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STUDY ON

**PREVALENCE OF HYPERTENSION AMONG
THE PEOPLE OF SURKHET DISTRICT OF
MID-WESTERN DEVELOPMENT REGION,
NEPAL, IN 2001.**

(Final Report)

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Submitted to:

NEPAL HEALTH RESEARCH COUNCIL
Ramshah Path, Kathmandu

Submitted by:

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STUDY ON
**PREVALENCE OF HYPERTENSION AMONG
THE PEOPLE OF SURKHET DISTRICT OF
MID-WESTERN DEVELOPMENT REGION,
NEPAL, IN 2001.**

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ACKNOWLEDGEMENTS

DEDICATION

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Accession No. 1

Call No.

This study has been dedicated to a social worker and the great Nepalese stage **artist**, Mr. Ganesh Bahadur "**Mastana**" who **died of** heart attack due to **hypertension**, while the audience were laughing after his comedian role on 7th Kartik, 2048 (October 27, 1991) during Dashain festival in Gaur, Rautahat District, Teraian part of Central Development Region of Nepal. This is also dedicated to those who have died of hypertension in various parts of Nepal.

ACKNOWLEDGEMENTS

The report would be incomplete without an expression of gratitude to the following experts, consultants, scientists, co-researchers, field and official staffs, and other cooperative hands:

The Mayor, Chairmen, vice-chairmen, ward-commissioners & members, the people and the participants living in the study-communities of Birendranagar Municipality, Uttarganga VDC, Latikoili VDC and Mehelkuna VDC; Dr. Shyam Sundar Mishra (The Director, Mid-Western Development Regional Health Directorate & Medical Epidemiologist), Dr. Ram Shanker Thakur (The Medical Superintendent, Surkhet Hospital & The chief, Surkhet District Health Office, DHO), and Mr. Govinda Prasad Adhikari (The Director, Educational Community Health Organization, ECHO); Professor Dr. Gopal Prasad Acharya (Professor of Internal Medicine in IOM, TU, Scientific Consultant of the hypertension research & The Chairman of NHRC), Prof. Dr. Kanak Bahadur Raut (Professor of Internal Medicine in IOM, TU, & Scientific Consultant) and Dr. Kamal Gyanwali (Associate Professor, IOM, TU & The member-secretary, NHRC); staffs of NHRC; Mr. Shashidhar Prasad Singh (Incharge, Primary Health Care Center, Mehelkuna); Survey team members - Mr. Prabhakar Chalise, Mr. Durga Bahadur Thapa, Ms. Chitra Kumari Barhaghare & Mr. Suraj Kumar Ghimire (who were sincerely and hardly committed for data-collection from morning to evening daily in the communities during very hot and heavy rain); Mr. Lekh Bahadur Gurung, Research Co-ordinator, Mrs. Rekha Basnet Office Assisnant), and Mr. Shambhu Gupta (Research office staff); Mr. J. B. Magar (field volunteer); Mr. T. P. Ghimire & Mr. S. Adhikari (ECHO-staffs); Prof. Dr. M.P. Shrestha (Professor of Community Medicine & Chairman, RECPHEC), Dr. Sonja Johansen (Ph.D.) & Mr. Sushan M. Shrestha (Biostatisticians, NHRC), Dr. D.P. Pokhrel (CTVS, Bir Hospital); Dr. Y. P. Singh (Ph.D. Oncologist, TUTH), Dr. R. P. Gartoulla (Ph.D., Medical Anthropologist), Dr. B. Yadav (Patan Hospital), Dr. B. L. Manandhar (TUTH); Dr. N.M. Dangol, Dr. K. Dhakal & Dr. P. Khadka, Surkhet Hospital and Surkhet DHO-staffs; and Ms. Pragya, Mr. Sushant & Saurav brothers.

A solely thank my mother, Mrs. Aasha Devi Ghimire who inspired me and supported in do something against hypertension among Nepalese people and to dedicate to those who are dieing of hypertension and its complications.

I am grateful to **NHRC** who provided me an opportunity of the study and managed the financial support to carryout the project-activities.

I also express acknowledgements to all whom I may have forgotten to mention.

October 14, 2001.
Tel: 977-01- 439440 (Res.)
Kathmandu, Nepal

PKG, PI

Abbreviations

BHT	=	Borderline hypertension
BK	=	Biswokarma
BMI	=	Body Mass Index
B.P.	=	Blood pressure
CTVS	=	Cardiothoracic Vascular Surgery/Surgeon
DDC	=	District Development Committee
d.f.	=	degree of freedom
DHO	=	District Health Office
ECHO	=	Education and community health organisation
F	=	Female
F.Y.	=	Fiscal Year
Gm/gm	=	Gram
GO	=	Governmental organisation
Hg	=	Hydrargyrum (Mercury)
HMIS	=	Health Management Information System
HP	=	Health post
Hr	=	Hour
HTN	=	Hypertension
ICD	=	International Code of Diseases
ID	=	Identity Card
IOM	=	Institute of Medicine
Kg	=	Kilogram
M	=	Male
ml/ml	=	milliliter
mm	=	millimeter
MWDR	=	Mid-western Development Region
NGO	=	Non-governmental organization
NHRC	=	Nepal Health Research Council
NMC	=	Nepal Medical College
Non-HTN	=	Non-hypertension
OPD	=	Out Patient Department
PHC	=	Primary Health Care
PI	=	Principal Investigator
p-value	=	probability value
RECPHEC	=	Resource Center for Primary Health Care
SHP	=	Sub-health post
SN	=	Serial number
TU	=	Tribhuvan University
UNICEF	=	United Nations Children's Fund
VDC	=	Village Development Committee
WHO	=	World Health Organization

Abstract

Project Title: Study of the prevalence of hypertension among the people of 15 and above years of age residing in Surkhet District of Mid-western Development Region, Nepal in 2001.

Introduction: Hypertension is a major factor for stroke, coronary heart disease, ischaemic heart disease, heart or kidney failure, ocular disease, pregnancy related problems, etc. Hypertension is one of the major public health problems in the country. It is an "Iceberg" condition. In Nepal, the prevalence of hypertension has been considered as an increasing "silent killer" problem along with rapid urbanization. In addition, the public health and medical professionals at national level need to have current information as national and regional figures of prevalence of hypertension.

Surkhet district is located in the hilly and inner terai of Bheri Zone of Mid-western Development Region. It has the population about 224768 (male 49.54%, female 50.46%) and average household size 5.7. It has population density of 92.1 person per sq. km. It has one municipality and 50 VDCs on three electorate constituency and 11 Illakas. The population of age group 15 years and above are 53.54%. Economically active population aged 15-59 are 49.66% which is lower than the national average of 51.8%.

The **objectives** of the study were to determine the prevalence of hypertension among the people of 15 and above years of age residing in Surkhet District; to determine the role of various predisposing factors like age, sex, body weight & height, salt intake, tobacco smoking, alcohol consumption, sedentary habit, literacy, occupation on the prevalence of hypertension; to find if there is any urban and rural difference in prevalence of hypertension; and to support health (public health and medical) institutions of Nepal by providing information on the prevalence of hypertension determined in Surkhet.

Design and Methodology: It was a descriptive study to describe the various factors responsible for the prevalence of hypertension. There were urban and rural communities in Surkhet District were the study areas, 15 and above years of age as study population and 3079 samples(90% of calculated samples) as sample size. Simple random sampling technique was applied to select study areas and population in the district.

The factors which might influence hypertension were defined before hand. Similarly, selection criteria, guidelines and objective-based test instruments were developed.

Oriented and trained surveyors with the help of supporting staff, researchers and community participation carried out **survey procedures** in the study areas. All the instruments and the equipment were standardized before the start of the survey. Everyday, the data were edited in the households as routine. All the completed data were processed and analyzed in MS - EPI 6.04 and word programmers.

The study has revealed **hypertension prevailing among 990 per 10,000 people** of 15 and above years of age residing in Surkhet District in 2001. The prevalence of hypertension has been seen significantly higher among 12.5% of urban people, 11.9% of male, 27.7% of Buddhist, 14-29 4% of Magar, Thakuri & Newar, 11.5% of married, 17.6% of illiterate, 12.2% of those who consumed 5 gm or more than 5 gm of salt per day, 18.7% of those who consumed alcohol, 12.2% of tobacco smokers, 34.3% of obese, 48.6% of those who do not have any occupation, 18.6% of the service-holders & 13.1% of the farmers, and among 21.9% of individuals who irregularly work for less than 5 hours a day. Many medical and public health professionals have provided some comments. Findings and comments-based conclusion and **recommendations** have developed for further study of hypertension in Nepal.

Keywords: Hypertension, Prevalence, Surkhet, Nepal.

