

## Nutritional Status of Adults in Himachal Pradesh

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### ABSTRACT

*Nutrition is a critical part of health and development. Adequately nourished individuals are more inventive and productive. India declares the first week of September to be National Nutrition Week and dedicates the entire month of September to campaigns and events centered on nutrition. This study aims to evaluate the nutritional condition of adult residents in Himachal Pradesh. Explain the food habits, level of physical exercise, and nutritional status in Himachal Pradesh. Secondary data is what we use. NFHS-4 will be the source of the secondary data extraction. For the purpose of data analysis, this study employs suitable statistics and the econometrics method. Himachal Pradesh is my field of study. Putting data or information on a table and processing it is called tabulating. In order to accomplish the study's goal, the data was evaluated utilizing a range of mathematical and statistical methods, including simple tabular data, percentages, and more. Health issues impact both affluent and low-income populations. People in high and moderate income groups are more likely to be obese, whereas those in low income groups are more likely to be undernourished. For children's growth and learning, as well as their present and future health, a healthy diet is essential. From an early age, adopting healthy eating and lifestyle habits can have a positive effect on people's nutrition and health as they grow older, as well as increase national and individual productivity. A comprehensive plan to increase food security and stop all types of malnutrition must include nutrition education as a key component. The best places to encourage healthy eating and living are schools, from early childhood education to secondary education.*

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### I. INTRODUCTION

Health and development are significantly impacted by nutrition. A reduced risk of non-communicable diseases like anemia, diabetes, and hypertension, as well as stronger immune systems, is associated with better diet. Sufficiently nourished people can generate new opportunities and are more productive. A serious risk to human health exists in India is malnutrition. Development has an equal impact on nutrition and nutrition on development. The nutrition status of adults and several disorders like hypertension, diabetes, and anemia are covered in this chapter.

#### Body Mass Index (BMI)

The adult nutritional status is indicated by the body mass index (BMI), which is calculated by dividing the individual's weight in kilograms by the square of their height in meters. For women, particularly well-educated women, under nutrition is more widespread in younger age groups and in rural areas. Due to under nutrition and being overweight, particularly in low- and middle-income nations, the globe has recently had to deal with a twin burden of malnutrition. Among adults, those living in cities, especially educated men, overweight and obesity are most common. 48% of children under five are stunted, and 43% are underweight. This represents nearly half of the kid population.

#### ANEMIA

Anemia is a disorder in which a person's blood's capacity to carry oxygen is decreased due to a lack of hemoglobin or red blood cells. In 2016, it was discovered that 50.4% of pregnant women, 53.2% of non-pregnant women, and 58.6% of children in India were anemic. In Himachal Pradesh, it is a serious health issue, especially for women and children. 39% of adults are overweight or obese, and a third of women who are of reproductive age are anemic. It is more common for children of anemic moms to also be anemic.

### Blood sugar

One million individuals die each year in India from diabetes mellitus, a chronic metabolic condition that causes elevated blood glucose levels and affects 65.1 million people. Urbanization, processed meals, smoking, drinking alcohol, refined carbohydrates, and a decline in physical activity are among the environmental and genetic variables that contribute to the epidemic. When fasting, normal blood sugar ranges from 4.0 to 5.4 mmol/L and can reach up to 7.8 mmol/L two hours after eating. Patients with diabetes are at risk for developing a number of illnesses and can suffer significant harm to their heart, blood vessels, retina, kidneys, and nerves. Diabetes and its consequences must be managed with early diagnosis and treatment.

### High blood pressure (BP)

In India, hypertension is the primary cause of 24% of fatalities from coronary heart disease and 57% of stroke deaths. High blood pressure is the third most important risk factor for the burden of illness. 20.6% of Indian men over 20.9% of Indian women had hypertension in 2005; the prevalence was greater in men between the ages of 15 and 49. Both genders' rates of hypertension tend to rise with age.

### OBJECTIVE

- To assess the nutritional status of adults in Himachal Pradesh.
- Describe dietary intake, physical activity and nutritional status in a Himachal Pradesh.

