

MASTER OF PUBLIC HEALTH

**Johns Hopkins Bloomberg School of Public Health & IIHMR
University**

PRACTICUM REPORT

By

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Cohort-8
2020 - 2022

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TO WHOMSOEVER MAY CONCERN

This is to certify that Shubhra Bardhar, student of Master of Public Health Program offered by IIHMR University, Jaipur in cooperation with Johns Hopkins Bloomberg School of Public Health, Baltimore has undergone Practicum Training at NHM (National Health Mission), Rajasthan from 10/01/2022 to 31/03/2022

The Candidate has successfully carried out the study designated to her during practicum training and her approach to the study has been sincere, scientific, and analytical.

The Practicum Training is in fulfilment of the course requirements.

I wish her success in all her future endeavours.

Dr Anoop Khanna

Professor IIHMR University

IIHMR University, Jaipur,

CERTIFICATE BY SCHOLAR

This is to certify that the Practicum Project titled submitted by me, Shubhra Bardhar with Enrollment No.0048 under the supervision of Dr Anoop Khanna for award of Master of Public Health carried out during the period 10/01/2022 to 31/03/2022 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Dr Shubhra Bardhar
MPH Cohort 2020-2022

CERTIFICATE OF COMPLETION FROM THE ORGANIZATION

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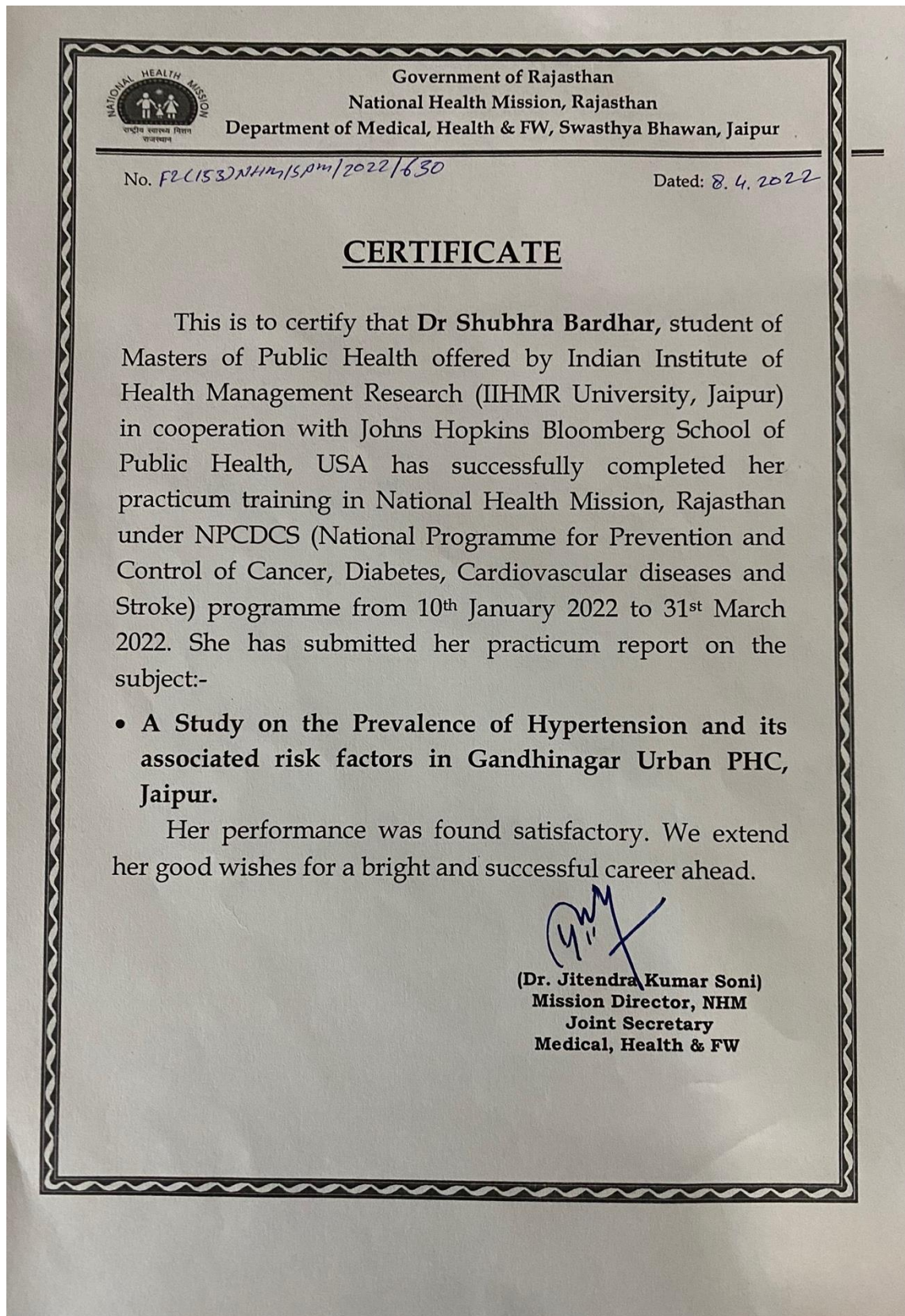
CERTIFICATE OF COMPLETION