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
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REGION : MID-WESTERN

ZONE : BHERI












DISTRICT : SURKHET



POPULATION DISTRIBUTION
AND
EDUCATIONAL FACILITIES

Study Area: 

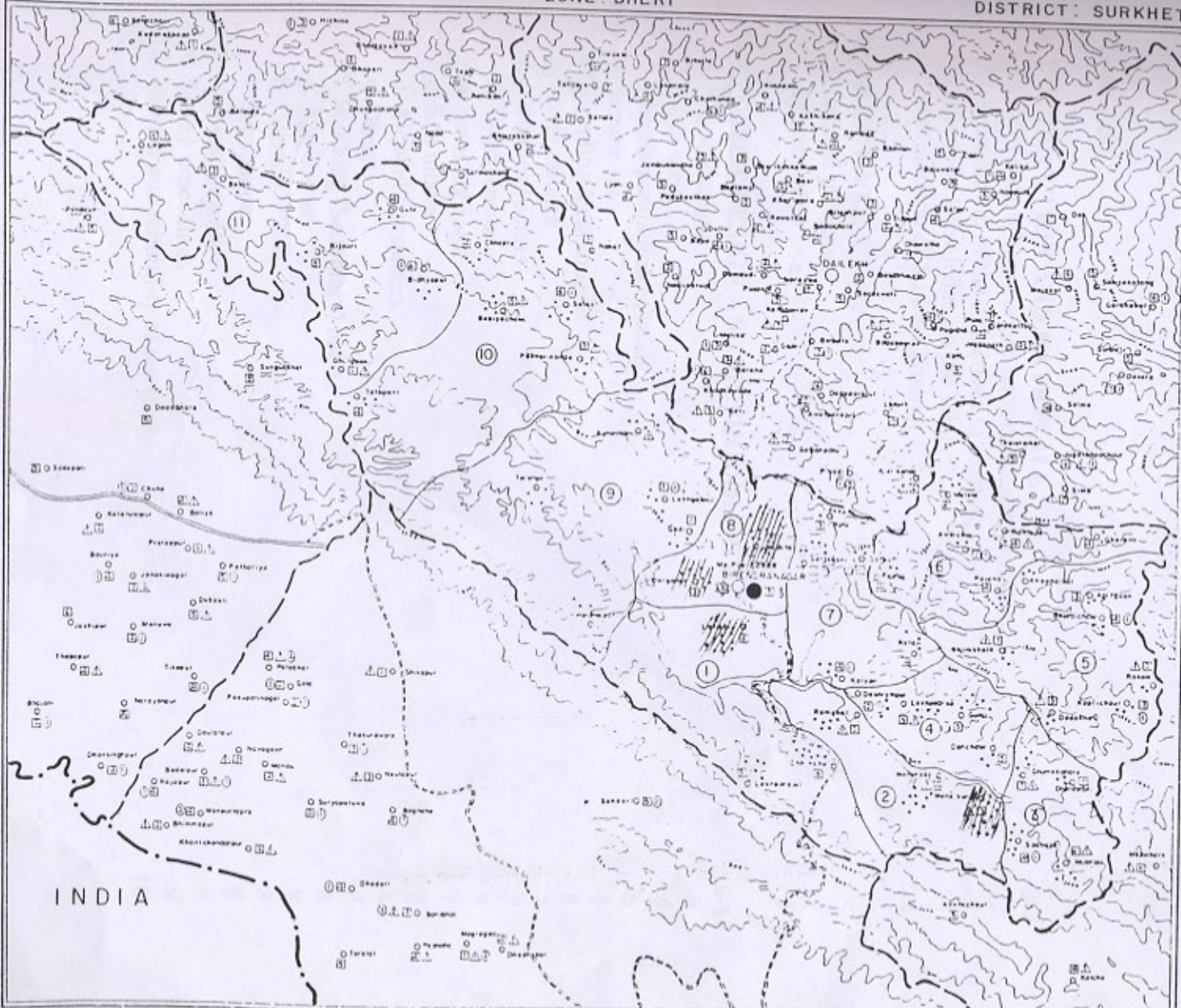
REFERENCE OF EDUCATION FACILITIES	
PRIMARY SCHOOL	
LOWER-SECONDARY SCHOOL	
SECONDARY SCHOOL	
CAMPUS	
POPULATION (1 Unit = 100 persons)	
MUNICIPALITY POP (Map Pop. fig. of Figures)	

Population Census 1991, Nepal

LEGEND	
INTERNATIONAL BOUNDARY	
DISTRICT BOUNDARY	
ILAKHA BOUNDARY & NUMBER	
MAIN RIVER & LAKE	
ALL WEATHER ROAD	
SEASONAL ROAD	
TRACY	
DISTRICT HQS	
MUNICIPALITY	
V. D. C.	
CONTOUR LINE	

Administrative Area	<p>SCALE</p> <p>1 : 250,000</p>  <p>0 1 2 Km</p> 
	
<p>1. Surkhet</p> <p>2. Datt</p>	<p>Center: 27° 30' North</p>

Map of the Study District
(Surkhet)



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Project Title

Study of the prevalence of hypertension among the people of 15 and above years of age residing in Surkhet District of Mid-western Development Region, Nepal in 2001.

I. INTRODUCTION AND RATIONALE

A) Relevance of the work to national health priorities:

Nepal has been committed to the primary health care (PHC) services from very beginning to achieve the Global Goal "Health For All By 2000 AD" because of Nepal is one of the signatories for this. Health education concerning prevailing health problems and prevention and control of the locally available health problems including endemic diseases are two important elements which have also been declared by Alma-Ata Conference (1978) jointly sponsored by WHO & UNICEF.^(1,2) Hypertension is one of the major public health problems in Nepal^(3,4) to be prevented and controlled through health education within the primary health care services as stressed by both the national health system and WHO.^(5,6) In addition, the public health and medical professionals at national level needed to have current information as national and regional figures of prevalence of hypertension as health problem due to very little and old information available about the magnitude of hypertension in Nepal.⁽³⁾ And, all of the health institutions at every level are committing to treat hypertension with essential drug⁽⁷⁾ and to educate the people against this major health problem in the country.⁽⁸⁾ So, the study was relevant to the national health system in developing new documentation on community based prevalence of hypertension in one of western development regions.

B) Relationship of the objectives to existing scientific knowledge on the subject:

Hypertension is one of the major public health problems in the country. It is an "Iceberg" condition. High blood pressure is a major factor for stroke, coronary heart disease, ischaemic heart disease, heart or kidney failure, ocular disease, pregnancy related problems, etc.^(10,11)

Very little and old information is available about the magnitude of high blood pressure or hypertension problem in Nepal. Analysis of hospital statistics (1969 to 1975) on hypertension tends to show a biased information and it did not give true picture of the problem of the community in the country.^(3,12) Some epidemiological data concerning the problem of hypertension in rural community in the outskirts of Kathmandu valley showed 5.98%.⁽¹³⁾ Even a small field study of hypertension a village of terai region (Saptari district) showed the prevalence rate of 10.6%.⁽¹⁴⁾ The prevalence rate of hypertension in an urban community of Nepal had been found as 9.9% for both sexes.⁽¹⁵⁾ During the same period of time, a study done for prevalence of hypertension in another community of a rural type in terai (Bara district) had shown 8.1% and a

survey done in a rural community of Jumla district mountain region had also shown the rate of 5.3%.⁽¹⁶⁾

In addition to those, some other important researches had been done as epidemiological studies on the genesis of hypertension in some districts of Nepal. Among those, a study conducted in 1987 showed the prevalence rate of hypertension in a hilly rural community of Kabhrepalanchowk district as 0.7% and that in a sub-urban community in Kathmandu district in the same year showed 7.3%.⁽¹⁷⁾ Those were the studies done by an International Joint Research titled "Tribhuvan University-Kyushu University Hypertension Project" of the "Japan-Nepal Health Scientific Expedition" group. They had also carried out few studies in Helambu and Jomsom communities and among Tibetan Immigrants in Nepal to see the prevalence rates of hypertension and to specify the factors which affected the pathogenesis of hypertension. The group had seen the rates of hypertension in different communities as different i.e. in 1990, the studies among monks and nuns of six monasteries at Boudhnath and among Tibetan immigrants living in Tibetan Refugee camp at Jawalakhel in sub-urban districts of Kathmandu valley showed the prevalence rates of hypertension as 11.3% among monks and nuns, and 10.4% for both sexes at Jawalakhel.⁽¹⁸⁾ The Helambu study done in 199, indicated the prevalence of rate of 23.3% for both sexes.⁽¹⁹⁾ About 11.4% prevalence rate had been found in Jomsom areas in the same year.⁽²⁰⁾

There were some other studies regarding to the prevalence of hypertension done separately in few communities. But the reports were lacking or were not being found.

The medical and public health teachers, students and the national health professionals always faced query on the prevalence of hypertension in the communities of different regions of Nepal. There were only limited and few community-based studies done in the central development region and few done in two upper hilly communities of Mustang and Jumla districts situated at high altitude level. In Nepal, the prevalence of hypertension was increasing along with rapid urbanization and hypertension was being considered as "silent killer".⁽¹⁷⁾

The prevalence of hypertension had been significantly higher among those who consumed more than 5 gm of salt per day compared to those who consumed less than 5 gm of salt per day. The prevalence had also been seen among those who are obese. In addition, hypertension was also prevailing at higher rate among the group who smoked tobacco or who consumed alcohol.⁽³⁾ The prevalence of hypertension had been found altered according to difference in occupation, physical activity and ethnical groups.^(3,17)

The investigators were interested to determine the prevalence of hypertension among the people including the women of reproductive age who were residing in the communities of Surkhet District, which is one of the districts in western development

regions and it has been located in the center where many people from other districts have come and residing by mixing up with local tribal people.

