Level	27	7.6	32	6.8	59	7.2
SLC* Passed	30	8.4	83	18.0	113	13.7
10 + 2 Level	10	2.8	30	6.5	40	4.8
Above 10 + 2 Level	6	1.7	16	3.5	22	2.7
Total	355	100	463	100	818	100

Occupational Status of Mothers

The majority (77%) of the mothers were involved in domestic work and followed by small business (Table 6). The mothers involved in domestic work in Inaruwa and Dhankuta were 82.4% and 72.1% respectively.

Table 6. Occupational Status of School Children's Mothers

Occupation	Inaruwa		Dhankuta		Total	
	No.	%	No.	%	No.	%
Domestic	296	83.4	334	72.1	630	77.0
Agricultural / Agricultural Daily wage	15	4.2	32	6.9	47	5.7
Non - Agricultural Daily wage	13	3.6	21	4.5	34	4.2
Service	9	2.6	35	7.6	44	5.4
Business	20	5.6	37	8.0	57	7.0
Others	2	0.6	4	0.9	6	0.7
Total	355	100	463	100	818	100

II Hygiene

Personal Hygiene of school Children

Among 818 students, unclean skins were found in 148(18.1%) during the survey (Table 7). There were 58 (16.4%) from Inaurwa and 90 (19.4%) from Dhankuta. Similarly 183 students (22.4%) were found to be unclean uncombed hair and not cut nails. Other unhygienic conditions like running nose 120 (14.7%), unclean clothes 138 (16.9%) were seen. Students of Dhankuta had poor personal hygiene than students of Inaruwa, in terms of cleanliness of skin, hair, nails and nose. Students were asked about washing of hands after defecation, before meal and used of sanitary toilet or open field.

This shows that the students from Dhankuta were more using sanitary toilet and washing their hands than in Inaruwa. But in case of bathing students from Inaruwa frequently take bath than in Dhankuta.

Statistically the differences of personal hygiene practices in terms of skin, hair, nails, nose and clothes were not significant in Dhankuta and in Inaruwa. But washing of hands before meal was highly significant ($p=0.00001$) in Dhankuta than in Sunsari. Bathing among students of Inaruwa was highly significant ($p=0.00001$) than students of Dhankuta.

Table 7. Personal Hygiene of School Children*

Hygiene	Inaruwa (n=355)		Dhankuta (n=463)		Total (n=818)		Test	
	No	%	No.	%	No.	%	χ^2	p
Skin: Clean	297	83.6	373	80.6	670	81.9	1.3	0.25 (NS)
Not Clean	58	16.4	90	19.4	148	18.1		
Hair: Combed	284	80.0	351	75.8	635	77.6	2.03	0.15 (NS)
Not combed	71	20.0	112	24.2	183	22.4		
Nails: Cut / Clean	275	77.2	360	77.7	635	77.6	0.01	0.9 (NS)
Not cut / Unclean	80	22.8	103	22.3	183	22.4		
Nose: Clean	296	83.4	402	87.0	698	85.3	1.9	0.17 (NS)
Running	59	16.6	61	13.0	120	14.7		
Clothes: Clean	297	83.6	383	82.7	680	83.1	0.13	0.72 (NS)
Not Clean	58	16.4	80	17.3	138	16.9		
Washing hands after defecation: Yes	294	82.8	384	83.0	678	82.9	0.00	0.96 (NS)
No	61	17.2	79	17.0	140	17.1		
Washing hands before meals: Yes	294	82.8	284	61.3	578	70.6	44.71	0.00001 (S)
No	61	17.2	179	38.7	240	29.4		
Toilet: Sanitary	200	56.3	343	74.0	543	66.0	28.35	0.00001 (S)
Open Field	155	43.7	120	26.0	275	34.0		
Bath: Daily	155	43.7	95	20.5	250	30.5	218.89	0.00001 (S)
Twice a week	150	42.3	65	14.0	215	26.3		
Once or less than once a week	50	14.0	303	65.5	353	43.2		

NS = Not Significant, S = significant

*multiple response

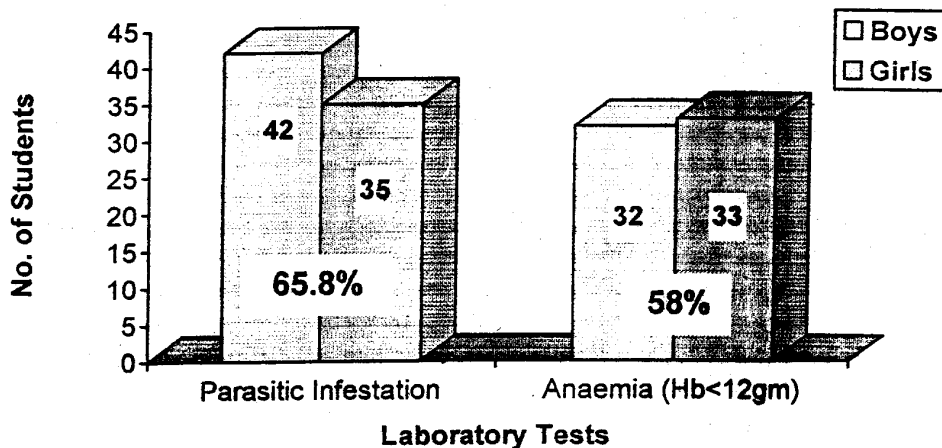
III Health Screening

Morbidity Pattern

One of the objectives of this study is to determine common morbidity in school children. The morbidity patterns recorded during survey was shown in Fig 2 and Table 8. These morbidities are dealt separately.

The Fig 2 shows 65.8% stool samples showed parasites. There were the 58% of blood samples showed anaemia among school children.

Fig 2. Distribution of Parasitic Infestation and Anaemia among School Children (n=112)



The skin disease was the commonest (20%) among all health problems followed by dental caries (Table 8). Skin diseases,

lymphadenopathies and gingivitis were common in boys where as anaemia, worm infestation and caries in girls.

Behavior disorders were seen in 102 students (12.3%). The girls were more predominant than boys (13% Vs 11.7%).

Table 8. Morbidity Pattern among School Children*

Rank	Clinical examination/ observation	Boys (n=424)		Girls (n=394)		Total (n=818)	
		No.	%	No.	%	No.	%
1	Skin Diseases	97	22.9	67	17.0	164	20.0
2	Dental Caries	67	17.8	76	22.6	143	19.8
3	Behavior Disorder	50	11.7	52	13.0	102	12.3
4	Lymphadenopathy	49	11.5	37	9.4	86	10.5
5	Angular Cheilosis	29	6.8	29	7.3	58	7.0
6	Tonsillitis	17	4.0	16	4.0	33	4.0
7	White Coated Tongue	16	3.7	15	3.8	31	3.7
8	Pain Abdomen	16	3.7	11	2.7	27	3.3
9	Heart/ Lung Diseases	11	2.5	15	3.8	26	3.2
10	Gingivitis	10	3.7	9	2.2	19	2.3
11	Ear discharge	8	1.8	8	2.0	16	1.9
12	Palpable Thyroid Gland	8	1.8	8	2.0	16	1.9
13	Abnormal Posture/ Rickets	9	2.1	6	1.5	16	1.9
14	Conjunctivitis	9	2.1	5	1.2	14	1.7
15	Ulcer Tongue	6	1.4	6	1.5	12	1.5
16	Hepatosplenomegaly	8	1.8	3	0.7	11	1.3
17	Dry Tongue	6	1.4	5	1.5	11	1.3
18	Others***	-	-	-	-	47	5.1