## II. REVIEW OF LITERATURE

Review of literature is a broad, comprehensive, systematic identification and summary of written materials that contain information on a related problem. Review of literature is an integral component of any study or research project. It inspires insight and enhances the depth of knowledge into the problem. An attempt has been made in this chapter to review the findings closely related to the present study to derive meaningful conclusions for the completion of the present study on a scientific basis.

**Humphries et al. (2016)** Examine obesity and overweight disorders as major public health issues in India's rural communities. In order to gather data for a cross-sectional study on nutrition, education, and standard BMI methodologies, a random sample of persons aged 20 to 80 years was chosen in 2013 and 2014. There were 14.9, 16.1, and 3.3 percent of overweight obesity and 22.7% of underweight obesity. Address risk factors at the societal level and concentrate on using education to promote positive behavior.

**Rengma et al.(2015)**Analyze how lifestyle, socioeconomic, and demographic factors affect the prevalence of adult obesity and overweight. The original data from Assam served as the basis for the cross-sectional study. ANOVA, chi-square analysis, and binary logistic regression were used to evaluate the data.

**Kamath et al. (2013)** found the spread of anemia among tribal women, aged 15 to 49 years in Udupital, UK, Udupi district, Karnataka. The study findings declared that in the sample of tribal women aged 15-49 years, the number affected by anemia was 55.9%. Among the subjects, 6 (3.5%) were severely anemic, 33 (19.4%) had moderate anemia and 56 (32.9%) were mildly anemic. Analyze how lifestyle, socioeconomic, and demographic factors affect the prevalence of adult obesity and overweight. The original data from Assam served as the basis for the cross-sectional study. ANOVA, chi-square analysis, and binary logistic regression were used to evaluate the data.

**Bhanushali et al. (2010)** examined that the main cause of Iron deficiency anemia is excessive loss of iron or demand for iron associated with menstruation and childbirth. Due to poverty, inadequate diet, pregnancy, lactation, poor educational level and poor access to health services, women become easy prey for anemia.

**Sandozi et al. (2010)** examined the effect of AMLODIPINE on blood sugar levels in hypertensive patients. In this study, patients were selected from Princess Ezra Hospital, Hyderabad. Statistical analysis shows a highly significant rise in blood sugar level with a 'P' value of < 0.001 after 2 and 4 weeks of using 2.5 to 5 mm (once daily) amlodipine. As calcium channels are involved in the release of insulin from the  $\beta$  cells of the pancreas, calcium channel blockers like amlodipine may cause hyperglycemia when used in hypertensive patients. Further studies are required in this field on a larger number of patients.

**Rajeev et al. (2010)** examine that there is no community-based study of the prevalence of hypertension in Himachal Pradesh. A population-based survey was done in three villages of Himachal Pradesh in different districts. A total of 1092 adult's  $\geq 18$  years of age were examined. 507 (46.42%) were males and 573 (52.47%) were females. 392 (35.89%) were found to have hypertension (39.8% of males and 33.15% in females). 267 had their blood pressure in the pre-hypertensive range (24.45%). Only 433 (39.6%) had their blood pressure in the normal range. 84 (21.98%) of 392 hypertensive persons were aware of their hypertensive status and only 17 of

these 84 (20.23%) had their blood pressure under control. One-fifth of hypertensive people were aware of their disease and only a fifth of these had their blood pressure under control.

**Gupta et al.(2020) examining the** health and nutritional status of hill farm women selected in Mandi District of Himachal Pradesh . The maximum selected sample size of women is aged at 25-35 years. All selected women belonged to farm families. Most women showed a deficiency of iron and B complex vitamins, less than 35% of women exhibited iron deficiency symptoms. The women of Mandi had low intake of all food groups except sugar and oil. Their diets were inadequate in energy , protein , calcium ,iron , B Vitamins and acerbic acid when compared with RDA.

**Zanvar et al.(2007)** In this article, the main focus is on assessing the growth and nutritional status of teenage girls in Marathwada. Urban girls were better in their anthropometric measurements than rural and tribal adolescent girls for this income factor is responsible. But in tribal areas, no significant differences were found. 17 % to 59% of adolescents girls were normal while the remaining suffering from under nutrition severe under nutrition decreased by 30.90% to 10.00% as income increases. Urban girls' haemoglobin value is normal in comparison to remaining girls.