C) Introduction of Surkhet District:

Surkhet District is a hilly and inner terai of Bheri Zone of Mid-western Development Region. It has area of 2451 sq. km. It elevates from 198 to 2347 meters from center to periphery.

It is politically bounded by Salyan district in East; Kailali, Doti & Achham districts in West, Achham, Dailekh, Jajarkot & Doti districts in North; and by Banke, Bardiya & Kailali districts in South.

Topographically, it is located at 28⁰14' Latitude and from 80⁰59' to 82⁰02' Longitude. There are tropical, sub-tropical and mild temperate climate found in the district

It has the population about 280678 (male 49.54%, female 50.46%) and average household size 5.7 as projected for 1998. ⁽²²⁾ It has population density of 114.5 person per sq. km.. It has one municipality and 50 VDCs, 3 electorate constituencies and 11 Illakas.

The population of age group 15 years and above are 53.54%. Economically active population aged 15-59 are 49.66% which is lower than the national average of 51.8%.

The district health services consists of a District Hospital, 3 PHC Centers, 9 Health Posts and 39 Sub-Health Posts, and some other health institutions of GO and NGO types. District Health Office is responsible to manage and coordinate the health care services at district and periphery level specially in preventive, promotive and curative health services. So with the help of DHO, the PI has implemented and managed the project in Surkhet district and because of the current reactionary political situation and for less/unbiased data collection from randomly selected communities and study population.

II. OBJECTIVES

1. General Objective:

To study the prevalence of hypertension among the people of 15 and above years of age residing in Surkhet District of Mid-western Development Region, Nepal in 2001.

2. Specific Objectives:

1. To determine the prevalence of hypertension among the people of 15 and above years of age residing in Surkhet District;
2. to determine the role of various predisposing factors like age, sex, body weight & height, salt intake, tobacco smoking, alcohol consumption, sedentary habit, literacy, occupation on the prevalence of hypertension;
3. to find if there is any urban and rural difference in prevalence of hypertension; and
4. to support health (public health and medical) institutions of Nepal by providing information on the prevalence of hypertension determined in Surkhet.

III. PROJECT DESIGN AND METHODOLOGY

1. Project design:

The project was established for a descriptive study to provide qualitative and some quantitative information and to describe the various factors responsible for the prevalence of hypertension.

2. Study areas:

The urban and rural communities in Surkhet District were the study areas. Three VDCs (Latikoili VDC, Mehelkuna VDC and Uttarganga VDC) as rural communities and three wards of a municipality, Birendranagar Nagarpalika as an urban community were the randomly selected study areas for the consideration of sample population.

3. Sample population of study:

The people of 15 and above years of age residing in the study areas and who were meeting the criteria for study were the study or sample population.

4. Sample size:

The sample size as calculated was 3110 at least for qualitative information within 95% confidence limit of occurrence of hypertension.(Annex-I) But, due to some constraints faced in the fields and market situation, only 3079 samples (99.0% coverage) were collected for the study within some limits. (Annex-II)

5. Sampling technique:

Due to lack of list of the people residing in the study areas after a discussion, PI could not apply the stratified random sampling technique. But, random sampling was applied to select three VDCs from 50 and three wards of each VDC and that of municipality. There were different clusters in municipality. So, PI also randomly selected the clusters for data collection from the individuals of the households in those.

6. Study criteria:

By applying the inclusion and exclusion criteria (Annex-III), there were 3079 samples for data collected and 46 samples were excluded.

(7 individuals from three households did not have study because of the household-owners refused the team members; 2 individuals dropped the study off/broke the informed consent from the study because of they thought that the measuring of the body might cause bad effect on their bodies after measurement; 4 individuals had smoked just 10 - 20 minutes before the measurement of blood pressure and they could not wait for a while; an exaggerating individual and a very irritate, restless and old woman which had resulted more fluctuation in measurement including blood pressure measurement; 12 relatives of the household owners who were not permanently residing in the district; and 19 individuals who had come from non-sampling households; were excluded.)

7. Variables/Factors:

a. Hypertension:

Those people under study who could have systolic blood pressure equal to or greater than 140 mm of Hg and/or diastolic blood pressure equal to or greater than 90 mm of Hg were considered as hypertensive.

b. Smoking habit:

- i. Those people who had never smoked or smoked less than 1 cigarette or equivalent per day as long as a year during their life time before the study were considered as "non-smokers"
- ii. Those who regularly smoked as much as one cigarette or equivalent per day for as long as one year were considered as "smokers".
- iii. Those who ever smoked as much as one cigarette or equivalent per day for as long as one year but now smoke less than that were considered as "Ex-smokers"

c. Salt intake:

Those who regularly consumed salt as much as 5 gm or more per day or less than were grouped into two.

d. Alcohol consumers:

Those who regularly drank alcohol as much as one glass (about 100 ml) or more of any kind of alcohol per day were considered as alcohol consumers/drinkers.

e. Obesity:

Those males who had body mass index (BMI) of 30 or more and those females who had body mass index (BMI) of 28.6 or more were considered as obese.

f. Working habit:

Those who were performing their particular work for a certain hours a day were considered as the population with that particular working habit for that period in hours, e.g. 0-5 Hr., 5-10 Hr., 10+ Hr. (It was difficult to the people and surveyors to mention and understand about the sedentary works and only two individuals were seen with the habit of regular exercise of more than half an hour thrice a week at least. So, it was decided to present the data in "working habit" form.)

g. Age and sex:

Males or females who had completed their age of 15 years or above were grouped into different age groups such as 15-19 years, 20-29 years, 30-39 years, and so on.

h. Literacy:

Those who could read and write were literate, and those who could not read and write were illiterate in consideration.

i. Occupation:

Those who primarily engaged in a particular activity to earn some money or things for livelihood, e.g. farming, service holding, teaching, shop-keeping, daily wages based laboring, etc. were the people with different occupation considered.

8. Test instruments:

Questionnaire and observation forms (Annex-IV) were the test instruments for collecting data from the study population. The test-instruments were developed on the basis of set objectives and the factors/variables to be determined.

9. Survey procedures:

Demographic particulars like age and sex, literacy, occupation and ethnicity for identifying and classifying the individuals into various groups were asked and recorded. Information about physical activity, amount of salt intake per day, smoking and alcohol consumption, were also asked and recorded. The blood pressure, both the systolic and diastolic blood pressure, body weight and height of the individuals, were observed and measured, and were recorded in the observation part of the form. All data were collected in Nepali language in pre designed record forms during the survey. To ensure appropriate survey, a guideline for the surveyors was developed. (Annex-V)

The survey team consisted of a senior health assistant, co-researcher and field assistant/boy. The survey was done in the randomly selected households for gathering data from eligible study population. Prior to initiation of the surveyors, all the team members were oriented and trained in survey methods including recording data. Blood pressure was measured three times consecutively in the right upper arms in the sitting position using the automatic B.P. measuring device (OMRON M4 HEM 401C, Japan) (Annex-VI). The average of three consecutive measurements were computed and adopted for analyses.

The body weight was measured with a weighing machine and the height with an engineering tape and accurately measured stick.

All the instruments and the equipment were standardized before the start of the survey.

Periodic checks were carried out in the field to ensure that the instruments were free from any error in instruments or observation, and question-answering. The survey was carried out from 2058/2/24 to 5/15 (June 6 to August 31, 2001).

The survey was carried out with the help of DHO and with a voluntary assistance of the medical doctors of the district hospital, and with the help of village development committee members and municipality chairman and ward members of concerned.

The daily average salt being consumed by an individual was determined by the surveyor (by showing different transparent polythene bags/packets with certain amount of salt - A packet with 5 gm salt, B packet of 10 gm salt, C packet of 20 gm salt & D packet of 40 gm salt). And, the average of salt consumed per day by the household/family members and an individual was calculated and recorded.

The Body Mass Index (BMI) of an individual was determined by calculating the body weight (kg) by squared height in meter and was recorded in his/her individual form to see any individual's obesity .

The hypertensive individuals were provided 4-7 days' lasiride tablets (4-7 Tablets) and a referral slip(Annex-VII) and they were referred to the Surkhet Hospital at Birendranagar for proper curative and preventive management under the doctor's advice.

Everyday, the data were edited and corrected in the households as routine. Even after that, some data were missing and immediately or on the next day they were necessarily corrected in the same households.

All the completed data were safely kept in separate study area- wise polythene bag and marked with a permanent marker. They were safely transported the project office in Kathmandu for data processing and data analyses.