This is to certify that **Dr Shubhra Bardhar** student of Masters of Public Health offered by **IIHMR University, Jaipur** in cooperation with Johns Hopkins Bloomberg School of Public Health, USA has successfully completed her practicum training in National Health Mission, Rajasthan under the NPCDCS(National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke) programme from **10th January 2022 to 31st March 2022**. She has submitted her practicum report on the subject: A Study on the Prevalence of Hypertension and its Associated Risk Factors in Gandhinagar Urban PHC, Jaipur.

(Dr. R.N. Meena)
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CERTIFICATE FROM THE ORGANIZATION



ABSTRACT

BACKGROUND

Hypertension (HTN) is considered as an important public health issue around the world. The prevalence of HTN is growing rapidly in countries in the developing phase. Hypertension is associated with the development of more serious medical conditions like myocardial infarction, cardiac failure, stroke, renal disease, etc. According to the WHO, high blood pressure affects 1280 million adults aged 30 to 79 years worldwide and almost two-thirds of them come from low-middle-income countries. A nationwide survey conducted by Ramakrishnan S et al in 24 states and UTs of India reported a high risk of hypertension in Indians. The study also concluded that almost one in every three Indian adults suffers from hypertension. Many other studies conducted in India have also reported a significant burden of hypertension.

METHOD

An Out-Patient-Department (OPD) based, Observational study was conducted among individuals aged 30 years or above at Gandhinagar UPHC of Jaipur city in the state of Rajasthan. Prevalence of Hypertension and prehypertension were analysed based on the NPCDCS criteria. The details regarding gender, age, family history of individuals and other behavioural characteristics like tobacco, smokeless tobacco and alcohol consumption, physical activity, and anthropometric measurements: height, weight were also collected. Blood Pressure was recorded, and BMI was calculated as per the reported height and weight. Microsoft Excel was used to collect the data and SPSS was utilized for analyzing the data. Chi-square tests were applied to analyze if a statistically significant association exist between hypertension and the above-mentioned factors.

RESULT

This study estimated hypertension prevalence as 23.2%. The prevalence of Prehypertension was estimated to be 33.2% and the prevalence of individuals with No-hypertension was 43.6%. This study also reports that Obesity, consumption of alcohol, smoking and positive HTN family history were significant determinants for hypertension.

ACKNOWLEDGEMENT

The practicum report was done under the guidance of Dr Anoop Khanna, Professor at IIHMR University, Jaipur, India and Dr R.N. Meena, State Nodal Officer at National Health Mission, Rajasthan, India.