**Bhardwaj et.al (2013)** examine the relationship between BMI and periodontal status among state government employees in Shimla HP. The study sample comprised of 1008 subjects aged 18-58 years.BMI is calculated by Quetelet index .Periodontal status using the community Periodontal Index. In this study, we used Binary Multiple Logistic regression analysis. BMI evaluation could be used in the assessment of periodontal risk.

### NUTRITIONAL STATUS OF ADULTS IN HIMACHAL PRADESH

#### District-wise Nutritional status of Adults (age15-49 years) in Himachal Pradesh.

District	Nutritional status of Adults(age15-49 years)							
	Women				Men			
	Normal#		Obese#		Normal#		Obese#	
	R	T	R	T	R	T	R	T
Kangra	19.3	18.8	27.7	28.2	18	18.1	21.6	20.5
Chamba	19.9	19.1	18.6	20.8	18.8	20.7	15.8	14.5
Bilaspur	15.9	15.7	27.7	28.4	18.4	19.5	18.2	17.9
Shimla	13.6	14.1	31.4	33.2	17.6	15	27.1	30.2
Hamirpur	13.5	13.6	30.4	30.9	13.8	14.2	30.5	31.5
Kinnaur	13.2	13.2	27.6	27.6	18.6	18.6	22	22
Sirmaur	21.8	19.3	23	25.2	20.5	19.1	21.5	27.6
Mandi	15.2	15.2	23.5	24	13.3	15.4	14.7	15.8
Solon	16.9	15.5	31.5	32.7	24.2	24.5	19.3	18.4
Lahaul&Spiti	9.6	9.6	23.4	23.4	8.2	8.2	19.4	19.4
Una	15.2	14.7	37.3	37.5	19.4	18.3	24.3	26.1
Kullu	13.3	13.4	25.7	26.7	15.7	14.6	20.2	20.6

**Note:-** # implies with Excludes pregnant women and women birth in the preceding 2 months, Normal# - Body Mass Index is below normal(BMI<18.5kg/m square), Obese# - overweight (BMI>=25.0kg/m square)(%), R implies Rural, U implies Urban, T implies Total.

Source :- by the Complied researcher from the state and national report of NFHS -4(2015-2016

This table shows the district-wise nutritional status of adults in all districts of HP (2015-16). BMI is below normal in Kangra women rural area 19.3, in total area percentage 18.8 and the men of Kangra Rural area 18 % and in the total area men's percentage is 18.1. The percentage of overweight women in Kangra Rural area is 27.7 % ,total area men percentage 28.2 and man in rural area 21.6% and Total area 20.5%. If we compare districts of HP, I found highest value of women normal BMI in Sirmour 19.3 % and lowest value in Lahaul – spiti rural and Total area 9.6%. 2015-16 data shows highest value of overweight women in Una. Now, the highest value of normal BMI of HP men in Solan Rural area is 24.2 % ,Total 24.5 % Lowest value in Lahaul&Spiti Rural 8.2 % , Total 8.2 % . The percentage of obese men in Hamirpur is 31.5 % and the lowest percentage of overweight men in rural areas is 14.7 and in total area 14.5 % .

**District-wise Anaemia among Children and Adults in Himachal Pradesh.**

District	% of Anemia among children & adults (2015-16)									
	Children		Women						Men	
			Non-Pregnant		Pregnant		All women			
	<11.0g/dl		<12.0g/dl		<11.0g/dl		%		<13.0g/dl	
	R	T	R	T	R	T	R	T	R	T
Kangra	48.2	47.3	61.9	60.2	48.7	46.9	61.4	59.7	20.6	20.5
Bilaspur	29	28.3	39.5	39.1	Na	38.1	39.4	39.1	11.3	10.7
Hamirpur	40.7	41.2	35.8	35.6	Na	Na	36	35.8	9.2	8.4
Shimla	74.3	70	72.1	69.1	Na	Na	71.7	68.7	36.7	30.6
Kinnaur	83.1	83.1	81	81	Na	Na	80.8	80.8	47.9	47.9
Sirmour	63.9	65.1	45.3	48.1	48.7	46.3	45.4	48	10.8	14.8
Mandi	35.1	37.8	37	39.7	41.6	42.2	37.1	39.8	13.7	16.3
Lahaul&Spiti	94.7	94.7	83.5	83.5	Na	Na	83.2	83.2	55.9	55.9
Solan	70	71.8	67.2	67.7	Na	62.4	66.7	67.5	28.1	27.6
Una	55.6	55.6	47.2	46.6	Na	Na	47.5	46.9	22.5	20.4
Kullu	56.3	54.9	62.8	60	48.3	47.7	62.3	59.5	17.5	16.1
Chamba	67	66.3	50	50.6	65.8	65.8	50	51.2	14.7	17