10. Validity and reliability of the study:

The following activities performed ensured to have higher validification of the study:

- a. An agreement's development between NHRC and Researcher;
- b. The orientation and training to the surveyors;
- c. pre-test and finalisation of the test - instruments;
- d. utilization of the random numbers from a scientific calculator;
- e. permission of the municipality, VDCs, wards and the household owners for the study;
- f. individuals' informed consent for the study;
- g. rapport building by the survey team members and community participation;
- h. standardization of the equipment & instruments of measurement;
- i. calculation of the sample-size by using statistical formula, daily editing of the data, verification and updating of the data-entry to see mistakes and missing;
- j. coverage of samples from the proposed study areas - 99% of calculated sample-size;

- k. recruitment of the technical personnel including scientific professional's Consultancy during the study;
- l. Use of scientific calculator for random numbers in study areas and use of EPI 6.04 and word processing programers in the Microsoft computer; and

11. Data Processing and analyses:

The final recorded data were processed according to the different factors and blood pressure as mentioned to meet all pre-set objectives. The data were processed in MS - EPI 6.04 and word programmers of the computer . A master table was developed and coded information were entered serially. Later, the PI ensured about accurate entry of all information.

The analysis was done to determine the relationship between the prevalence of hypertension and factors responsible for this by using χ^2 -test process to see any difference to significance between them. All the factors were presented in percentages. For the effective presentation, figures, tables, and some charts were used. The processed and analyzed data were reviewed by an experienced Biostatistician to identify any error and its management for good inferences - making.

12. Implementation of project activities and management:

Immediately after an agreement developed between NHRC and the Principal Investigator, the PI implemented the activities under his direction and with the coordination of the Project Coordinator for smooth performance of the project-activities according to the redeveloped action-plan(Annex-VIII). The planned activities were literature review, preparation of the instruments, their pre-test and finalisation, orientation and training of the surveyors, data collection and editing, data processing and analyses, report-writing and commenting on that, report-writing, printing, & binding of the final report and submission of the final report to NHRC.

The PI managed the project himself with the help of the Project Coordinator, office staffs, the field staffs, DHO, ECHO and NHRC-staffs. Proposed and planned activities were implemented. But, due to some constraints been faced during the project period, these were disturbed so that the project was stopped for three and half months, from start of February to the first half of May, 2001; though it was started immediately after an agreement between NHRC and PI. The duration of the project became 10 months started from January to October, 2001.

During the implementation of the project and constraints being faced by the project personnel, the following activities were carried out for better implementation of the planned and needed activities to achieve the objectives:

A) Project-activities developed to be done according to proposal-

- Development of Action - plan, guidelines, Referral-slip and formats for data collection, data entry and office management.
- Purchasing of the equipment and instruments.
- Recruitment of the staffs.
- Orientation and pre-testing of the instruments.
- Consultation with specialists and discussions about activities, problems and issues and management.
- Coordination with DHO, Municipality, VDCs, Health post Incharges, some other local formal and non-formal leaders.
- Survey (data collection), supervision and editing.
- Pre-lunch and post dinner session discussion
- Communication and information with/to NHRC.
- Master table formatting.
- Daily data correction and data entry.

**B) Needed activities to solve the issues being raised during project-
Issues and Solution:**

a. Equipment out of market:

The main equipment was electronic blood pressure device. It was out of Nepalese market and the unit cost (price) was in creasing. Later, it was purchased in increased price. One of Nepalese markets made the device available in Nepal through considerable and reasonable price which was at higher cost. Before its purchase, NHRC was informed about its unavailability and expensiveness of the device. and the PI got a permission to purchase.

b. Late Implementation:

Due to local political situation and unavailability of the device in the market, the PI implemented the replanned project-activities lately even during rainy season.

c. Rainy season:

The rainy season resulted in making transportation blocked or difficult in hilly parts so that the men from outside could not join the study in time. Farmers were going to the fields for cultivation of the lands by leaving their children in houses. Very few people were found for the study in the households. And, the surveyors did not find the people in natural proportion (similar to pyramid of male and female) for study or measurement.

d. Fearful political situation:

The people were fearing from the current political situation because of an interaction between Maoists and the police/army. They looked at the team members in suspicious way because of sudden entry of the surveyors' group with height measuring stick, weight measuring and blood pressure measuring equipment, keeping baggage on their back. The team members firstly gave their introduction as the members from Surkhet District Hospital, introduced the objectives of the study, described about to measure the blood pressure of the individuals of 15 and above years of age in the households, to see any role of their age, sex, height, weight, salt intake, tobacco smoking, alcohol consumption, etc. and to determine the prevalence of hypertension among them whom are residing in Surkhet district. They were also informed they might have some tablets of a drug (lasiride) in case of hypertension detected during the study. All the team members maintained warm greeting of Namaste and politeness towards the people. The team members showed their ID card issued by the district health office (DHO). Then, the people became ready and gave their informed consent for questionnaire asking & answering and observation. The hypertensive individuals became happy to go to the district hospital along with the referral slip which was given to them for further Consultancy and management under the doctor of hospital.

e. Communication and information:

PI was always contacting NHRC-officials and communicating all the messages/information timely and more frequently. PI was getting necessary suggestions and help in time.

13. Mobilization of the resources:

Maximum local resources were utilized as far as possible. The locally available human resources as surveyors, helpers, volunteers, assistants and coordinator were utilized for

economic implementation of the project activities, more benefits to local people and for less or no error in study. It was all monetary resource received from NHRC counted as support to conduct the project. The grand total amount of expenditure became NRs. 1,87,997.92 during the project.

14. Dissemination of the reports:

The reports drafted were disseminated to the medical and public health experts and professionals, and to the Biostatisticians for valuable comments on it. The principal investigator consulted scientific health professionals for their valuable comments on it towards making the report fruitful for better utilization. The finally developed reports have been firstly submitted to NHRC. And, ECHO will arrange to disseminate some copies of the final reports to the concerned health institutions, the libraries and the authorities (DDC, DHO) of the study areas to utilize its information as per need.

IV. FINDINGS

District Health Office (DHO) is responsible to manage and coordinate the health care services at district and periphery level specially in preventive, promotive and curative health services. So with the help of DHO and local administration office and people's participation, the PI implemented and managed the project in Surkhet district.

A) Samples - presentation:

All the factors as mentioned in objectives have been presented in tables in relation to hypertension. They have been interpreted in percentages and to see any relationship among them through chi-square test to make inferences and to recommend for further study and/or for the control of hypertension in the study district at least. The tables are such as follows:

I. Demographic factors:

There are 1207 (39.2%) male and 1872 (60.8%) female samples collected from all study areas. There is much more difference in number of samples of male (1202) and female (1872) because of main causes such as many male's day-works in cultivating field during rainy season, service holding outside sampling areas, study in schools/college and productive male's emigration to any other city/part of Nepal or other country for some job in.

Table 1.A: Distribution of the samples in individual study- areas of Surkhet District.

B.P.		Hypertension (HTN)		Non-Hypertension (Non-HTN)		Total		
Area	Sex	M	F	M	F	M	F	Total
Birendranagar Municipality		63 (15.6%)	67 (10.6%)	341 (84.4%)	567 (89.4%)	404 (100%)	634 (100%)	1038 (33.7%)
Uttarganga VDC		23 (9.2%)	28 (7.4%)	228 (90.8%)	349 (92.6%)	251 (100%)	377 (100%)	628 (20.4%)
Lankoili VDC		31 (10.6%)	38 (9.3%)	260 (89.4%)	372 (90.7%)	291 (100%)	410 (100%)	701 (22.8%)
Mehelkuna VDC		27 (10.3%)	28 (6.2%)	234 (89.7%)	423 (93.8%)	261 (100%)	451 (100%)	712 (23.1%)
Total		144 (11.9%)	161 (8.6%)	1063 (88.1%)	1711 (91.4%)	1207 (39.2%)	1872 (60.8%)	3079 (100%)
		305 (9.9%)		2774 (90.1%)		3079 (100%)		

$$\chi^2=14.01$$

d.f.=3

p-value=0.00288719

The data collected from municipality have been considered as urban data and data from VDCs as rural.

The total samples are the sum of 1038 (33.7%) samples from the Birendranagar Municipality, 628 (20.4%) from Uttarganga VDC, 701 (22.8%) from Latikoili VDC and 712 (23.1%) from Mehelkuna VDC of Surkhet District. There are 144 (11.9%) of total male samples found with hypertension and 161 (8.6%) of total hypertensive female samples. Hence, total 3079 samples have been considered in presenting the factors in relation to hypertension.

In the municipality, 15.6% of male and 10.6% of female individuals have got hypertension. But, among VDCs, 9.2% of male in Uttarganga, 10.3% of male in Mehelkuna and 10.6% of male in Latikoili have been found with hypertension. Similarly, 6.2% of female in Mehelkuna, 7.4% of female in Uttarganga and 9.3% of female in Latikoili have been found with hypertension.

There is a significant difference in occurrence of hypertension ($\chi^2=14.01$, d.f.=3, p-value=0.00288719) among the four individual study areas. But, among 3 VDCs, there is no significant difference in occurrence of hypertension ($\chi^2=2.26$, d.f.=2, p-value=0.32307618)

Table 1.B: Distribution of Blood Pressure individuals in different health institutional clinics in F.Y. 2057/2058.

