

ORIGINAL ARTICLE

Prevalence of the Non-Communicable disease triad in hilly state of Uttarakhand: Evidences from National Family Health Surveys

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Abstract

India is facing epidemiological transition towards non communicable diseases and morbidities due to NCD triad of obesity, hypertension and diabetes. The risk factors contributing to chronic disease and NCD triad are lifestyle changes, poor dietary habits, lack of physical activity, tobacco/alcohol consumption. These risk factors are however modifiable and preventable. This article reviews secondary data of NFHS-4 and NFHS-5 to analyse trends of obesity, hypertension and diabetes among urban and rural population of Uttarakhand from 2015 to 2021.

Keywords

Non Communicable Diseases; Risk Factors; Hypertension; Diabetes; Obesity; Dalys

Introduction

Over the past decade, an exponential increase (over 0.5% per year globally) in chronic diseases burden have been a public health concern though preventable. Largest absolute increase in number of disability-adjusted life years (DALYs) reported in ischemic heart diseases increased by 50%, diabetes by 148% and stroke by 32% between 1990 and 2019, worldwide (1). Globally, NCDs account for 71% of the total number of deaths each year(2).

India is facing an epidemiological shift with an increased proportion of NCDs in every state. State level analysis in India has analyzed variations in epidemiological transition levels (ETL) from the year 1990 to 2016. The contribution of NCDs to the total disease burden has increased since then. The occurrence of non-communicable diseases in India constitute 60% of overall country's disease burden largely due to the consequence of morbidities of hypertension, diabetes and obesity (3,4). In-depth data on health status provides self-reported prevalence of 27.7% Cardiovascular diseases, 25.8% hypertension, 3.6% chronic heart diseases and 11.5% diabetes among Indian

population (5). India contributes to more than 2/3rd of the total deaths due to NCDs in the South-East Asia Region (SEAR) (6).

The main risk factors of concern contributing to NCD triad are modifiable and preventable provided the interventions are done in the early stages of life such as unhealthy lifestyle, high blood pressure, high blood sugar, high cholesterol, physical inactivity, obesity, dietary intake, tobacco use and alcohol misuse while the non-modifiable risk factors involve age, gender, genetic factors, race, and ethnicity (7-10).

Aims & Objectives

To review NFHS-4 and NFHS-5 data of NCD Triad (obesity, hypertension and diabetes) highlighting its prevalence and trend among urban and rural population of Uttarakhand.

1. To study the characteristics and establish trends of obesity from 2015 to 2021 in urban and rural areas of Uttarakhand.
2. To study the trend analysis of hypertension from 2015-2021 in urban and rural areas of Uttarakhand.

3. To study the trend analysis of diabetes from 2015-2021 in urban and rural areas of Uttarakhand.

Material & Methods

This study analyses the secondary data of NFHS 4 and NFHS 5 for establishing trends and characteristics of Obesity, Hypertension and Diabetes in Uttarakhand.

About NFHS: The National Family Health Survey is a collaborative project of the International Institute for Population Sciences (IIPS) Mumbai as the nodal agency by The Ministry of Health and Family Welfare (MOHFW), responsible for providing coordination and technical guidance, funded by USAID. For multi-round household survey in a representative sample of population in the states, IIPS collaborated with Field Organizations. (11)

In 1992-92, the first National Family Health Survey (NFHS-1) was initiated. The survey was based on extensive information of population, health, and nutrition emphasizing women and child. In NFHS-2 (1998-99), the quality of health and family planning services, reproductive health, domestic violence, anaemia and other parameters were added. Since then, NFHS-3 (2005-06), NFHS 4 (2015-2016) and NFHS 5 (2019-20) has been completed in India. (12). With each survey new features were added to examine the progress in health sector over a time period.

NFHS-4 field-survey was conducted from 20 January 2015 to 4 December 2016 and gathered information from 601,509 households (699,686 women and 112,122 men). NFHS-5 fieldwork was carried in two phases: Phase one from 17 June 2019 - 30 January 2020 and Phase two from 2 January 2020 - 30 April 2021 to collected data of 636,699 households (724,115 women and 101,839 men) (13). In NFHS-5 preschool education, disability, access to a toilet facility, death registration, clinical, anthropometric, and biochemical testing (CAB), age range for NCDs are added in the household surveys. So, this data will be setting up evidence for the effectiveness of implementation of ongoing programmes and identifying the need based focus on population groups, essential services and upgradation in national programmes.