First and foremost, I thank GOD Almighty who blessed me to complete this journey. As a teacher is considered next to God, I want to express my heartfelt gratitude to my mentor and professor Dr Anoop Khanna. He has guided, supported and helped me to enhance the quality of my work throughout my MPH journey. I would also like to thank my preceptor Dr R.N. Meena, National Health Mission, Rajasthan for his unstinted support and advice which helped me to complete this practicum report. A special thanks to the NHM Mission Director Dr Jitendra Kumar Soni for providing me with this learning platform for my practicum training. My heartfelt thanks to all patients who have been the subject of my research work and study and their family members they deserve the utmost respect for their untiring compliance. I would also like to acknowledge the constant support and encouragement given by my parents during my study which made my path smoother. A special thanks to my sister for her encouragement and endless support throughout the course.

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ABBREVIATIONS

“NHM: National Health Mission”

“NUHM: National Urban Health Mission”

“NRHM: National Rural Health Mission”

“NPCDCS: National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke”

“RMNCH+A: Reproductive, Maternal, Newborn Child and Adolescents Health”

UTs: Union Territories

HMIS: Health Management Information Systems

NCDs: Non-Communicable Diseases

MSG: Mission Steering Group

EPC: Empowered Programme Committee

SHM: State Health Mission

CCU: Cardiac Care Units

DALYs: Disability-adjusted life years

HMIC: High-Middle-Income Countries

LMIC: Low-Middle-Income Countries

WHO: World Health Organization

CVDs: Cardiovascular Diseases

HTN: Hypertension

OPD: Out Patient Department

UPHC: Urban Primary Health Centre

PHC: Primary Health Centre

BP: Blood Pressure

SBP: Systolic Blood Pressure

DBP: Diastolic Blood Pressure

BMI: Body-Mass-Index

NCD-RisC: NCD Risk Factor Collaboration

GBD: Global burden of disease

CA: Cancer

no. : Number

“MoHFW: Ministry of health and family welfare”

“SPSS: Statistical Package for Social Sciences”

ABOUT THE ORGANIZATION

The National Health Mission was initiated by the Indian government in the year 2013, combining the NRHM (started in the year 2005) and the NUHM (started in the year 2013).¹ The mission is implemented from the centre by the department of health and family welfare ministry.¹ The vision of NHM is the “Attainment of Universal Access to Equitable, Affordable and Quality health care services, accountable and responsive to people’s needs, with effective inter-sectoral convergent action to address the wider social determinants of health”.¹ NHM takes a decentralized health-system approach and aims to establish a nexus of public healthcare facilities, including health and wellness centres at the grass-roots level and district level hospitals with strong referring systems to provide citizens with a complete primary and secondary level medical care.¹ National Health Mission emphasizes the creation of knowledge hubs within district hospitals, improvement of service delivery, enhancement of secondary-level care at district hospitals, the expansion of out-reach services, advancement of community processes, communication for behaviour-change, human-resource development, public health governance, and HMIS.² The main programs in NHM include: “Reproductive, Maternal, Newborn Child and Adolescents Health (RMNCH+A) and Communicable and Non-communicable diseases (NCDs)”.²

At the national level, there are two panels namely the “MSG-mission steering group” and the “EPC-empowered programme committee”. The MSG provides policy guidance to Mission.² It is chaired by the Union-Minister of Health & Family Welfare.² The EPC is supervised by the Union-Secretary of Health & Family Welfare.² EPC examines all the financial proposals before seeking approval from MSG.² The Mission-Director heads the Mission and is of the cadre of Additional-Secretary.² A team constituted of Joint-Secretaries supports the Mission-Director.²

At the state level, the Mission is overseen by the SHM (State Health Mission) and is led by the Chief Minister.² The Mission's functions are carried out by the State Health Society (SHS), which is led by the Chief Secretary.²