High Blood Pressure Records from different concerned Health Institutions under DHO, Surkhet (HMIS-33, ICD-Other Diseases & Injuries, S.N.-36: Hypertension)			
Health Institution	B.P. Male	B.P. Female	Total B.P.
Surkhet Hospital	8 in 6065 (0.13%)	6 in 5442 (0.11%)	14 in 11507 (0.12%)
Katkuwa HP	27 in 6962 (0.39%)	34 in 9202 (0.37%)	61 in 16164 (0.38%)
Latikoili HP	13 in 5382 (0.24%)	14 in 7297 (0.19%)	27 in 12679 (0.21%)
Mehelkuna PHC	10 in 8765 (0.11%)	13 in 12169 (0.11%)	23 in 20934 (0.11%)
Total	58 in 27174 (0.21%)	67 in 34160 (0.20%)	125 in 61284 (0.20%)
All district - clinics	131 in 56618 (0.23%)	135 in 64034 (0.21%)	266 in 120652 (0.22%)

After an statement that hypertension is an "Iceberg" condition, it was important to see hypertension cases identified in health institutions as mentioned in the above table which is showing the distribution of individuals with high blood pressure in different health institutional clinics. The sum total of the monthly High Blood Pressure records under Surkhet DHO in F.Y. 2057/058 shows the different pattern of high blood pressure cases been diagnosed in different health institutional clinics' OPD. In the district, the high blood pressure cases is occurring as morbidity at around 0.22% of the total district cases or 22 out of 10,000 patients in Surkhet District have been found with hypertension .

Table 2: Distribution of the samples with hypertension in different developmental areas of Surkhet District.

Area	B.P.	Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
Urban/ Municipality		130 (12.5%)	908 (87.5%)	1038 (100%)
Rural/VDCs		175 (8.6%)	1866 (91.4%)	2041 (100%)
Total		305 (9.9%)	2774 (90.1%)	3079 (100%)

$$\chi^2 = 12.02$$

$$P\text{-values} = 0.0005251$$

Out of 3079 samples, 1038 (33.7%) samples are from urban and 2041 (66.3%) from rural communities of three VDCs. In urban communities, 130 (12.5%) responding individuals have hypertension and in rural communities, 175 (8.6%) respondents have this. Hence, in general, 305 (9.9%) of total sample-population have hypertension, which may be considered as the prevalence rate of hypertension or the occurrence of hypertension is among 990 per 10,000 population of 15 years and above of age in Surkhet District.

In the above table, urban has more hypertensive people than rural ones by 3.9% in comparison, which is significantly higher ($\chi^2=12.02$, $p<0.005$). It reveals that there may be impact of urbanization to its residents.

Again, the community based occurrence of high blood pressure (hypertension) at 9.9% is 45 times higher than the clinic based morbidity rate of high blood pressure cases at 0.22% in comparison.

In comparison to this prevalence of hypertension on Surkhet, some epidemiological data concerning the problem of hypertension in rural community in the outskirts of Kathmandu valley which had shown 5.98% (13) is very low. Similarly a field study of hypertension in a village of terai region (Saptari district) which had shown the prevalence rate of 10.6% (14) is little higher. The prevalence rate of hypertension in an urban community of Nepal had been found as 9.9% for both sexes (15) is lower than that of urban in Surkhet. Again, a study done for prevalence of hypertension in terai (Bara district) had shown 8.1% which near to the value of the study in Surkhet. A survey done in a rural community of Jumla district mountain region which had shown the rate of 5.3% (16) is very low in comparison to Surkhet's value.

Table 3: Occurrence of hypertension between both sexes.

Sex	B.P.	Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
Male		144 (11.9%)	1063 (88.1%)	1207 (100%)
Female		161 (8.6%)	1711 (91.4%)	1872 (100%)
Total		305 (9.9%)	2774 (90.1%)	3079 (100%)

$\chi^2=9.12$

P-values=0.0025311

In the Table-3, there are 1207(39.2%) males and 1872 (60.8%) females. Table shows that 11.9% of male and 8.6% of female individuals have got hypertension which is differently occurred. Hypertension is occurring among male individuals being significantly higher than that among females. ($\chi^2=9.12$, P-values=0.0025311)

Table 4: Occurrence of hypertension among different age groups.

Age group	B.P.	Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
15 - 19 years		14 (2.3%)	585 (97.7%)	599 (100%)
20 - 29 years		33 (3.9%)	813 (96.1%)	846 (100%)
30 - 39 years		38 (6.2%)	572 (93.8%)	610 (100%)
40 - 49 years		55 (12.5%)	386 (87.5%)	441 (100%)
50 - 59 years		69 (22.1%)	243 (77.9%)	312 (100%)
60 & above years		96 (35.4%)	175 (64.6%)	271 (100%)
Total		305 (9.9%)	2774 (90.1%)	3079 (100%)

$\chi^2=334.57$

d.f. = 5

p-value = 0.0000000

The above table shows an increasing percentages in hypertension occurrence of the respondents as their age-group increases i.e. the percentages of occurrence of hypertension increases in older age-groups or 2.3% of "15-19 years" of age group have been found with hypertension whereas 35.4% of "60 & above years" of age-group been found with hypertension. Similarly, 3.9% of "20-29 years", 6.2% of "30-39 years", 12.5% of "40-49 years" and 22.1% of "50-59 years" of age groups have been found hypertension in increasing pattern.

Statistically, it is significant in difference of occurrence of hypertension in different age-groups of the people. ($\chi^2=334.57$, d.f.=5, p-value= 0.0000000)

There are 68.5% (209 of 305) hypertensive individuals falling in economically productive age-group.

II. Socio-economic factors:

The socio-economic conditions of the respondents are considered as the factor to see their influence on community hypertension.

Table 5.A: Occurrence of hypertension among different religious groups.

Religion	B.P. Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
Buddhist	13 (27.7%)	34 (72.3%)	47 (100%)
Hindu	292 (9.6%)	2740 (90.4%)	3032 (100%)
Total	305 (9.9%)	2774 (90.1%)	3079 (%100)

Fisher exact : 1-tailed p-value = 0.0004289 2-tailed p-value = 0.0004289

There are 98.5% (3032) Hindu and 1.5% (47) Buddhist respondents. Among Buddhist, 27.7% (13) respondents are with hypertension which is much more higher than the percentages (9.9%) of hypertension of the district. And, 9.6% of Hindu respondents have hypertension which is near the district's prevalence-percentages.

The above table shows a great difference of 18.1% between them, which is significantly different in occurrence of hypertension. (Fisher exact: 1-tailed p-value = 0.0004289, 2-tailed p-value = 0.0004289).

Table 5.B: Occurrence of hypertension among different ethnic/caste groups.

Caste	B.P.	Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
Brahmin		42 (8.9%)	431 (91.1%)	473 (100%)
Chhetri		60 (6.9%)	804 (93.1%)	864 (100%)
Tharu		51 (10.8%)	422 (89.2%)	473 (100%)
B.K./Nepali/Kami/ Sunar/Pariyar		58 (8.9%)	594 (91.1%)	652 (100%)
Magar		21 (14.2%)	127 (85.8%)	148 (100%)
Yogi/Sanyasi/ Puri/Bharati/Giri		13 (8.8%)	134 (91.2%)	147 (100%)
Thakuri		19 (15.0%)	108 (85.0%)	127 (100%)
Newar		25 (29.4%)	60 (70.6%)	85 (100%)
Others: Gurung (15*), Rai, Rajp(1*), Lama, Bodi, Majhi, Tamang, Gandarb		16 (14.5%)	94 (85.5%)	110 (100%)
Total		305 (9.9%)	2774 (90.1%)	3079 (100%)

* hypertensive individuals $\chi^2=55.96$ d.f. = 8 p-value=0.000000

In the above table, Chhetri, B.K./Nepali/Kami/Pariyar, and Tharu & Brahmin are the main castes standing at first, second and third in numerical form. But, the occurrence of hypertension is higher among Newar, Thakuri and Magar by percentages respectively. Tharu, Newar, Thakuri and Magar are the castes having hypertension percentages more than district's hypertension percentages (9.9%). Others are below the district's percentages of hypertension occurrence.

The difference in occurrence of hypertension among different castes of the people is significant. ($\chi^2=55.96$, d.f. = 8, p-value=0.000000)

Table 6: Occurrence of hypertension and marital status of the people.

Marital status	B.P. Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
Married	295 (11.5%)	2280 (88.5%)	2575 (100%)
Unmarried	10 (0.5%)	494 (99.5%)	504 (100%)
Total	305 (9.9%)	2774 (90.1%)	3079 (100%)

$$\chi^2=24.36$$

$$P\text{-values}=0.0000000$$

From the Table-6, 2575 (83.6%) respondents are married, of which 11.5% (295) have hypertension. On other hand, 504 (16.4%) are unmarried, of which 0.5% (10) have hypertension. Married people have 23 times more occurrence of hypertension among them than that among unmarried. It is highly significantly differing in occurrence of hypertension between them. ($\chi^2=42.36$, $P\text{-values}=0.0000000$)

Table 7: Occurrence of hypertension and type of family size of the people.