Data collection and sample size in Uttarakhand: For the first time, District-level estimates were done under NFHS-4 for the indicators in assessing the progress and changes in the health sector of the country in lapse of time. NFHS-4 fieldwork survey was conducted from “30 January - 19 July 2015” and information was collected from 15,171 households (17,300 women, 1994 men) in Uttarakhand. Likewise, NFHS-5 also provides district-level estimates for certain indicators canvassed in local dialect in Four Survey Schedules: Household, Woman’s, Man’s, and Biomarker using Computer Assisted Personal Interviewing (CAPI). NFHS-5 fieldwork was completed in two phases keeping a view of COVID and lockdown restrictions. NFHS-5 survey in state was conducted from “7 January - 21 March 2020 prior to the lockdown and 5 December 2020 - 31 March

2021 post lockdown”. Data was collected from 12,169 households (13,280 women, 1586 men).

Categorization of data for NCD Triad under NFHS 4 and 5:

In view of epidemiological transition in country and recent changes in morbidity patterns, NFHS now monitors metabolic health as well. This approach will be useful in assessing the prevalence of various non-communicable diseases across country. The Biomarker Schedule under NFHS 4 and 5 households covered measurements of height, weight, hemoglobin levels, blood pressure, and random blood glucose level for women/men under specified age group. (14)

A. Categorization for Obesity: In data collection in field-work exercise, NFHS has measured body mass index (BMI) <18.5 to ≥ 25.0 kg/m² for men and women (Excluding “pregnant women and women with a birth in the preceding 2 months”), urban and rural inhabitants separately. Women and men who are considered to be overweight or obese under this categorization has BMI ≥ 25.0 kg/m² in percentage.

B. For Hypertension: Prevalence of hypertension is assessed under NFHS-4 and NFHS-5 measuring respondent’s blood pressure using OMRON BP monitor. Three blood pressure readings were obtained.

Blood Pressure measurements were taken for women/men age group 15-49 years in NFHS 4. Three sub categories under NFHS 4 are: “Slightly above normal (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg %), Moderately high (Systolic 160-179 mm of Hg and/or Diastolic 100-109 mm of Hg %) and Very high (Systolic ≥ 180 mm of Hg and/or Diastolic ≥ 110 mm of Hg %)”.

In NFHS 5, Blood Pressure measurements were taken for women 15-49 years and men 15-54 years. The sub categories included: “Mildly elevated blood pressure (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg %), Moderately or severely elevated blood pressure (Systolic ≥ 160 mm of Hg and/or Diastolic ≥ 100 mm of Hg %), Elevated blood pressure (Systolic ≥ 140 mm of Hg and/or Diastolic ≥ 90 mm of Hg) or taking medicine to control blood pressure (%)”.

C. For Diabetes: Gender-specific prevalence of diabetes was assessed by measuring Blood Sugar Level among Adults (age 15-49 years, Random blood sugar measurement including those under medication) under two sub categories: High Blood sugar level (>140 mg/dl %), Very High Blood sugar level (>160 mg/dl %) in NFHS 4.

In NFHS 5, three sub categories were taken into consideration: High Blood sugar level (141-160 mg/dl %), Very high blood sugar level (>160 mg/dl %) and Blood sugar level high or very high (>140 mg/dl) or taking medicine to control blood sugar level. (15,16)

Results

Data analysis was done for prevalence of NCD Triad in Uttarakhand under NFHS-4 and 5. There is a marked increase in all the three diseases from 2015 to 2021. The percent share of DALYs accountable for NCDs is slightly above in state (61.74%) comparing with average percentage prevalence in India of 61.43% to the total disease burden. (17)

A. Obesity: Though prevalence is lower in rural area of Uttarakhand comparing with urban area with a prevalence of 72.3% but it has increased manifold from 30.1% to 45.1% within the 2015 to 2019 surveys. Gender based prevalence shows, more BMI of females 20.4% in NFHS 4 to 29.7% in NHFS-5 than males from 17.7% in NFHS-4 to 24% in NFHS-5.

B. Hypertension: During the field surveys under NFHS 4 and 5, the sub categorizations for hypertension are different, so directly comparing these sub categories for trend analysis is difficult. To avoid ambiguity, in this article the category: I and II (slightly above normal and moderately elevated blood pressure) are considered for comparison.