To prevent and control the main NCDs, the MoHFW started the “National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke” in the year 2010.³ The program focuses on infrastructure strengthening, developing the human resource, health awareness, diagnosis at an early stage, management and referral system.³ The main effective implementation of the programme came when it was integrated under National Health Mission in 2013-14.³ Under the program NPCDCS, NCD units are set up at the National, State and District scale for proper functioning and supervision of the program. NCD-clinics are established at District and Community health centre levels, to provide diagnostic facilities for common NCDs followed by treatment and follow-up.³

NPCDCS at various government health centres provides supportive, promotive, preventive and curative services for diabetes, stroke, cardiovascular diseases and cancer.³ Primary care involves the prevention of diabetes and hypertension and a free screening of these diseases.² Secondary prevention involves providing medication and follow-up to prevent diseases like stroke and cardiovascular diseases.² This is linked with appropriate secondary and tertiary care providers via a two-way referral system.² At the district hospital level, cardiac care units (CCU) are established for the treatment of stroke, myocardial infarction, and other CVDs.² Diagnostic, treatment and facilities like dialysis are also made available at the district level for renal diseases. Screening facilities are provided for common carcinomas like CA cervix, CA breast and CA oral cavity.² Cancer care facilities are provided through the establishment of daycare centres for chemotherapy recommended by tertiary cancer hospitals in the identified districts.²

The emblem of NHM and NPCDCS:

FIGURE 1: NHM Emblem¹⁴



FIGURE 2: NPCDCS Emblem²⁷



COMPETENCY-BASED LEARNING OBJECTIVES FOR MPH PRACTICUM

PROJECT TITLE: A STUDY ON THE PREVALENCE OF HYPERTENSION AND ITS ASSOCIATED RISK - FACTORS IN GANDHINAGAR URBAN PHC, JAIPUR

ANALYTICAL SKILLS: High blood pressure or hypertension(HTN) is a lifestyle disorder that increases the risk of serious illnesses. Those suffering from hypertension may not be even aware of their condition as it can act as a silent disease, because sometimes at the early stages there can be no warning signs or symptoms. If left undiagnosed or untreated for an extended period, it may lead to the risk of stroke, cardiac attack, and other cardiovascular diseases. So, screening and determining its prevalence will help in the management of hypertension. In this study, we obtained the data from people aged 30 years or more at the Gandhinagar urban primary health centre. We determined hypertension and pre-hypertension prevalence and looked for the risk factors associated with hypertension.

COMMUNICATION SKILLS: Communication plays an essential role in any area of public health. Utilized my learned skills to communicate effectively with a variety of stakeholders. Communicated with the people with a questionnaire and collected their information like gender, age, particulars like behavioural habits such as alcohol consumption, smoking and physical activity, collected their anthropometric measurements like weight and height and measured blood pressure. Interacted with people and explained the purpose of the study to all the individuals involved.

COMMUNITY DIMENSIONS OF PRACTICE SKILLS: The NHM(National Health Mission) comes under the wing of the Indian government. As NHM aims to establish a community-owned decentralized health system it has to collaborate with many stakeholders like the community, local bodies and not for profit health organizations for pro-active involvement in the planning phase, the implementation phase, and monitoring of health activities.

PUBLIC HEALTH SCIENCES SKILLS: Utilized public health assessment tools to assess hypertension status in individuals aged 30 years or more visiting the Gandhinagar urban primary health centre outpatient department, Jaipur, Rajasthan.