Family type	B.P. Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
Non-idle family members	208 (9.9%)	1885 (90.1%)	2093 (100%)
Idle family members	97 (9.8%)	889 (90.2%)	986 (100%)
Total	305 (9.9%)	2774 (90.1%)	3079 (100%)

$$\chi^2 = 0.01$$

$$p\text{-value} = 0.9308418$$

The respondents from the idle-family with 1-4 members or the respondents from the family with 5 or more members are similar to have about same percentages (9.8% and 9.9%) of hypertension-occurrence among them. So that, there is no significant difference in occurrence of hypertension between the different respondents. ($\chi^2= 0.01$, $p\text{-value} = 0.9308418$)

Table 8 : Occurrence of hypertension and educational status of the people.

B.P. Educational status	Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
Illiterate	158 (17.6%)	738 (82.4%)	896 (100%)
Literate	147 (6.7%)	2036 (93.3%)	2183 (100%)
Total	305 (9.9%)	2774 (90.1%)	3079 (100%)

$$\chi^2=84.54$$

$$P\text{-values}=0.0000000$$

There are 17.6% of "Illiterate" respondents with hypertension being revealed in the Table-8. Among "Literate" respondents", 6.7% are hypertensive. It is showing a difference of 10.9% between them, which is significantly different. ($\chi^2=84.54$, P-values=0.0000000)

Table 9: Occurrence of hypertension and status of the people with land & its production's sufficiency per year.

B.P. Land & production	Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
No Land	73 (10.8%)	606 (89.2%)	679 (100%)
< 6 months	51 (8.0%)	590 (92.0%)	641 (100%)
6 - 9 months	26 (10.4%)	223 (89.6%)	249 (100%)
9-12 months	155 (10.3%)	1355 (89.7%)	1510 (100%)
Total	305 (9.9%)	2774 (90.1%)	3079 (100%)

$$\chi^2 = 3.57$$

$$d.f. = 3$$

$$p\text{-value} = 0.31158958$$

The above table shows that 679 (22%) of the respondents have no land. The major part of the respondents, 78% have land whose production is sufficient for a certain period of months in a year. The respondents without land have hypertension which is similar to that among land-holders. The percentages of respondents with land or without land are found with hypertension nearly at around the percentages of occurrence of hypertension in the district i.e., 9.9%.

There is no significant difference in occurrence of hypertension among different people with or without land, and among the land-holders with some certain sufficiency of their land's production for a year. ($\chi^2 = 3.57$, d.f. = 3, p-value = 0.31158958)

Table 10: Occurrence of hypertension and occupational status of the people.

Occupation	B.P. Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
Farmers	65 (13.1%)	432 (86.9%)	497 (100%)
Laborers	8 (8.9%)	82 (91.1%)	90 (100%)
Shopkeepers	19 (10.4%)	162 (89.6%)	181 (100%)
Service-holders	20 (18.6%)	88 (81.4%)	108 (100%)
Students	14 (3.2%)	426 (96.8%)	440 (100%)
Domestic helpers	41 (11.0%)	331 (89%)	372 (100%)
Housewives	93 (7.8%)	1100 (92.2%)	1193 (100%)
Others: teachers, tailors, masons, driver, contractor, mechanic, priest, player, painting	11 (8.6%)	117 (81.4%)	128 (100%)
None	34 (48.6%)	36 (51.4%)	70 (100%)
Total	305 (9.9%)	2774 (90.1%)	3079 (100%)

$$\chi^2 = 161.03 \quad \text{d.f.} = 8 \quad \text{p-value} = 0.0000000$$

The people are seen primarily involved in different types of works for their livelihood and food-subsistence. In the samples, there are 1193 housewives, 497 farmers, 440 students, 372 domestic workers, 181 shopkeepers, 120 service-holders and 90 laborers. Other occupational individuals are about 128 in total. But, there are 70 individuals found having no any occupation because of older age and no opportunity.

The occurrence of hypertension is highest among the individuals without any occupation i.e., 48.6% of the individuals who do not have any occupation are found with hypertension. They have been followed by the hypertension-occurrence among service-holders (18.6%), that among farmers (13.1%), etc. The least occurrence of hypertension is among students (3.2%).

The difference in occurrence of hypertension among different occupation of the respondents is statistically significant. ($\chi^2 = 161.03$, d.f. = 8, p-value = 0.0000000) There may be the influence of less or light or no works on hypertension.

III. Personal habit factors:

The individuals have been grouped according to their regular habit, physical structure and the activity. These factors are such as:

Table 11: Occurrence of hypertension and salt intake habit of the people.

Salt intake habit	B.P.	Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
= >5 gm/day		278 (10.3%)	2417 (89.7%)	2695 (100%)
<5 gm/day		27 (7.0%)	354 (93.0%)	384 (100%)
Total		305 (9.9%)	2774 (90.1%)	3079 (100%)

$$\chi^2=4.06$$

$$P\text{-values}=0.0438587$$

In the Table-11, 10.3% of the respondents who are taking 5 gm or more of salt in a day have got hypertension. In the mean time, 7% of the respondents who are taking less than 5 gm of salt in a day have also got hypertension. It has resulted a significant difference by 3.3% between them. ($\chi^2=4.06$, $P\text{-values}=0.0438587$)

Table 12: Occurrence of hypertension and tobacco-smoking habit of the people.

Smoking habit	B.P.	Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
Smokers		115 (12.2%)	830 (87.8%)	945 (100%)
Ex-smokers		15 (15.6%)	81 (84.4%)	96 (100%)
Non-smokers		175 (8.6%)	1863 (91.4%)	2038 (100%)
Total		305 (9.9%)	2774 (90.1%)	3079 (100%)

$$\chi^2=12.92$$

$$d.f.=2$$

$$p\text{-value}=0.00156777$$

In the Table-12, 30.7% of the respondents regularly smoke tobacco and 3.1% of the respondents have ever smoked tobacco. Little more than 12.2% of the respondents who regularly smoke tobacco have been found with hypertension. Similarly, 15.6% of the respondents who are considered as "Ex-smokers" have got hypertension. And, 8.6% of the "non-smokers" respondents also hypertension.

The above table reveals a significant difference among them. ($\chi^2=12.92$, d.f.=2, p-value=0.00156777) It may mean that there is influence of smoking on hypertension occurrence among the smoking-people.

Table 13: Occurrence of hypertension and alcohol consumption habit of the people.

Alcohol consumption	B.P. Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
Consumers	116 (18.7%)	504 (81.3%)	620 (100%)
Non-consumers	189 (7.7%)	2270 (92.3%)	2459 (100%)
Total	305 (9.9%)	2774 (90.1%)	3079 (100%)

$\chi^2=67.40$ P-values=0.0000000

In the Table-13, 20.1% of the respondents regularly consume any type of alcohol, among which 18.7% of them have been found with hypertension which is about 2.5 times more than that among "non-consumers" of alcohol, among whom 7.7% of them have hypertension.

According to the above table, there is a significant difference in occurrence of hypertension among them. ($\chi^2=67.40$, P-values=0.0000000) It means that there may be an influence of alcohol in occurrence of hypertension among its consumers.

IV. Individual's body mass index (BMI) or obesity:

Table 14: Occurrence of hypertension and obesity status of the people.

Obesity (For both sexes)	B.P. Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
Obese	12 (34.3%)	23 (65.7%)	35 (100%)
Non-obese	293 (9.6%)	2751 (90.4%)	3044 (100%)
Total	305 (9.9%)	2774 (90.1%)	3079 (100%)

Fisher exact: 1-tailed P-value=0.0000737 2-tailed P-value=0.0000737

According to the Table-14, only few numbers of samples (35) have been found with obesity and among them, 34.3% respondents are hypertensive. In comparison to this, 9.6% of the non-obese respondents are hypertensive. It is a significant difference between

these. (Fisher exact: 1-tailed P-value=0.0000737, 2-tailed P-value=0.0000737). There may be an influence of the individual's obesity among such individuals.

B) Comments and suggestions on Findings:

V. Personal physical activity :

Table 15: Occurrence of hypertension and working habit of the people.

Working habit	B.P. Hypertension (HTN)	Non-Hypertension (Non-HTN)	Total
0 - 4 Hr. daily (No normal work)	85 (21.9%)	303 (78.1%)	388 (100%)
5 + Hr. daily (Normal work)	220 (8.2%)	2471 (91.8%)	2691 (100%)
Total	305 (9.9%)	2774 (90.1%)	3079 (100%)

$$\chi^2=71.65 \quad P\text{-values}=0.0000000$$

According to the Table-15, it is seen that 21.9% of individuals who irregularly work for less than 5 hours a day or who have no normal day to day work but in sedentary habit are hypertensive, whereas 8.2% of the respondents who regularly work for 5 hours or more than this as normal are hypertensive. Most of the individuals of "0-4 Hr. daily (No normal work)" work light type of works mostly within home environment. They feel their work as light or no harder or work without sweat. On other hand, the individuals of "5 - Hr. daily" group feel their work hard and sometimes with sweat.

The occurrence of hypertension among these distinct groups is significantly differing. ($\chi^2=71.65$, P-values=0.0000000)

B) Comments and suggestions on findings:

Many experts and professionals made comments on the findings of the study on drafted reports which were disseminated to them. These were listed such as follows:

Each and every individual should have second time B.P. measurements after an interval of weeks to verify individual' B.P. in the study.