The data shows, the prevalence has markedly increased in both the males and females from 16.7% to 29.6% and 8.9% to 20% respectively over a survey period from 2015 to 2021. Considering area-wise population of Uttarakhand, high blood pressure is significantly increasing in both rural and urban areas as well. During NFHS-4, it was 29.4% in Urban area which has now elevated to 51.8% and 42.2% in rural area from 23.1%. Comparing Mildly Elevated Blood Pressure in females (13.7%) and males (20.1%) with average prevalence in India (12.4% and 15.7% respectively) a marked increase is evidently present among population in the state. (18)

C. Diabetes: The categories for field survey under NFHS 4 and 5 are different with an addition of third category in NFHS 5 of Blood Sugar Level: High/very High or taking medicines to control blood sugar level. So, category 1 and 2 has been considered for trend analysis.

Comparing Males (5.6%) and Females (4.2%) under NFHS 5, cases with high blood sugar level prevalence are above national level of 6.1% and 7.3% respectively. (18) Considering prevalence in Rural and Urban population, high blood sugar level cases have substantially increased.

Discussion

In recent years although the state of Uttarakhand has ramped out the public health care facilities and boasts of 13 district hospitals, 21 sub district hospitals, 79 community health centres, 578 primary health centres and 1900 health and wellness centres including sub centres, yet disability/morbidity account for 32.0% with ischemic heart diseases, diabetes mellitus type-2 and

COPD as the major causes of DALYs and risk factors such as hypertension and increased blood sugar which are preventable in nature through active lifestyle interventions. It's evident from the analysis, there has been quantum jump in the burden of hypertension, diabetes and obesity in the Himalayan state in the last decade. The state is in a crucial juncture and should undertake imminent steps to reverse the epidemic curve by provision of continuum of care approach at all public health facilities primarily focused at primary health care facilities by implementing single window for health promotion, diagnosis, management and follow up at regular intervals. Special emphasis should be provided to population from hilly and hard to reach areas, high risk and marginalized population who might be facing access barriers primarily distance. Steps should be taken to build capacity of health care workforce at all levels.

According to the national action plan for control of non-communicable diseases, the state needs to take efforts for developing a comprehensive plan of action involving private sector, international development agencies, non-governmental organizations, research institutions and establishing coordination committees for taking effective and timely policy decisions, smooth implementation of control interventions and timely follow up.

Conclusion

Since 1992, National Health Surveys in India have generated a vast data to analyze and compare the key health factors and their risk factors. This articles highlights the need of attention to improve health indicators by comprehensive monitoring of epidemiological trends for NCD Triad, prevention and primordial interventions by National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke (NPCDCS) in the state. This may include control and care of risk factors within the ambit of guidelines for the National Programmes. With the changing trends in India's disease burden, it's prime time for national program's planning, implementation, surveillance & evaluation and policy development in the right direction.

Recommendation

The study highlighting urban–rural convergence of obesity, diabetes and hypertension in Uttarakhand is worrisome and is probably due to rapid urbanization of rural populations with consequent changes in lifestyles (sedentariness, high dietary salt, sugar and fat intake). Howsoever steps should be undertaken to prevent the productive population group from developing NCD triad by development of comprehensive public health interventions and implemented in close coordination of multi stakeholders as has been highlighted in this study.

Limitation of the study

Only two sub-categories of hypertension and diabetes have been considered for trend analysis and comparison which are common in both NHFS 4 and NFHS-5.

Relevance of the study

To the best of our knowledge, the study for the first time has attempted to highlight the rising prevalence of NCD triad in a hilly state and establish clear cut demographic trends among rural and urban population in the last decade. The study will support policy makers of Uttarakhand to develop new and strengthen existing interventional strategies for control of obesity, hypertension and diabetes.

Authors Contribution

All authors contributed equally.

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Tables

TABLE 1 PREVALENCE OF OBESITY IN NFHS 4 & NFHS 5

Obesity BMI ≥25.0 kg/m2	Male %			Female %		
	Urban	Rural	Total	Urban	Rural	Total
NFHS-4	23	14.1	17.7	28.4	16	20.4
NFHS-5	33.2	19.7	24	39.1	25.4	29.7

TABLE 2: PREVALENCE OF HYPERTENSION IN UTTARAKHAND (NFHS 4 & NFHS 5)

Hypertension Categories	Male %			Female %		
	Urban	Rural	Total	Urban	Rural	Total
NFHS-4						
Slightly above normal	15.1	12.3	13.4	8.1	6.8	7.3
Moderately high	4.3	2.6	3.3	1.9	1.4	1.6
Very High	0.9	0.8	0.8	1.1	0.7	0.8
NFHS-5						
Mildly elevated blood pressure	21.2	19.6	20.1	14.3	13.4	13.7
Moderately or severely elevated blood pressure	10.2	2.9	9.5	6.1	6.3	6.3
Elevated blood pressure	34.8	30.5	31.8	25.4	22	22.9