*** Ptosis, Bitot's Spot, Earache, Glossitis etc.

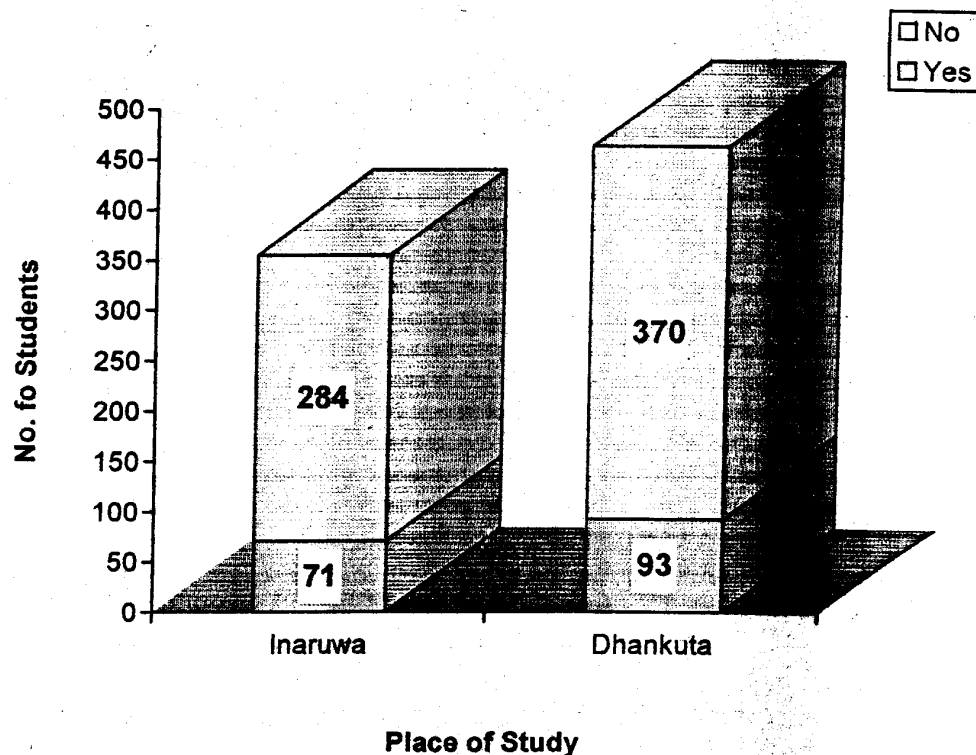
Multiple responses

Clinical Examination

Skin Disease Pattern

During the study period, 20% (164) of total examined students (818) had skin problems. Among them 20.5% were from Dhankuta and 20% from Inaruwa (Fig 3).

Fig 3. Distribution of Skin Lesions among School Children



The pediculosis was the commonest skin problem (21%) followed by ring worms (19.5%) and scabies (Table 9). Pediculosis was more common in girls (29.8%), where as ring worm (25.7%) and

scabies (17.6%) were common in boys. Overall boys were suffering from more skin problems than girls.

Table 9. Types of Skin Lesions among School Children

Skin Lesions	Boys		Girls		Total	
	No.	%	No.	%	No.	%
Pediculosis	14	14.4	20	29.8	34	21.0
Ring Worms	25	25.7	8	11.9	33	19.5
Scabies	17	17.6	6	8.9	23	14.0
Impetigo	9	9.3	9	13.4	18	11.0
Eczema	10	10.3	7	10.4	17	10.5
Scars	10	10.3	6	8.9	16	9.5
Rashes	4	4.4	5	7.4	9	5.5
Warts	3	3.0	3	4.3	6	3.5
Vitiligo	3	3.0	-	-	3	2.0
Scaly Skin (Ichthyosis)	1	1.0	1	1.4	2	1.5
Nevus/ moles	-	-	2	4.4	2	1.5
Pityriasis versicolor	1	1.0	-	-	1	0.5
Total	97	100	67	100	164	100

Abnormal Posture

Among 818 students, 15(1.9%) students were found of abnormal postures like: kyphosis, lordosis and scoliosis (Table 10).

Rickets cases were 2 among all students.

Table 10. Distribution of Abnormal Postures and Rickets among School Children

Abnormal Posture-	Boys		Girls		Total		Test	
	No.	%	No.	%	No.	%	χ^2	%
Normal Posture	415	97.9	388	98.5	803	98.1	0.37	0.54
Abnormal Posture	9	2.1	6	1.5	15	1.9		
Kyphosis	5	1.2	2	0.5	7	0.8		
Lordosis	1	0.2	2	0.5	3	0.4		
Scoliosis	1	0.2	2	0.5	3	0.4		
Rickets	2	0.5	-	-	2	0.3		
Total	424	100	394	100	818	100		

Eye, ENT and Dental Problems

Among the eye problems 14 students had red eyes or conjunctivitis (1.7%) and 3 had ptosis (Table 11). The total eye diseases were found in 79 (9.6%) students.

Ear discharges were found in 16 (2.0%) students followed by tonsillitis (Table 11). Dental caries were found in 143 (17.5%) students.

Among 818 students, 16 (2.0%) were found with thyroid enlargement. Both boys and girls were equally affected. The nutritional deficiencies like pallor Bitot's spots, and angular cheilosis were seen among the school children.

Table 11. Distribution of Eye, ENT and Dental Diseases among School Children

	Diseases	Boys		Girls		Total	
		No.	%	No.	%	No.	%
Eye Diseases	Conjunctivitis	9	2.1	5	1.2	14	1.7
	Ptosis	2	0.47	1	0.25	3	0.4
	Pallor	17	4.0	38	9.6	55	6.7
	Bitot's Spot	2	0.45	3	0.76	5	0.6
	Corneal Opacity	1	0.2	1	0.2	2	0.2
	Total	31	7.3	48	12.1	79	9.6
Ear	Ear discharge	8	1.8	8	2.0	16	2.0
	Earache	8	1.8	6	1.5	14	1.7
	Total	16	3.6	14	3.5	30	3.7
Nose / Throat	Tonsillitis	17	4.0	16	4.0	33	4.0
	Nose Obstruction	1	0.2	2	0.5	3	0.4
	Total	18	4.2	18	4.5	36	4.4
Tongue	White Coated	16	3.7	15	3.8	31	3.7
	Ulcers	6	1.4	6	1.6	12	1.4
	Dry	6	1.4	5	1.3	11	1.3
	Glossitis	1	0.2	3	0.7	4	0.5
	Total	29	6.7	29	7.4	58	6.9
Lips	Angular Cheilosis	29	6.8	29	7.3	58	7.0
	Ulcers	5	1.1	2	0.5	7	0.8
	Dry	6	1.4	3	0.7	9	1.0
	Total	40	9.3	34	8.5	74	8.8
Teeth	Caries	67	15.8	76	19.3	143	17.5
	Gingivitis	10	2.3	9	2.3	19	2.3
	Total	77	18.1	85	21.6	162	19.8
Palpable Thyroid Gland		8	1.8	8	2.0	16	2.0

Lymphadenopathy

It was found that 86 (10.5%) students had palpable lymph nodes (Table 12). Among these lymphadenopathies, 93% were cervical followed by inguinal lymphadenopathy. These palpable lymph nodes were mobile, non-tender, and soft in 85 (95.8%) students. Boys were more affected than girls. The highest numbers of palpable lymph nodes were of size (1cm x 1cm), and were mobile non-tender and soft.

Table 12. Lymphadenopathy among School Children

Lymphadeno pathy	Size (cm x cm)	Boys		Girls		Total	
		No.	%	No.	%	No.	%
Cervical	1.0 x 1.0	36	83.7	30	69.8	66	76.7
	1.0 x 0.5	3	7.0	6	14.0	9	10.4
	1.0 x 2.0	1	2.3	4	9.3	5	5.6
Inguinal	1.0 x 1.0	1	2.3	1	2.3	2	2.3
Axillary	1.0 x 2.0	-	-	1	2.3	1	1.6
More than one site evolvement	Variable	2	4.7	1	2.3	3	3.4
Total		43	100	43	100	86	100

Lungs and Heart Diseases

From this study, it was revealed that 18 (2.2%) students and 8 (0.9%) students had lungs and heart problems respectively (Table 13). Heart murmurs and added sound in lungs were detected by auscultation.