**Note:** R implies Rural, U implies Urban, T implies Total, Na implies Not available.

Source:- by the Compiled researcher from the state and national report of NFHS -4(2015-2016)

This table shows the 2015-16 percentage of Anemia in different districts of Himachal Pradesh . Highest anemia percentage of children in Lahaulspiti 94.7 in rural area and in total area 94.7 %.In case of non – pregnant women highest value in lahaul and spiti rural area 83.5 % and in total area 83.5 % and the lowest percentage in Hamirpur rural area is 35.8 and in total area 35.6 % . In pregnant women, highest percentage of anemia Chamba in rural areas is 65.8 % , Total area 65.8 % . In case of all women highest percentage of anemia Lahaulspiti 83.The lowest value, was rural 36 % , total of 35.8 % . Highest % of anemic men in Lahaul&spiti 55.9 and in total area 55.9 % Lowest percentage of anemia in Hamirpur in rural area 9.2% and in total area 8.4 % .

**DISTRICT- WISE BLOOD SUGAR LEVEL AMONG ADULTS(age 15-49) IN HIMACHAL PRADESH**

District	Blood Sugar level among Adults(age15-49 years) (2015-16)							
	Women				Men			
	High*		high\$		High*		high\$	
	R	T	R	T	R	T	R	T
Chamba	3.1	3.7	2.2	2.3	7.9	7.2	3.5	3.2
Kullu	3.4	3.8	1.5	1.9	5.2	6.7	2.8	3
Una	8.7	9	5.9	5.9	7.6	7.8	2.1	2.5
Solan	5.5	5.7	2.1	2.1	8.9	8.7	4.6	3.9
Lahaul&Spiti	2.7	2.7	1.2	1.2	2.9	3.6	1.1	1.7

Mandi	2.9	3.6	1.1	1.7	4.7	4	2.5	2.2
Sirmaur	5.6	6.5	2.8	2.9	4.7	5.7	2.3	3.2
Kinnaur	3.8	3.8	1.9	1.9	6.4	6.9	1.9	1.9
Hamirpur	6.1	5.8	3.3	3.1	7.7	7	4	3.6
Shimla	6.7	6.8	2.7	3.1	8.2	8.6	1.9	2.5
Kangra	7.5	7.3	4.2	4.1	7.6	6.9	1.3	1.2
Bilaspur	6.8	6.6	2.7	2.7	5.1	5.5	3.8	3.6

**Note:-** High\*-Blood sugar level -high (>140mg/dl)(%), high\$ -Blood sugar level-very high (>160mg/dl)(%),: R implies Rural,T implies Total

Source:- by the Complied researcher from the state and national report of NFHS -4(2015-2016).

This table shows district wise blood sugar level among adults in Himachal Pradesh . Highest value of women in rural area Una 8.7 % ,Total area kangra 7.3 % and lowest value in Lahaul and spiti Rural area 2.7 % , total area percentage 2.7. High \$ ( very high blood sugar level ) highest percentage in Una district women in rural areas 5.9 % , total 5.9 % . Lowest percentage in district Mandi in Rural area 1.1and lahaul –spiti 1.2 % . In case of men highest percentage in solan rural area 8.9 and in total area 8.7.