Better to have seasonal, regional and terrain wise difference/variation in prevalence of hypertension in addition in Nepalese context.

Knowledge, attitude and behavior of the individuals against hypertension should also be addressed.

Influence of the practices of the different health practitioners in the district should also be considered. What may be the treatment situation of the hypertension among the community respondents in the study district ?

May have continuous data be highlighted. Statistical Correlation and linear regression in presentation may also be supportive to predict better study in future.

Verify the average amount of salt intake which has been verbally expressed during survey (questioning-answering). It may lessen the verbal bias. Average salt intake may also be measured by a chemical balance in the kitchen of the respondents during survey.

Provide information on Mean, Mode, variance, standard deviation (SD) of systolic and diastolic Blood Pressure of the Nepalese individuals.

Have a generalisable and basic information on hypertension in Nepal, if possible to compare the result of the study done in Surkhet.

It is also important to know about the health seeking behavior, health Consultancy and influence of these factors on hypertension for prevention and control of hypertension in the district(s) and country.

V. CONCLUSION AND RECOMMENDATION

A. CONCLUSION :

The study has revealed hypertension prevailing high or 990 per 10,000 people of 15 and above years of age with hypertension are residing in Surkhet District in year, 2001.

The prevalence of hypertension has been seen significantly higher among 12.5% of urban people, 11.9% of male, 27.7% of Buddhist, 14 - 29.4% of Magar, Thakuri & Newar, 11.5% of married, 17.6% of illiterate, 12.2% of those who consumed 5 gm or more than 5 gm of salt per day, 18.7% of those who consumed alcohol, 12.2% of tobacco smokers, 34.3% of obese, 48.6% of those who do not have any occupation (None), 18.6% of the service-holders & 13.1% of the farmers, and among 21.9% of individuals who worked for less than 5 hours a day.

There is lacking of a basic value on community prevalence of hypertension in Nepal. In absence of a basic information on hypertension in Nepal in general, this is the study which may reveal information sufficiently for Surkhet District only or this can not reveal information in detail to represent hypertension condition of Nepal in general. So, there is need of a generalisable and basic detail information on hypertension as both the qualitative and quantitative information through analysis by keeping useful comments and suggestions in mind.

B. RECOMMENDATIONS:

According to the inferences drawn from the study, the researchers would like recommend the following important things for maximum utilization of the revealed information:

1. The results should be disseminated through different media and places which are being mostly used in Nepal.
2. There should be a further basic and analytical study to have detail and generalisable values regarding prevalence of hypertension and the extent of relationship of the different predisposing factors with hypertension in Nepal. While arranging next study, there should be comments and suggestions made by experts and professionals be considered.
3. At each and every level, the health institutions should support in control of hypertension through health education including the information revealed from this study.
4. There should be measures of control of hypertension in Surkhet District under DHO, at least in those areas where the study was done.

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Annex-I

Calculation of sample - size for qualitative data

$$\text{Sample - size (n)} = \frac{\text{Probability of occurrence (P) X (1-P) X Z}^2}{\text{Squared allowable error in 10\% of P or L}^2}$$

where, Z^2 = percentages of confidence limit for occurrence in total

$$\text{Therefore, n} = \frac{P \times (1-P) \times Z^2}{L^2}$$

$$= \frac{0.11 \times (1-0.11) \times 1.96^2}{0.011^2}$$

$$= \frac{0.37609}{0.000121}$$

$$= 3108$$

(Sample size = 3108)

Annex-II

**Concerning Letter
from DHO, Surkhet**


**His Majesty's Government
Ministry of Health
Department of Health Services
District Health Office
Surkhet**

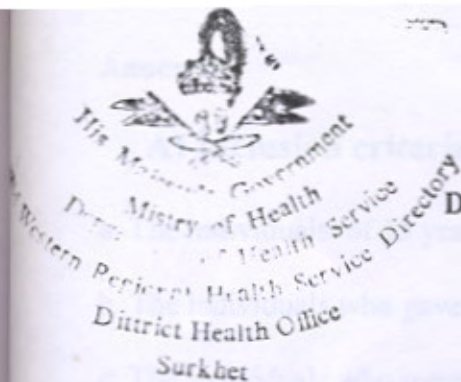
Date: 2058/05/22

TO WHOM IT MAY CONCERN

This is to certify that Surkhet Hypertension Study project, conducted for Nepal Health Research Council (NHRC) had been implemented and managed by Mr. Pradeep Kumar Ghimire (PI) with the help of this DHO and its concerned health institutions (Surkhet Hospital, PHC, HP, and SHP). Mr. Ghimire had managed to carryout the survey and other research activities according to the proposal guidelines, community people's participation and their informed consent.

The oriented and trained research team had carried out the survey to collect data among 3079 people of Birendranagar Municipality, Latikoili VDC, Uttarganga VDC and Mehelkuna VDC, all of Surkhet district within the planned duration of hot and rainy season.


(Dr. RS Thakur)
Chief, DHO



His Majesty's Government
Ministry of Health
Department of Health Services
District Health Office
Surkhet

Date: 2058/05/22

TO WHOM IT MAY CONCERN

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The oriented and trained research team had carried out the survey to collect data among 3079 people of Birendranagar Municipality, Latikoili VDC, Uttarganga VDC and Mehelkuna VDC, all of Surkhet district within the planned duration of hot and rainy season.

(Dr. R. S. Thakur)
Chief, DHO

Annex-III

Study criteria

A) Inclusion criteria:

- a. The individuals of 15 years of age or above
- b. The individuals who gave informed consent for the study and measurement.
- c. The individuals who were from the randomly selected area and households.
- d. The individuals who were also known as hypertensive along with/without medication.

B) Exclusion criteria:

- a. The individuals who dropped the study off or who broke the informed consent from the study.
- b. Those individuals who smoked just half an hour before the measurement of blood pressure.
- c. The individuals who had severe heart diseases or malignant disease.
- d. Those people who were relatives of the household owners and who were not permanently residing in the district.
- e. Those individuals who had come from non-sampling households.
- f. Those who were exaggerating and very irritate resulting with more fluctuation in blood pressure measurement.

Test-instrument
(in Nepali language used during survey)

उच्च रक्तचाप अध्ययन कार्यक्रम

सुर्खेत, नेपाल
२०५७

व्यक्तिगत प्रश्नावली

क्रम संख्या: गाउँ/नगर: वडा नं.: घर संख्या
व्यक्तिको नाम र थर: उमेर वर्ष, लिंग: पु. / म.
धर्म: जाति: वैवाहिक स्थिति: विवाहित / अविवाहित
शैक्षिक स्थिति: पेशा: परिवारमा सदस्य संख्या:

बानी व्यहोरा:

क) धुम्रपान गर्नुहुन्छ ? गर्छु () गर्दिन ()
गर्नुहुन्छ भने, कुन चाहिँ ? दैनिक पटक, अवधि
ख) रक्सी पिउनु हुन्छ ? पिउँछु () पिउँदिन ()
पिउनु हुन्छ भने, कुन ? दैनिक मात्रा, अवधि
ग) दैनिक काम/व्यायाम गर्नुहुन्छ ? गर्छु () गर्दिन ()
गर्नु हुन्छ भने, के काम ? दैनिक घण्टा, अवधि

नून खाने बानी व्यहोरा:

सरदर नून खाने मात्रा:	बिहान	दिउंसो	साँझ	राती
परिवारले खाने मात्रा:	ग्राम	ग्राम	ग्राम	ग्राम
व्यक्तिले खाने मात्रा:	ग्राम	ग्राम	ग्राम	ग्राम

विरामी हुनु हुन्छ ? छु () छुइन ()
हुनु हुन्छ भने, उच्च रक्तचापबाट हो ? हो () होइन ()
तपाईंको उब्जनी हुने खेतबारी छ ? छैन () छ () छ भने महिनासम्म पुग्छ ।

व्यक्तिगत अवलोकन

शरीरको तौल: / / / / किलो ग्राम शरीरको उचाई / / / / से.मी.

BMI =

रक्तचाप:	पहिलो पटक	दोश्रो पटक	तेस्रो पटक	सरदर
सिस्टोलिक:	mm Hg	mm Hg	mm Hg	mm Hg
डायस्टोलिक:	mm Hg	mm Hg	mm Hg	mm Hg

उच्च रक्तचाप भएमा, स्वास्थ्य संस्थामा प्रेषण गरिएको छ ? छ () छैन ()
छैन भने, किन ?

दस्तखत :

सर्वेक्षकको नाम :

मिति: २०५७/...../.....

दस्तखत :

सुरिवेक्षकको नाम:

मिति: २०५७/...../.....

Annex-IV. b

Test-instrument
(as approved along with proposal)
HYPERTENSION STUDY PROGRAM

Surkhet, Nepal
2058 (2001)

INDIVIDUAL INTERVIEW

S.N.:..... VDC/Municipality:..... Ward No.:..... HH No.:.....
Individual's Name..... Age:..... Yr. Sex: M / F
Religion:..... Caste:..... Marital Status: Mar. / Unmar.
Education:..... Occupation..... Family Members:.....