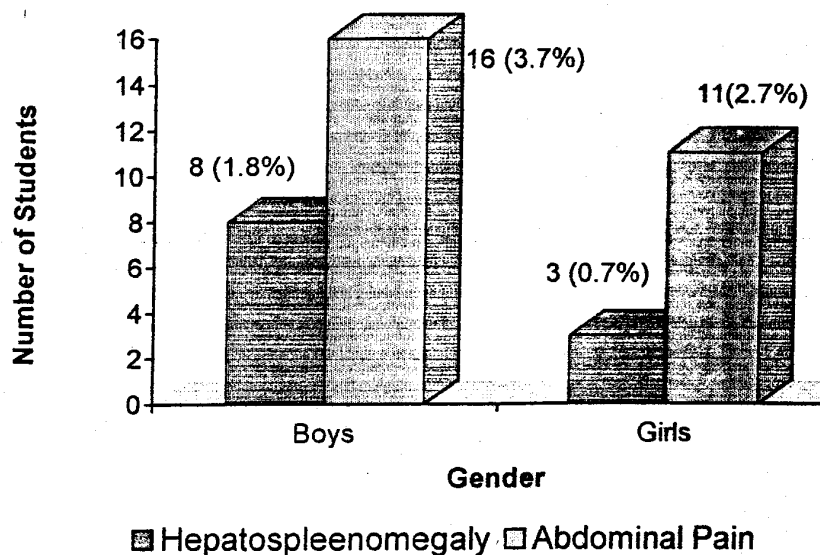
Table 13. Lungs and Heart Diseases among School Children

Diseases		Boys		Girls		Total	
		No.	%	No.	%	No.	%
Lungs	Ronchi	2	0.47	2	0.5	4	0.5
	Crepitation	6	1.4	6	1.5	12	1.4
	Ronchi and crepitation	-	-	2	0.5	2	0.25
Heart murmurs	Diastolic murmur	2	0.47	1	0.25	3	0.37
	Systolic murmur	-	-	1	0.25	1	0.12
	Pansystolic murmur	1	0.23	3	0.76	4	0.49
Total		11	2.6	15	3.8	26	3.1

2.6. Abdominal Problems

Abdomen pain was found in 27 (3.3%) students followed by hepatosplenomegaly in 11(1.3%) students (Fig 4). The abdomen problems were common in boys than in girls.

Fig 4. Distribution of Abdominal Problems among School Children



Behavior Status

Behavior status was studied by asking questions to students as well as habits of students to teachers and observation during the study period.

The commonest behavior problem among the school children was nail biting (3.6%) followed by thumb sucking (Table 14). Total behavior disorders were found in 102 (12.3%) students. The problems were more predominant in girls (n=52) than in boys (n=50).

Table 14. Distribution of Behavior Disorders among School Children

Behavior Disorders	Boys		Girls		Total		Test	
	No.	%	No.	%	No.	%	χ^2	p
Has few Friends	26	6.1	12	3.0	38	4.6	1.42	0.49
Nail Biting	10	2.4	20	5.0	30	3.6		
Thumb Sucking	8	1.8	10	2.5	18	2.2		
Prefer to be alone	6	1.4	10	2.5	16	1.9		
Total	50	11.7	52	13.0	102	12.3		

Laboratory Test

Blood test for haemoglobin

Blood test for haemoglobin was done on 112 students (Table 15). Among them a total of 65(58%) were anaemic (i.e. haemoglobin <12gm%). Most of them 36.6% were mild anaemic. There were 63.4% of girls and 53.3% of boys were suffering from anaemia. Students from Inaruwa were more anaemic than from Dhankuta ($\chi^2 = 4.63$, d.f.=1, p=0.03) .

Table 15. Distribution of Anaemia among School Children

*Haemoglobin Gram%	Inaruwa		Dhankuta		Boys		Girls		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<7 (Severe)	-	-	5	9.8	1	1.7	4	7.7	5	4.5
7 to10 (Moderate)	11	18.2	8	15.7	4	6.6	15	28.7	19	16.9
10 to12 (Mild)	30	49.0	11	21.5	27	45.0	14	27.0	41	36.6
<12 Total (anaemia)	41	67.2	24	47.0	32	53.3	33	63.4	65	58
>= 12 (Not anaemia)	20	32.8	27	53.0	28	46.7	19	36.6	47	42.0
Total	61	100	51	100	60	100	52	100	112	100

$\chi^2 = 4.63$, d.f.=1, p=0.03 significant $\chi^2 = 1.17$, d.f.=1, p=0.279 not significant

*according WHO classification (severity of anaemia)

Urine Test

Urine test for protein and glucose was examined by Uri stick method and found that all 112 urine samples were free of protein and glucose.

Stool Test

The total numbers of 112 stool samples were examined for parasites. There were 77(65.8%) samples consisted of parasites (Table 16). The girls (66.0%) and boys (65.6%) were affected equally. The samples from Dhankuta showed more stool parasites (80.6%) than samples from Inaruwa ($\chi^2 = 15.23$, d.f.=1, $p=0.00009$, statistically significant).

Table 16. Distribution of Parasitic Infestation among School Children

Parasitic Infestation	Inaruwa		Dhankuta		Boys		Girls		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Parasitic Infestation	23	46.0	54	80.6	42	65.6	35	66.0	77	65.8
Normal stool	27	54	13	19.4	22	34.4	18	34.0	40	34.2
Total	50	100	67	100	64	100	53	100	117	100

The highest percentage was round worm infestation (35.0%) followed by *E. histolytica* (Table 17). The round worm infestation and *E. histolytica* were more common in both towns.

Table 17. Types of Parasitic Infestation among School Children

Stool parasites	Inaruwa		Dhankuta		Boys		Girls		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<i>Entamoeba histolytica</i>	5	21.7	9	16.7	9	21.4	6	17.2	15	19.5
<i>Giardia lamblia</i>	3	13.3	7	13.0	9	21.4	5	14.3	14	18.2
<i>Ascaris lumbricoides</i>	10	43.4	24	44.4	15	35.7	12	34.3	27	35.0
<i>Ancylostoma duodenale</i> (Hookworm)	2	8.7	3	5.6	1	2.4	5	14.3	6	7.8
<i>Enterobius vermicularis</i> (Pin worm)	1	4.3	4	7.6	2	4.7	3	8.5	5	6.5
<i>Trichuris trichiura</i> (Whip worm)	1	4.3	1	1.8	2	4.7	-	-	2	2.6
<i>Heminolepsis</i> and <i>Tinea</i> (Tape worm)	1	4.3	6	11.1	4	9.6	4	11.4	8	10.4
Total	23	100	54	100	42	100	35	100	77	100

Nutritional Status of School Children

Anthropometry

The mean values were compared with standard height and weight of the National Centre of Health Statistics/ WHO (50percentile) and with Indian Academy Paediatric (Table 18 and 19).

The table 19 shows that mean heights were similarly distributed in both genders with their ages from 5 to 13 years. In the 14 and 15 age group, girls were taller than boys. This also shows the distribution of weight among boys and girls were similar with their age.

Table 18. Mean weights of students by age were compared to Harward or Boston Standard (50 percentile)

Age (years)	Mean Wt. (kg)			'Boston' Standard	IAP Weight (in percentile)
	Boys	Girls	Mean		
5	16.75	16.40	16.56	20.00	82.80
6	19.27	18.16	18.68	21.90	85.20
7	18.94	18.71	18.81	24.50	76.70
8	20.72	20.10	20.39	27.30	74.60
9	22.56	21.77	22.19	29.90	74.20
10	24.66	24.81	24.74	32.60	75.70
11	26.61	28.12	27.26	35.20	77.40
12	27.70	28.42	27.98	38.30	73.00
13	29.58	28.45	29.17	42.20	69.20
14	30.00	33.00	30.86	48.40	63.00
15	33.50	37.50	35.50	NA	NA

$$\text{IAP} = \frac{\text{Observed Weight}}{\text{Standard Wt. for Age (Based on Harward Standard)}} \times 100\%$$

Table 19. Distribution of Mean Height, Mean Weight of School Children and Comparison with NCHS/WHO

Age (in years)	Gender									
	Boys					Girls				
	Height		Weight		Mean NCHS (X%)	Height		Weight		Mean NCHS (Y%)
	Mean \pm SD (cm)	Mean \pm SD (kg)	Mean \pm SD (cm)	Mean \pm SD (kg)		Mean \pm SD (cm)	Mean \pm SD (kg)	Mean \pm SD (kg)	Mean NCHS (Y%)	
5	105.00 \pm 5.72	16.75 \pm 2.22	105.00 \pm 8.43	16.40 \pm 1.14	96.33	89.72	96.86	92.87	92.87	
6	111.88 \pm 4.76	19.27 \pm 2.94	112.16 \pm 5.89	18.16 \pm 2.33	96.40	92.70	97.87	93.02	93.02	
7	114.52 \pm 5.41	18.94 \pm 2.40	114.03 \pm 5.80	18.71 \pm 2.39	94.10	82.88	94.56	85.65	85.65	
8	119.03 \pm 5.91	20.72 \pm 2.78	118.76 \pm 5.36	20.10 \pm 2.39	93.73	81.91	93.96	80.91	80.91	
9	124.13 \pm 7.35	22.56 \pm 3.56	123.95 \pm 6.18	21.77 \pm 3.29	93.90	80.19	93.76	76.50	76.50	
10	127.43 \pm 6.91	24.66 \pm 4.31	127.65 \pm 7.56	24.81 \pm 4.12	92.67	70.42	92.30	76.23	76.23	
11	133.21 \pm 6.38	26.61 \pm 4.47	132.49 \pm 7.29	28.12 \pm 4.37	92.96	75.39	91.50	76.09	76.09	
12	134.24 \pm 8.41	27.70 \pm 5.74	135.84 \pm 9.17	28.42 \pm 5.29	90.09	69.63	89.66	68.43	68.43	
13	136.21 \pm 8.41	29.58 \pm 5.20	133.36 \pm 5.46	28.45 \pm 3.93	87.04	65.80	84.89	61.72	61.72	
14	137.80 \pm 10.18	30.00 \pm 6.93	143.00 \pm 11.52	33.00 \pm 5.72	84.49	59.09	95.15	65.63	65.63	
15	131.00 \pm 19.8	33.50 \pm 16.26	155.50 \pm 20.51	37.50 \pm 3.54	77.51	59.07	96.11	69.86	69.86	

$$X = \frac{\text{Observed Height}}{\text{Standard Height for Age}} \times 100\%$$