**District-wise Hypertension among Adults (age 15-49 years) in Himachal Pradesh.**

District	Hypertension among Adults (age 15-49 years) (2015-16)											
	Women						Men					
	Normal*		Moderately high		Very High@		Normal*		Moderately high		Very High@	
	R	T	R	T	R	T	R	T	R	T	R	T
Solan	8.4	8.4	1.7	1.7	0.7	0.9	14.8	13.7	4.7	1.7	0.7	0.9
Shimla	6.7	8.1	1	1.4	0.6	0.6	11.9	12.1	2.6	3	2.9	2
Hamirpur	11.6	11.9	2.5	2.5	1.2	1.1	24.6	24.6	6.8	6.2	2.8	3.3
Kinnaur	7	7	2.2	2.2	0.2	0.2	14.6	14.6	5	5	0.5	0.5
Sirmaur	9.7	9.5	1.8	2.0	0.8	1	17.9	19.8	4.8	4.5	0.8	0.8
Mandi	10.3	9.8	1.5	1.3	0.8	0.8	18	19.4	3.6	3.8	0	0.8
Lahaul&Spiti	8.5	8.5	1.4	1.4	0.4	0.4	12.2	12.2	6.2	6.2	0.7	0.7
Kangra		8.4		1.7	0.7	0.9	14.8	13.7	4.7	3.2	1.6	1.1
Una	9.6	9.5	2.4	2.9	1.4	1.3	19.3	19.4	4.6	4.1	0.5	1
Kullu	9.8	10.3	2.5	2.3	0.9	1	25.7	24.8	3.9	3.9	2.1	2.3
Bilaspur	9.3	9.2	2	1.9	1.2	1.3	20.3	19.1	2.2	2.8	0.8	0.7
Chamba	5	5.3	0.6	0.7	1.1	1	18.8	20.3	4.8	5.3	19.2	21

**Note:-** Normal\*- Slightly above normal (Systolic140-159mmof Hg and/or Diastolic 90-99mm of Hg)(%), High# - Moderately high (Systolic 160-179mmof Hg/or Diastolic 100-109mmof Hg)(%), Very High@ - Systolic >=180mmof hg and /or Diastolic >=110mmofHg)(%), Na implies Not available, R implies Rural, U implies Urban, T implies Total, Random measurement of Blood sugar level.

Source:- by the Complied researcher from the state and national report of NFHS -4(2015-2016)

This table shows district-wise hypertension among adults (age 15-49 years) in Himachal Pradesh. Percentage of Hypertension divided three categories such as Normal \*, High # and Very High @. Highest percentage in Normal hypertension women patients in Hamirpur district 11.9 and men patients in Kullu district 24.8 %. Highest percentage in Moderately high hypertension women patients in Una district 2.9 and men patients in Hamirpur and Lahaul -spiti district 6.2 %. Highest percentage in Very high @ hypertension women patients in Una and Bilaspur district 1.3 % and male patients in Chamba district 21 %.

Lowest percentage in Normal hypertension women patients in Chamba district 5% and men patients in Shimla district 12.1 %. Lowest percentage in Moderately high hypertension women patients in Chamba district 0.7 % and men patients in Solan district 1.7 %.Lowest percentage in Very high @ hypertension women patients in Kangra and Solan district 0.9 % and men patients in Solan 0.9%.

**III. CONCLUSION**

Health issues impact both affluent and low-income populations. People in high and moderate income groups are more likely to be obese, whereas those in low income groups are more likely to be undernourished. Adults can improve their nutritional status by diet education and lifestyle adjustment; if not, they will eventually develop lifestyle diseases as well. Undernourishment is prevalent among women, especially those with higher education, in rural areas and younger age groups. The majority of overweight and obese people are adults, live in cities, and are well-educated men. In India, anemia is a serious health issue, particularly for mothers and young children. When compared to other age groups, the 15–19 year old age group likewise had the highest levels of anemia. It can be seen from a comparison with other states that fewer females in Himachal Pradesh have anemia. During the girls' reproductive years, this issue will persist. Their poor health will cause them to give birth to underweight and anemic children. The growing diabetes epidemic has been attributed to environmental factors like fast urbanization, the availability of processed foods high in calories, the widespread use of alcohol and tobacco, high intake of refined carbohydrates, and significantly lowers levels of physical activity.

The third most significant risk factor for the associated burden of illness in India is high blood pressure (BP). From an early age, adopting healthy eating and lifestyle habits can have a positive effect on people's nutrition and health as they grow older, as well as increase national and individual productivity. In an overarching plan to increase food security and stop malnutrition in all its manifestations, nutrition education plays a significant role. Schools are the best places to encourage lifetime good food and lifestyle choices, from preschool to secondary education.

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