HABIT:

- A. Do you smoke tobacco? Yes () No ()
If yes, what form of tobacco do you smoke?, Daily.....PC Duration.....Yr./Mo
- B. Do you drink alcohol? Yes () No ()
If yes, which alcohol do you drink?(specify) Daily.....ml Duration.....Yr./Mo.
- C. Do you do any normal work daily? Yes () No ()
If yes, what type of work ?(specify) Daily.....Hr Duration.....Yr./Mo.

SALT-INTAKE HABIT:

<u>Average Amount of Salt-Intake :</u>	<u>Morning</u>	<u>Day</u>	<u>Evening</u>	<u>Night</u>
Family's salt-intake amount	:.....gm	:.....gm	:.....gm	:.....gm
Individual's salt-intake amount	:.....gm	:.....gm	:.....gm	:.....gm

Are you sick ? Yes () No ()
If yes, is it from hypertension ? Yes () No ()

Do you have your own cultivating land ? Yes () No ()
If yes, what duration in months in a year is it sufficient for ?Mo.

INDIVIDUAL OBSERVATION

Body Weight: / / . / / Kg	Body Height: / / . / CM	BMI:		
<u>Blood Pressure</u> :	<u>First Time</u>	<u>Second Time</u>	<u>Third Time</u>	<u>Average</u>
Systolic	:.....mmHg	:.....mmHg	:.....mmHg	:.....mmHg
Diastolic	:.....mmHg	:.....mmHg	:.....mmHg	:.....mmHg

If high Blood Pressure identified, has individual referred to health institution ? Yes () No ()
If no, why ?.....

Signature :	Signature :
Surveyor's Name :	Supervisor's Name :
Date : 2058/ /	Date : 2058/ /

Guideline for Surveyors**A. IN VDC/MUNICIPALITY:**

1. Go to the Mayor of the Municipality or the Chairman of the selected VDC.
2. Ask him if any available information about different strata of the people.
3. If yes, take the records and make a list of different strata of sampled wards and calculate about proportionate percentages of each.
4. If not, ask him for making a list of about different strata of sampled wards and calculate about proportionate percentages of each.
5. Select the households randomly for proportionate data collection.
6. If not, do simple random selection of households in interval of one i.e., alternate selection of households.

B. IN HOUSEHOLDS:

1. Respect the people in the community(-ies) and households.
2. Tell them about survey purpose as information to them.
3. Explain about the survey method and techniques of sample collection - interview and observation.
4. Get the permission for application of survey methods and techniques.
5. After getting permission as verbal informed consent:
 - a. Interview the targeted individuals politely, obediently without any hurt from your voice.
 - b. Measure and record individual's height in cm. without his/her shoes.
 - c. Measure weight in kg. and gm. without his/her shoes and with minimum clothes as much as possible.
 - d. Make a list of the clothes worn by individual while measuring his/her weight so that the total weight of the clothes may be recorded and reduced from the inclusive weight (weight with clothes).
 - e. Tell him/her to put on his/her shoes and remaining clothes.
 - f. Tell him/her to have five minutes' relaxed sitting position on a chair or palang for measurement of his/her blood pressure from right upper arm.
 - g. Expose his/her right upper arm for BP measurement.
 - h. Measure and record his/her several readings of Blood Pressure in mm of Hg. (mercury) by using semi-automatic Blood Pressure Instrument.
 - i. Ask the kitchen holding woman or housewife about the amount of salt which she keeps in pulse (dal) and/or vegetables in meals of different times. Show her different packets of salt in transparent plastic packages e.g., 5 gm, 10 gm, 20 gm, 40 gm and 80 gm. packets to verify salt amount that she uses in meals.
 - j. If any HTN (hypertension) case/individual found during survey, please inform about his/her hypertension and refer the individual to the nearer health center/hospital in written form or if any BHT (border line hypertension) case/individual found during survey, please advice his/her with prediction of hypertension and say about no smoking and no alcohol (if there is any or both), less salt, some regular works or exercise and consultation in health institution or doctor if possible.
 - k. Before leaving the place, provide the individual(s) lot of thanks due to cooperation while collecting data in household.
 - l. Edit the form filled up immediately at spot and everyday in residence to delete wrong matter.

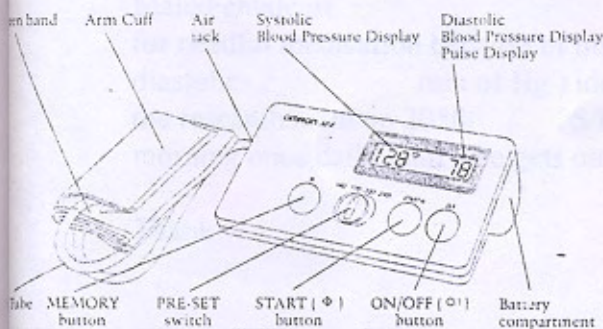
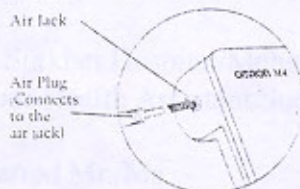
Picture of Blood Pressure measuring device (OMRON M4 HEM 401C)

OMRON M4

blood
are
for:
benefits

OMRON M4 is a compact, fully automated blood pressure monitor. Operating on the oscillometric principle, it measures your blood pressure and pulse simply and quickly.

OMRON is the world leading manufacturer of blood pressure monitors with the goal to always fulfill the need for reliable regular monitoring.



OMRON M4

Important! If you push up your sleeve, ensure it does not constrict the blood flow in your arm.

Close the cuff with the fabric fastener. The green area of the cuff must cover the brachial artery.

The standard-sized cuff is designed for an arm circumference of 22 - 32 cm. (For oversized cuffs see page 141).

Lay your arm on a table (e.g. on a cushion) with the palm of your hand facing upwards so that the cuff is approximately at heart level. In this way you ensure that the blood pressure measurement obtained is neither artificially high (measurement below heart level) nor low (measurement above heart level).

Inflation Pre-set switch

Set the inflation pre-set switch one value higher than your expected systolic blood pressure (upper value). As a rule the 170 mmHg or 200 mmHg setting is recommended.

When you press the start button, the blood pressure monitor automatically inflates the cuff to the preselected pressure. If the pressure you have set proves to be insufficient, the unit automatically continues inflating until the pressure is adequate for measurement. If you keep the start button depressed continuously, the pressure continues to rise even after the value you have set is reached. If you release the start button, the pressure will not rise any further.

Just push the START button (Φ).

170 200 240



Measuring your blood pressure



1 Prepare the unit

Open the battery compartment downside and insert batteries. Ensure that batteries contacts (+/-) are correct.

Insert air tube to air sack.

2 Switching on the unit

When you press the (ON/OFF) button all the symbols on the display light up for approximately two seconds in order to check the display.

Then all the symbols go out and the air release symbol (☐) begins to flash.

When preparations for measurement are complete the (☐) symbol appears in the display to indicate that the monitor is ready.

3 Fitting the cuff/Start

Wrap the cuff around your bare left arm so that the green-coloured band (indicating centre of the bladder) is positioned 2-3 cm above your elbow joint on the inside of your arm (see picture).

4 The measurement starts

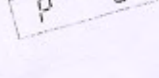
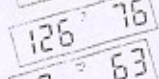
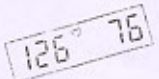
When the target inflation value is reached, the air is automatically released. The value in the display counts downwards.

As soon as the monitor detects your pulse the (☐) symbol begins to flash and, at the same time, the buzzer sounds (beep, beep, beep).

When the monitor no longer detects your pulse whilst the cuff pressure is dropping, your systolic and diastolic blood pressures (upper and lower values) are displayed.

The pressure drop symbol (☐) begins to flash to announce the end of the measurement.

When all the air has been released the (☐) symbol appears in the display and your blood pressure and pulse are displayed alternately for approx. 5 minutes.



Annex-VII

Sample of "referral-slip" given to hypertensive individual

HYPERTENSION STUDY PROJECT

Surkhet

2058

Referral Slip

Date: 2058/ /

To: Surkhet Hospital/Mehelkuna PHC

From: Health Assistant/Surveyor, Hypertension Survey Team Member

Referred Mr./Ms. _____ years of age,
Male/Female of _____ VDC/Municipality, Ward - _____
for needful medication because of his/her hypertension (systolic: _____ mm of Hg. &
diastolic: _____ mm of Hg.) identified with an automatic BP measuring device by
the research team on 2058/ / . S/he has been advised to take a tablet of Lasiride in the
morning once daily until s/he gets our service.

Thank you.

Signature:

Name:

Annex-VIII

Project-activities
(Replanned and implemented)

2001 AD	M O N T H S										
	Jan	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Literature review	****	****	****	****	****	****	****	****	****	**	
Instrumentation & Guidelines Devt.	****										
Recruitment of staff & Procurement	****		****		**	**					
Orientation & Training						*					
Pre-testing of Instruments.						*					
Survey/data-collection						***	****	****			
Data-processing								****	**		
Data-analyses									*		
Draft-report writing									**		
Dissemination of report, Comments & suggestions - collection									*	*	
Final report writing , printing, binding										**	
Submission of Final report to NHRC										*	
Auditing & Logistic clearance										**	

* = 1 week