(Based on NCHS/WHO 50 percentile)

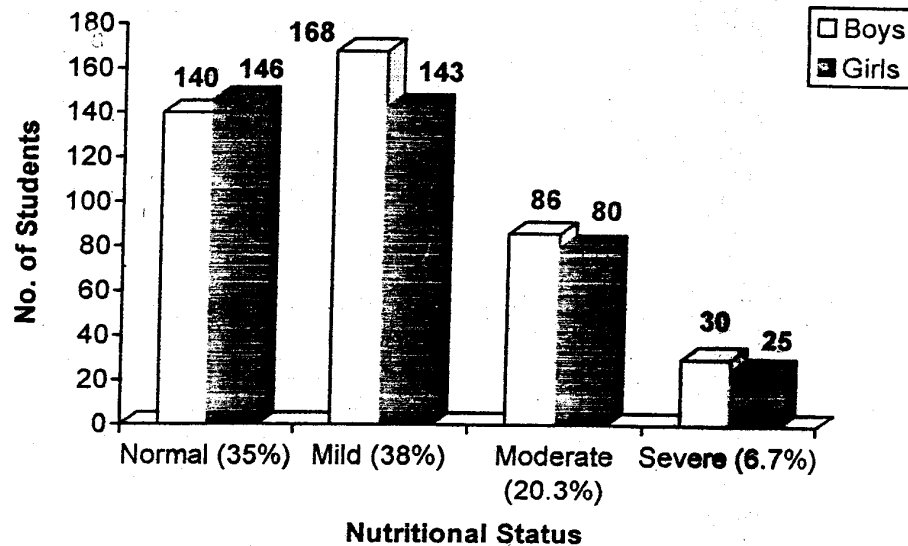
$$Y = \frac{\text{Observed Weight}}{\text{Standard Weight for Age}} \times 100\%$$

(Based on NCHS/WHO 50 percentile)

Height for age comparison with NCHS/WHO

The Fig 5 shows that 286 (35%) students of 818 had normal height for age. Boys 140 (33.1%) and girls 146 (37.1%) were with normal heights. The mild stunting was seen in 38% followed by moderate stunting (20.3%).

Fig 5. Height for Age (Stunting) comparison with NCHS/WHO standard

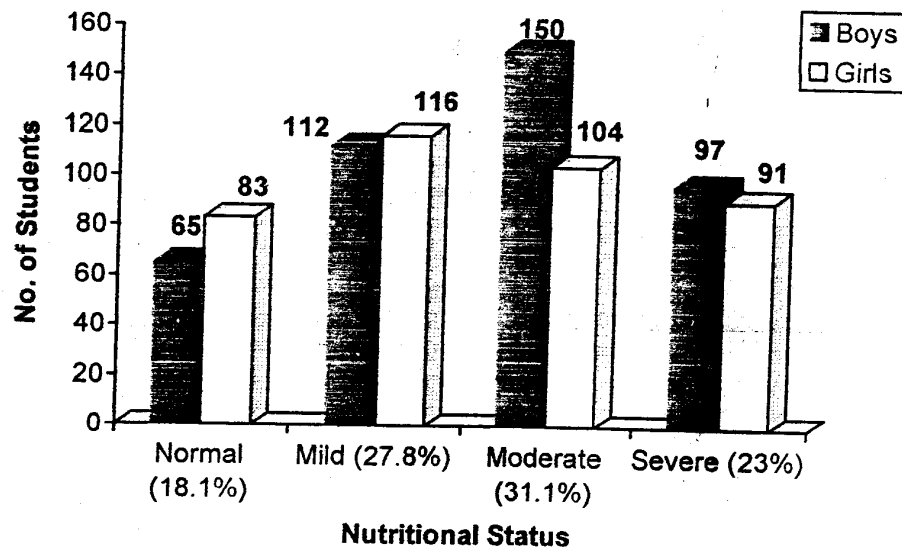


Weight for age in comparison with NCHS/WHO standard

Low weight for age or under nutrition patterns were shown in Fig 6. Among the examined students, boys 65 (15.4%) and girls 83 (21.1%) were of normal weight for age. The percentage of under nutrition among students was 82% as per NCHS/WHO.

The grade II or moderate under nutritional cases were 254(31%) among whom boys were predominant. The percentage of grade I under nutrition and grade III under nutrition were 28% and 23% respectively. The statistical analysis showed that distribution of under nutrition was highly significant ($\chi^2 = 9.69$, d.f.=3, $p=0.021$).

Fig 6. Weight for Age (Under nutrition) comparison with NCHS/WHO standard



Weights for age were compared with Indian Academy of Pediatrics (IAP) classification (Table 20). There were 317(39%) students with normal weight for age followed by grade I (30.6%), grade II (23%), grade III(6%) and grade IV (1.4%) under nutrition or underweight. The girls were more under nutrition than boys. The total percentage of under nutrition as per IAP was 61%.

Table 20. Weight for Age per IAP Classification

Label	Range	Boys		Girls		Total	
		No.	%	No.	%	No.	%
Normal	>80%	171	40.5	146	37.2	317	39.0
Grade I under nutrition	70%-80%	120	28.4	126	32.1	246	30.6
Grade II under nutrition	60%-70%	91	21.6	97	24.7	188	23.0
Grade III under nutrition	50%-60%	32	7.6	20	5.1	52	6.0
Grade IV under nutrition	<50%	8	1.9	3	0.8	11	1.4
Total		422	100.0	392	100.0	814	100.0

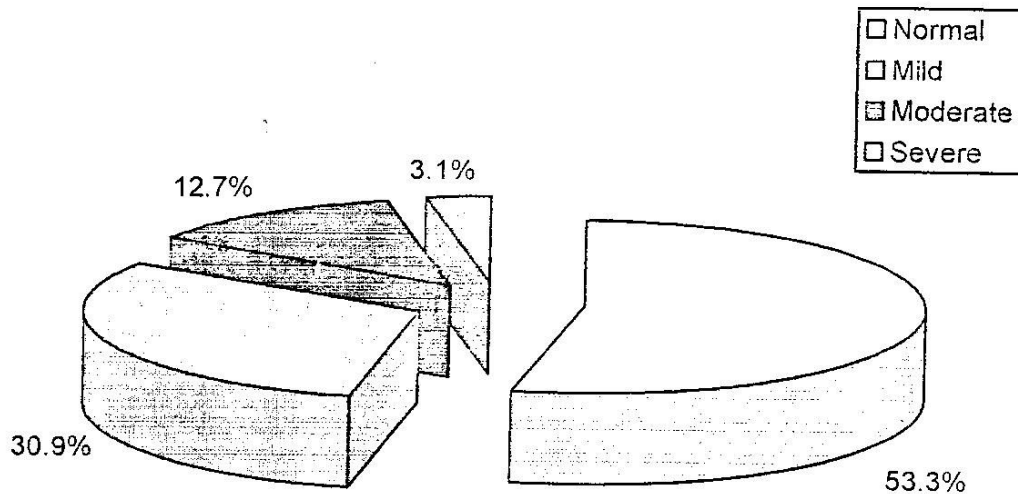
($\chi^2 = 6.25$, d.f.=4, p=0.18)

Waterlow Classification (Weight for Height)

According to Waterlow classification, low weights for height or wasting were shown in the Fig 7. Among 818 students, 436(53.3%) were of normal weights followed by mild (30.9%), moderate (12.7%) and severe (3.1%) wasting.