TABLE 3: PREVALENCE OF BLOOD SUGAR LEVEL IN POPULATION

Diabetes Categories	Male %			Female %		
	Urban	Rural	Total	Urban	Rural	Total
NFHS-4						
Blood sugar level- High	9.8	8.2	8.8	6.1	6.1	6.1
Blood Sugar Level: Very High	6	3.7	4.6	2.9	2.2	2.5
NFHS-5						
Blood sugar level- high	5.4	5.7	5.6	4.4	4.1	4.2
Blood Sugar Level: Very High	9.7	6.6	7.6	7.6	4.8	5.6
Blood Sugar Level: High/very high or taking medicine to control blood sugar level	16.3	13.3	14.3	14	9.6	10.8

Figures

FIGURE 1: OBESITY IN URBAN AND RURAL POPULATION OF STATE

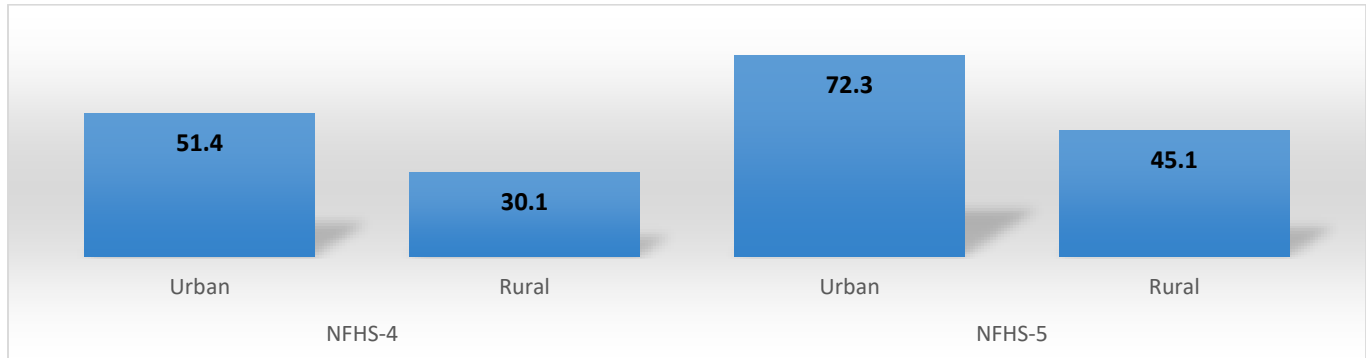


FIGURE 2: GENDER BASED PREVALENCE OF SLIGHTLY ABOVE NORMAL AND MODERATELY HIGH BLOOD PRESSURE

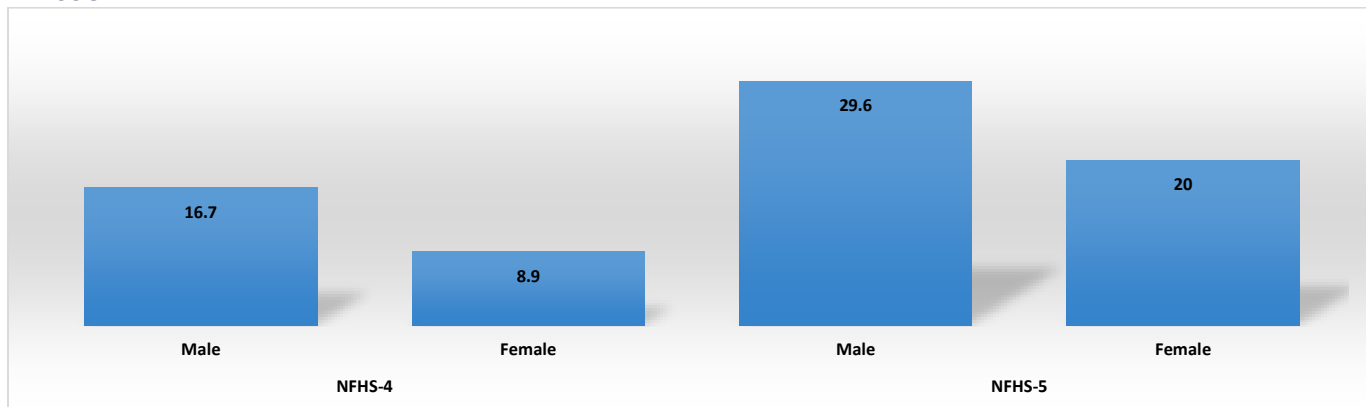


FIGURE 3: PREVALENCE OF HYPERTENSION IN URBAN AND RURAL POPULATION