Statistically the percentage of severity of wasting as per Waterlow classification were highly significant ($\chi^2=640.68$, d.f.=3, $p=0.000001$).

Fig 7. Nutritional Status per Waterlow Classification (Wt. for Ht.)



Waterlow classification (Wasting Vs Stunting)

Among the examined students 513 were found normal(62.7%) followed by 176(21.5%) students stunted (Table 21).

Distribution of wasting Vs stunting according to Waterlow was also statistically significant. ($\chi^2=4.05$, $p=0.044$).

Table 21. Wasting Vs Stunting per Waterlow classification

Weight for Height (Wasting)	Height for Age (Stunting)			Test*	
	>=90%	<90%	Total	χ^2	p
>=80%	Normal n = 513 (62.7%)	Stunted n = 176 (21.5%)	689 (84.2%)	4.05	0.044
<80%	Wasted n = 85 (10.4%)	Wasted and Stunted n = 44 (5.4%)	129 (15.8%)		
Total	598 (73.1%)	220 (26.9%)	818 (100%)		

*d.f.=1

Treatment Preferences and Perceptions among School Teachers

The available 25 school teachers (12 from Dhankuta town and 13 from Inaruwa town) were interviewed from these 5 schools. All teachers said that, they used to refer sick students to the nearest hospital and medical shop. They prefer to take these sick children for modern medical practices and facilities.

The sick pupils were sent to hospital with class teachers. If hospital is very far and the injury or sickness is mild, then teachers used to take the student to local medical shops for medications. If the sickness is serious one, then relatives or parents were informed to come to hospital where the sick student was taken.

In a school of Dhankuta, the emergency treatment cost is paid by the school fund and looked after all expenses till arrival of parents. The parents have to pay back the total expenditure to the school fund after the completion of the treatment of their children.

Teachers from Inaruwa were very conscious about malaria and kalazar. So if any student has mild fever, the parents were informed to manage their children. There is no specific fund in school like in Dhankuta

CHAPTER - VII

DISCUSSION

School health surveys offer an excellent opportunity to screen a large size of paediatric population with minimum resources. The present study was undertaken to find out growth patterns, morbidity patterns, behavior status etc. of primary school children.

Growth pattern and nutritional status

The growth of an individual is a result of a complicated interaction between a number of different external and internal factors. The environment and standard of living are stated as the factors which most clearly cause differences in height and weight among children.⁸⁶ In this study, the children from governmental schools were taken to find out growth patterns, morbidity patterns, behavior status etc. of primary school children.

Among 818 students, boys were 424(51.8%) and girls were 394(48.2%). The ratio of boys and girls is 1.07:1. This value is almost same to the ratio of boys & girls in primary school children of Nepal (1.18:1).⁸⁷

The present study revealed that the percentage of illiterate mother was more than the percentage of illiterate fathers (63.7% versus 28.2%). The people from Dhankuta town were more literate

than from Inaruwa town in this study. It supports the national data that the literacy rate in Dhankuta is higher than in Inaruwa.⁸⁷

A study in Iran by Ravanshad S. et al (1999)⁵⁸ obtained that boys were taller and heavier than girls up to 9 years. From age 10 to 13, girls were taller & heavier. Similarly in this study 13 – 14 years girls were taller & heavier than boys. In 5 to 13 years group the heights and weights of children were similar in both genders. This is due to early development of puberty in girls than in boys.

The present study showed that the stunting was 65% (Grade I - 38%, Grade II - 20.3% and Grade III - 6.7%) and underweight was 82% (Grade I - 28%, Grade II - 31% and Grade III - 23%) according to NCHS/WHO comparison. The values are similar to the percentage of stunting (60%) and underweight (85%) carried out by Kanade A. N. et al (1998) in Pune.⁶⁹

A study carried out in Oman by Musaiger AO in 1992⁵³ found 67% and 63% underweight in primary school children and in preschool children respectively. The results were similar to our study.

Panda P et al (2000)⁷⁵ found 52.2% wasting, and 26.6% stunting in the sub population of Ludhiana city. The wasting was higher and stunting was less than our study. It may be due to different genetic and environment factors. However the boys and girls were equally affected by malnutrition in our study.

In North India, Anand K. et al (1999)⁷³ also found similar results of stunting (33% to 55%) underweight (31% to 51%) among school children.

A study carried out in Terai region of Nepal by Pradhan E. et al (1989)⁸⁰ in found that 65.5% of preschool children were stunted, 11.5% were wasted. The stunting percentage of our study was similar with this study. the wasting were more in our study (46%) comparing with NCHS standards.

According to Waterlow classification the percentage of wasting in our study was 10.5% which is comparable with the wasting percentage (11.5%) of the study by Pradhan E et al (1989) done in Nepal.

In Nepal, a survey conducted by Manipal Medical College⁸⁵ found wasting of 10.3% and stunting of 15.7% assessed as per Waterlow classification. In our study, according to Waterlow classification the percentage of wasting was 10.5% and stunting was 21.5%. These results were similar to the present study.

Some studies had quite different results. Sebastian M. S. et al in Ecuador (1999)⁵⁶ found 1.4% of stunting and 1.8% of wasting among school children. In Tanzania, Lwambo N et al (2000)⁶¹ detected 42.5% stunted and 43% wasted. Boys were affected

predominantly than girls. This variability could be due to difference of environment and socioeconomic condition.

In South Africa by Jinnabhai C C. et al (2001)⁶⁵ described 7.3% were stunted, 0.7% underweight and 3.1% obese among 8 to 20 years of school children.

A study in Rajsthan by Singh M. B. et al (2001)⁷⁷ found that overall 29.9% girls had mild to moderate malnutrition where as 20.3% had chronic malnutrition. Similarly, by Bhandari N et al (2002)⁷⁸ in South Delhi found minimum percentage of stunting(3%) and wasting(4%). This result could be due to the children were from affluent families.

In Annual report 2000/2001, the latest national nutrition survey conducted in 1998 revealed 54% of stunting, 47% of underweight and 7% of wasting among Nepalese children but this study revealed 65% stunting, 85% underweight, 46% wasting as per NCHS/WHO classification.

This difference was due to age group. This national nutritional survey was under 5 years children while our study was among primary school children.³⁷

A high prevalence of PEM is often found in area with higher level of parasite infection.⁵⁷ This result was supported in our study.

The parasite infestation and malnutrition were predominant in our study.

In our environment, parasites should be considered an 'annoying tenant', which only develop symptoms in the presence of certain factors such as high intensity rates or associated infections.⁵⁶

Morbidity Pattern

There were 18.1% of unclean skin, 22.4% of unclean hairs and 14.7% of running nose. A study by Agrawal M et al (1999)⁷² in Mumbai also found 62.2% hygiene related problems. Similarly Baidhya P in (2001)⁸⁴ in his study, found 21.4% poor personal hygiene and 29% unclean nails.

The poor hygiene was the main cause of diseases in our part of world like skin diseases and worm infestation etc.

The highest prevalence of diseases in this study was parasites in stool (65.8%) followed by anaemia (58%) and skin diseases (20%). Among skin diseases, the most common one was pediculosis (21%) followed by ring worms (19.5%), scabies (14%), impetigo (11%) and eczema (10.5%).

Pediculosis was significantly higher in girls (29.8%) than in boys (14.4%) while ringworms and scabies were high in boys. Similar results were obtained in the survey by Negi KS et al (2001)⁴⁴ in Garhwal, Uttar Pradesh of India. His study revealed 22.6% of

pediculosis, 5.1% of scabies, 22.6% of impetigo and 8.1% of eczema. Vikas B (1997)⁴⁵ in Central India found 35.8% of girls and 11.6% of boys were infected with Pediculosis.

Nutritional deficiency dermatoses were angular cheilosis(7%), white coated tongue(3.7%), gingivitis(2.3%), ulcer tongue(1.5%) in this study where as Negi VS. (2001)⁴⁴ found 1.4% angular cheilosis and others.

In the present study, other diseases were found for example, dental caries(19.8%), lymphadenopathy especially cervical (10.5%), tonsillitis (4%), heart and lung diseases(3.2%), pain abdomen(3.3%), ear discharge(1.9%), palpable thyroid gland (1.9%), abnormal posture(1.9%), conjunctivitis (1.7%), hepatosplenomegaly (1.3%) and others(5.8%).The cervical lymphadenopathy could be due to pediculosis, tonsillitis and dental caries.

The prevalence of dental caries(57%) and gingivitis(72.7%) were higher among the rural children in a study done by Sukusu N et al in Japan⁵². A study in Massachusetta by Geltman P et al (2001)⁶² also revealed 62% of dental caries in children. These high prevalences could be due to intake of chocolates, ice-creams, sweets in these countries than in our study area.

The prevalence of vitamin 'A' deficiency (Bitot's spot - 0.6%, corneal opacity - 0.2%) was less in the present study than the

findings surveyed by Nepal Blindness Survey in 1981 (Bitot's spot = 2.2%). In few studies vitamin 'A' deficiency syndromes were 34.7% and 8.1% in rural primary school children from South Africa⁸⁵ and in the school girls of Mumbai⁷² respectively showed high prevalence. This could be due to successful implementation of vitamin A distribution program in Nepal.

However a survey carried out by Baidhya P. (2001)⁸⁵ and by Manipal Medical College⁸⁵ revealed similar findings as in our study.

Sunsari Health Examination Survey 1996,⁸⁰ found top ten diseases in 5 to 14 years group were Gastro intestinal problem(4.1%) followed by skin(2.2%), nutritional diseases(2.1%), respiratory(1.5) and eye diseases(4%) etc. Gastrointestinal problems were not present during survey but abdomen pains were present in this study. Other morbidities like tonsillitis, ear discharge, glossitis, palpable thyroid gland, hepatosplenomegaly and abnormal posture/ rickets were different in different studies. This could be due to different socioeconomic and environmental factors.

In the present study, most of the behavior problems seen, were nail biting(3.6%), thumb sucking(2.2%), prefer to stay alone(1.9%) and few friendship(4.6%). This indicates highly stressful and anxiety related behavior. The result of similar studies done in Mumbai (1999)⁷² and Ldhiana (2002)⁴⁹ detected 9.3% and 45.6% of such

behavior problems respectively. Sharma VD (1997)⁵⁰ in his study in Morang found that 27% of all school age children were suffering from behavior problems. These problems were more frequently noted in girls. These behaviors are due to excessive stress, competitiveness, high parental expectations for household works and consequent anxiety related to puberty.

Prevalence of Parasitic Infestation

In this study the percentage of stool infestation in boys and girls were 65.6% and 66% respectively. Ascariasis was found in 35% followed by *E. histolytica*(19.5%), *G. lamblia*(18.2%), tapeworm (10.4%) and hookworm(7.8%) in our study. A study in Pokhara (2002)⁸⁵ revealed 33.7% of worm infestation.

Similarly higher prevalence of worm infestation was found by Jinabhai C. C. et al in South Africa (2001)⁶⁵ and by Waikagul S et al in Thailand (2002)⁶⁶. In South Africa, 53.9%, 27.3% and 24.3% among 579 primary school children were infested with whipworm, *Ascaris* and *Schistosoma haematobium* respectively. In Northern Thailand, 21.7% had of ascariasis followed by 18.5% hook worm infestation and 16.3% whip worm. In spite of this, 25.8% *E. histolytica* and 53% *G. lamblia* were found in the students. Similarly in a study done by Ananthphruti (2002)⁶⁸ et al in Southern Thailand found 99% of hookworm infestation among school children.

In certain studies, the prevalence of stool parasites was minimal. For example Geltman P et al (2001)⁶² in Massachusetts found 21% of stool parasites in 1767 children and Agrawal M et al (1999)⁷² in affluent population of Mumbai reported 24.1% of stool parasites. All these result could be due to affluent population with good hygiene, use of sanitary toilet and wearing of shoes or slippery.

Overall 65.8% of the school children were found infested with one or more of the parasites. Similarly 65% of the children in Ecuador⁵⁶ were found to be infested worms. The high prevalence of stool parasites could be related to behavioral factors such as poor hygiene, walking bare foot or lack of safe drinking water supply and open field defecation. The 80% of students from Dhankuta town and 46% of students from Inaruwa were infested with stool parasites. The soil of Dhankuta is soft, humid where ova, larvae of worms can live longer. Another reason could be use of more green leafy vegetables (Rayo Sag) by the people in the Dhankuta than Inaruwa. These vegetable were grown in such type of soil and not properly washed before cooking.

Prevalence of anaemia

The overall prevalence of anaemia in our study was 58% with 4.5% severe, 16.9% moderate and 36.6% mild anaemia. Girls were affected more than boys(63.7% Vs 53.4%).

The mild anaemia was predominant in Inaruwa while severe anaemia was predominant in Dhankuta town. It is also supported with the presence of higher infestation rate among school children in Dahnkuta (80%).

Similar types of high prevalence of anaemia were found in Tanzania (62.6%) by Lwambo N et al (2000)⁶¹, in Benin, Africa (50.5%) surveyed by Frongia O et al⁶³ and in Sri Lanka (80%) surveyed by Fornando S D. et al (2000)⁶⁴. Similarly Verma M. et al (1998)⁷¹ in primary schools of Punjab, and Anand K. et al (1999)⁷³ in the rural north Indian primary schools found 51.5% and 48.8% of anaemia respectively. These similar results once again support the high percentages of anaemia in developing countries/areas where poor nutrition, hygiene and sanitation were present.

The surveys in students from Massachusette (2001)⁶², from South Africa (2001)⁶⁵, from Mumbai (1999)⁷² and from Ludhiana (2000)⁷⁵ found anaemia about 20%, 16.5%, 20% and 26% respectively. The school children were from affluent background.

A survey by Musaiger A O. in Oman (1992)⁵³, and a study by Saibaba A. et al in Andrapradesh (2002)⁷⁹ found higher percentage of anaemia.

Nepal Micronutrient Status Survey⁸¹ reported 78% of anaemia in preschool children while Baidhya P. et al⁸⁴ found 30% of pallor

among school children of Grade IV and Grade V from Gorkha, Kathmandu and Chitwan. In Pokhara, a survey by Manipal Medical College (2002)⁸⁵ found pallor in only 2% among the school children. This study was based on only clinical pallor signs but in our study blood test for haemoglobin was also done. This could be the reason for different percentage of anaemia.

Treatment Preference in School hours among Teachers

The treatment preference among teachers during sickness of the child in school hours was to take the sick child to the hospital for treatment. There is no separate treatment room in the school. Though district health office supposes to run the school health program in the schools but no such program exists in these schools. The school teachers showed interest to go for training in first aid and run the school health program with the support of District Health Office for the improvement of the health status of the school children.

CHAPTER - VIII

SUMMARY

Present study was carried out in 5 government schools, 2 from Dhankuta town and 3 from Inaruwa, Sunsari.

The study was based on demography, anthropometry, clinical and laboratory examinations, observations and questionnaires. All students from Grade I to Grade V were enrolled in this study. The total number of students examined, were 818 where 355(43.3%) from Inaruwa and 463(56.7%) from Dhankuta towns. The total numbers of boys were 424(51.8%) while girls were 394(49.2%).

The major hill caste/ethnicity were 40.8% followed by hill native(25.3%), terai occupational trader caste/ethnicity(22.9%), major terai caste/ethnicity (9.6%) and muslim(1.4%).

Most of the parents were of low socioeconomic background with high percentage of illiteracy.

The unhygienic personal habits and practices among the school children were prevalent.

Most of the morbid conditions found in the present study were related to malnutrition and infectious diseases, i.e. anaemia(58%), skin diseases(20%), dental caries(19.8%), lymphadenopathy(10.5%), etc.

In the prevalence of skin diseases, the commonest one was pediculosis followed by ring worm and scabies. Pediculosis was common in girls but scabies was common in boys. The commonest stool parasites were round worms followed by *E. histolytica* and giardia.

Behavior disorders like nail biting, thumb sucking, prefer to be alone were common in girls. Among all students overall 12.3% had behavior disorders.

The total percentages of stunting and under nutrition were 65% and 82% respectively as per NCHS/ WHO. As per IAP classification 61% were found to be under nutrition. According to Waterlow classification, 62.7% were normal in nutritional status while 21.5% were stunted and 10.5% wasted. There were 5.3% wasted as well as stunted both.

The treatment preference of teachers for sick students during school hours were interviewed with 25 school teachers. The common preference given by them was to take the sick children to near by hospital. There was no school health programs in schools in any of the surveyed school, but the school teacher showed their willingness to co-operate with health personnel for school health program in their schools.

CHAPTER - IX

CONCLUSION

The health and nutritional standards of school children in this study were found to be unsatisfactory. Boys were more stunted and girls were more wasted. As per NCHS/WHO standard, the study revealed 65% of total stunting and 82% of under nutrition. According to Waterlow classification 21.5% were stunted, 10.5% wasted and 5.3% wasted as well as stunted both.

Among different morbidities, parasitic infestation(65.8%), anaemia(58%), skin diseases(20%), dental caries(19.8%) and lymphadenopathy(10.8%) were found to be the commonest. Ascariasis was the commonest among worm infestation. Pediculosis was more predominant in girls, while scabies was more common in boys. Mild anaemia was more predominant in students of Inaruwa town than in students of Dhankuta town. Severe anaemia was more common in girls.

Behavior disorders were significantly more among the girls than the boys.

The treatment preference of the school teachers for sick children during school hours was to take them to hospital for treatment.

This study highlighted the need for initiation of school health program in the schools with the support of District Health Office with more emphasis on improving personal hygiene of the students, control and prevention of diseases like: parasitic infestations and anaemia to ensure overall improvement of their nutritional well being.

CHAPTER - X

RECOMMENDATIONS

1. School health program should be initiated in the schools with the support of DHO to control hygiene related and nutritional deficiency diseases in order to improve health status of children.
2. Training of the school teachers about hygiene and first aid should be arranged with the support of DHO.
3. The class teachers must be given responsibility to supervise the personal hygiene and health problems of the students specially in primary classes.
4. Regular school health checkup is necessary at least twice a year with help of DHO, INGO and local NGOs. The health examination of the school children must be done at the time of entry in the school.
5. School health fund should be made available in Inaruwa schools like schools in Dhankuta.
6. Deworming program should be initiated and done every 6 monthly among school children.

CHAPTER - XI

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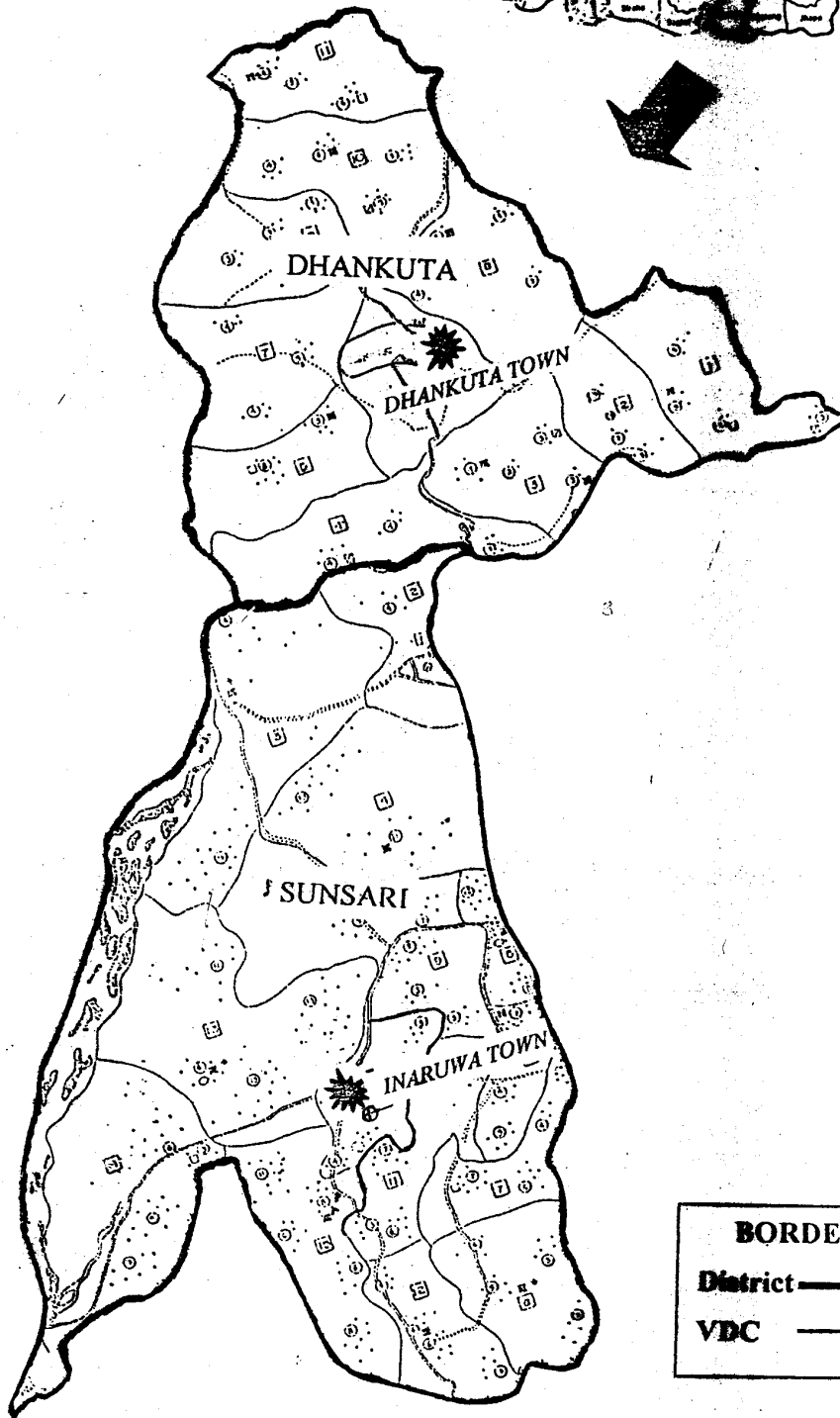
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Map of Nepal Showing Dhankuta and Sunsari Districts

Health Examination Schedule

Name of the School: _____

Class: _____

1. Name of the Student: _____ 2. ~~Class~~: _____

3. Gender: M / F 4. Address: _____

5. Date of Birth: _____ Year/ _____ Month/ _____ Day (as recorded in School)

6. Parents Details:

a) Father's Socioeconomic Detail:

I) Name: _____ II) Education: _____

III) Occupation: _____

b) Mother's Socioeconomic Detail:

I) Name: _____ II) Education: _____

III) Occupation: _____

7. Personal Hygiene:

- | | |
|--|---|
| I) Skin | Clean/ Not clean |
| II) Hair | Combed/ Uncombed |
| III) Nails | Cut & Clean/ Uncut & Unclean |
| IV) Nose | Clean/ Running nose |
| V) Clothes | Clean/ Not clean |
| VI) Washing of Hands with soap after defecation | Yes/ No |
| VII) Washing of Hands with soap before taking meal | Yes/ No |
| VIII) Use of toilet | Sanitary/ Open field |
| IX) Bath | a) Daily
b) Twice a week
c) Once a week
d) Others (Specify) _____ |

8. General Appearance:

I) Built a) Height: _____ cm b) Weight: _____ kg.

II) Abnormal Posture (apparent): _____

- | | | |
|-------------------|--------------|--|
| a) None (Healthy) | b) Kyphosis | c) Lordosis |
| d) Rickets | e) Scoliosis | f) Others (Specify) _____ |

9. Skin :

I) Color: a) Normal/ Non-healthy

b) Yellow/ Pallor

II) Lesions at the time of study.

Y/ N

If Yes, Specify:

a) Eczema

b) Ringworm

c) Scars

d) Impetigo

e) Pediculosis

f) Others (Specify) _____

10. Eyes

Right/ Left

I) Redness/ Discharge

_____ Y/ N

II) Any Lesion on Lids

_____ Y/ N

III) Any Lid abnormality (Ptosis)

_____ Y/ N

IV) Sclera/ Conjunctive

_____ Pallor/ Jaundice/ Healthy

V) Bitot's spot

_____ Y/ N

VI) Corneal opacity

_____ Y/ N

11. Ear

Right/ Left

I) General Condition

_____ Healthy/ Unhealthy

II) Discharge

_____ Y/ N

III) Pain

_____ Y/ N

12. Nasopharynx

I) Sore throat/ Tonsillitis

_____ Y/ N

II) Nasal Obstruction

_____ Y/ N

13. Mouth

I. Tongue

a) Healthy and Soft

b) Coated White

c) Ulcers

d) Dry

e) Others (Specify) _____

II) Lips

a) Healthy and Soft

b) Angular Cheilosis

c) Ulcers

d) Dry

e) Others (Specify) _____

III) Teeth/ Gum

a) Healthy

b) Caries

c) Gingivitis

d) Others (Specify) _____

14. Thyroid

_____ Enlarged/ Not enlarged

15. Lymph Nodes

(Cervical/ Inguinal/ Axillary) _____ Palpable/ Non Palpable

If Palpable size _____

Mobile/ Non Mobile _____, Painful/ Non Painful _____

Hard/ Soft _____

16. Pulse rate _____ / min Regular/ Irregular

17. Respiratory rate _____ /min

18. Lungs _____

19. Heart _____

20. Abdomen-

I) General appearance _____ Normal / Abnormal

II) Scars _____ Y/ N

III) Hernia _____ Y/ N

IV) Pain _____ Y/ N

V) Liver/ Spleen (enlarged) _____ Y/ N

V) Others (Specify) _____

21. Behavior Status

I) Nail Biting _____ Y/ N

II) Thumb Sucking _____ Y/ N

III) Has many friends _____ Y/ N

IV) Prefers to be alone _____ Y/ N

V) Others (Specify) _____

22. Locomotor System

I) Limbs _____ Normal/ Deformed (Specify)

II) Signs of Rickets _____ Y/ N

23. Lab Investigation:

a) Stool: RE/ME _____

b) Urine: Glucose _____ Y/ N

Protein _____ Y/ N

c) Blood: Haemoglobin (Hb) _____ gm %

Health Related Activity of School Teachers

1. Do you give any health education to school children? Yes/ No

If yes, what types of health education are given?

- a. Personal hygiene
- b. Sanitation
- c. First aid
- d. Others (specify)

2. Is there any health check-up program for the students? Yes/ No

If yes, how frequently?

3. What do you prefer when a student gets sick in school hour?

- a. Take faith healer
- b. Take to government health institution (SHP, HP, Hospital)
- c. Self treatment
- d. Private clinic
- e. Others (Specify) _____

4. Do you have any health fund for emergency treatment for sick children Yes/ No

If yes, what is the maximum amount of money you can spend for the treatment of a child?



Photo I
**Primary School Children of Bhagwati Madhyamik Vidhyalaya in Inaruwa
with Teachers**

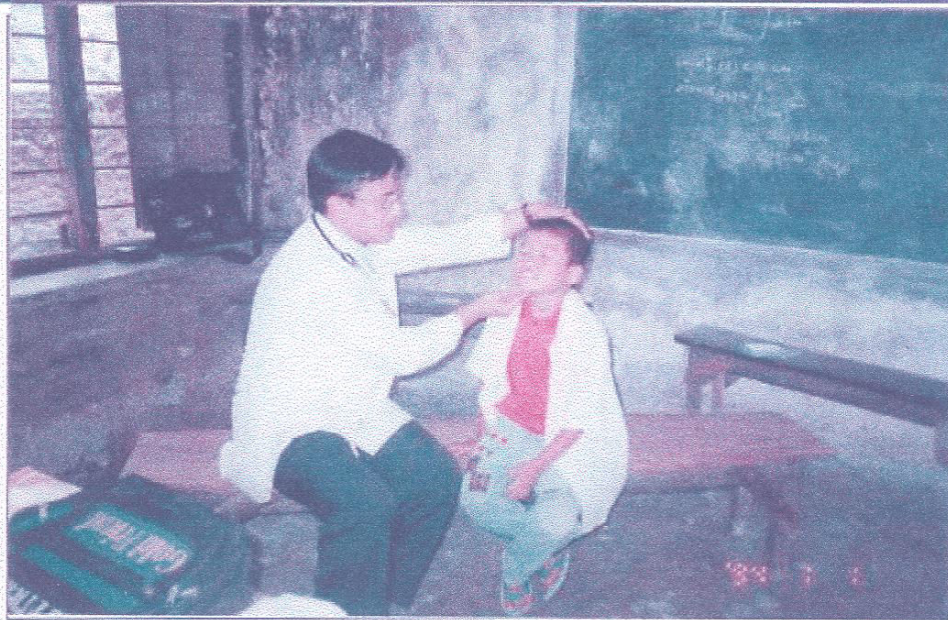


Photo II
**General Health Examination of School Children by
Investigator (Dr. Sagar Ratna Shakya)**



Photo III
Primary School Children of Gokundeshor Madhyamik Vidhyalaya

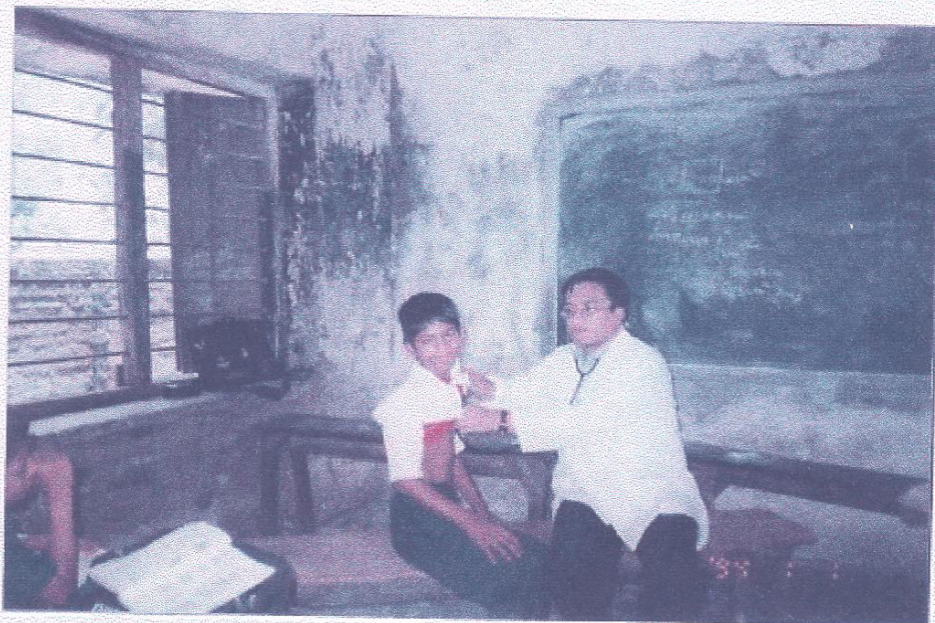


Photo IV
**General Health Examination of School Children by
Investigator (Dr. Sagar Ratna Shakya)**



Photo V
**General Health Examination of School Children at
Sunsari Prathamik Vidhyalaya with the help of Interns from BPKIHS**

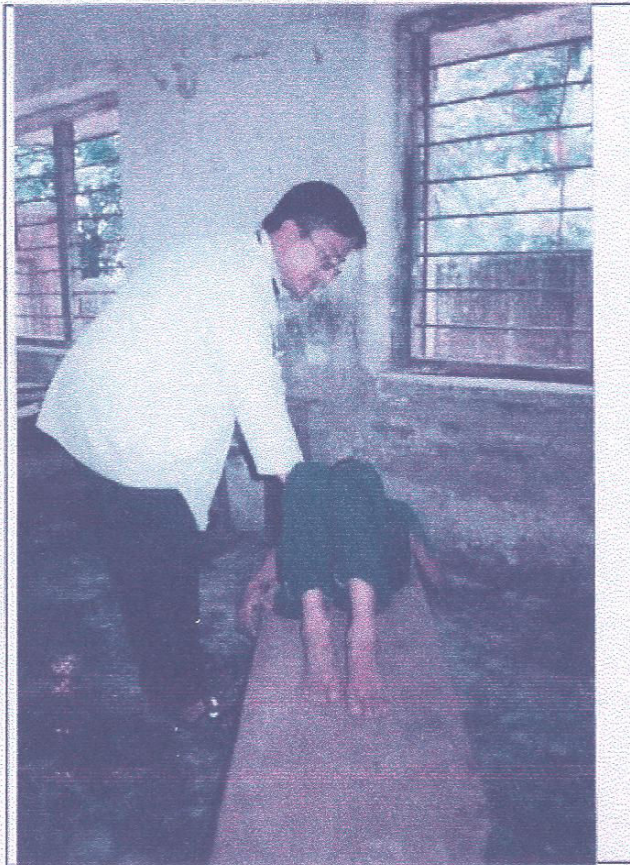


Photo VI
**General Health Examination of School Children by
Investigator (Dr. Sagar Ratna Shakya)**