INTRODUCTION

HYPERTENSION STATUS GLOBALLY

HTN is a pathological condition characterised by abnormally high arterial blood pressure.⁴ It is regarded as one of the major public health issues globally.⁵ The hypertension prevalence is increasing rapidly in countries in the developing phase.⁵ HTN is associated with the development of more serious medical conditions like myocardial infarction, cardiac failure, stroke, and renal disease.⁵ According to GBD-2015 hypertension led to 33.9 million DALYs and around 1.6 million deaths and so is considered a very important cause of mortality.⁶ In 2017, there were 208 million disability-adjusted life years attributed to hypertension worldwide.⁷ Over the last twenty years, the burden of hypertension has shifted from high-and-middle-income countries (HMIC) to low-and-middle-income-countries (LMIC), owing to a variety of factors including rapid urbanization, economic development, increasing elderly population, sedentary lifestyle, dietary changes, and an increase in the life expectancy.^{7,4} According to the WHO, hypertension affects 1280 million adults aged 30 to 79 years globally and almost two-thirds of them belong to low and middle income countries (LMIC).⁸

HYPERTENSION STATUS INDIA

The prevalence of HTN is worrisome in India and accounts for 10.8 % of all deaths in the country as per Kurjogi MM et al .⁵ It is a major determinant for increasing the burden of chronic disease in India.¹² There are around 207 million hypertensive people in India as per the Fourth District Level Household Survey.¹² According to a study by Ramakrishnan S et al, a nationwide survey was conducted in India's 24 states and UTs in the year 2015.⁹ In this study, blood pressure was recorded for 180,335 people and overall hypertension prevalence was found to be 30.7%.⁹ The study also concluded that almost one in every three Indian adults suffers from hypertension.⁹ Hypertension is related to 57% of strokes and 24% of deaths related to coronary artery (Anchala et al).¹⁰ As per the study by Prabhakaran D et al Indians are impacted by CVDs ten years earlier in their mid-life as compared to the European people.¹¹ Around 52% of total cardiovascular disease-related deaths occur below 70 years of age in India and this is comparatively very low (23%) for the western population.¹¹

A systematic review with meta-analysis was done for various studies conducted in different parts of India by Anchala et al.¹⁰ According to the study, the overall hypertension prevalence in India was 29.8%.¹⁰ The study also showed a difference in the prevalence of HTN, which was 27.6% in the rural population and 33.8% in the urban population.¹⁰ However, as a result of dietary and lifestyle changes, this gap is gradually narrowing down.¹⁰

There are very few studies conducted on hypertension prevalence in north India and especially in the state of Rajasthan. A study by Geldsetzer P et al found the prevalence of HTN to be 18.3% in the rural parts of Rajasthan and 26.1% in urban parts of Rajasthan.⁷ The study done by Godara R et al in the Barmer district of Rajasthan reported HTN & pre-HTN prevalence as 22.0% and 50.7% respectively.⁷ NPCDCS ("The national programme for the prevention and control of cancer, cardiovascular disease, diabetes, and stroke") primarily focus on HTN in individuals aged 30 or above.³ As a result, it's important to analyse the HTN prevalence as well as the risk factors linked to it in this age category. HTN is also recognised as a "silent killer" because sometimes it can exist without causing any symptoms or signs.⁸ According to the World Health Organization 46% of adults who have HTN are not aware of their condition.⁸ As people suffering from hypertension may be unaware of their condition, it could be left undiagnosed and untreated for a longer duration, which can further lead to serious medical conditions. Thereby, it is essential for adults aged 30 years or above to be screened for blood pressure. Also, Hypertension is a very common disorder that is generally observed in OPD. Therefore, in this study, an attempt has been made to estimate the prevalence and factors associated with HTN. The study is conducted amongst individuals who were aged 30 years or plus, who attended the Out-Patients-Department of the Gandhinagar urban PHC of Jaipur, Rajasthan India.

OBJECTIVES

- This study's primary objective is to understand the prevalence of hypertension and pre-hypertension in people aged 30 years and above, visiting the outpatient department at the Gandhinagar urban primary health centre (Jaipur, Rajasthan, India)
- The secondary objective is to identify the risk factors related to hypertension in the above-mentioned population

ETHICAL CONSIDERATION

The study received ethical approval from the National Health Mission, Rajasthan. An informed consent was also taken from every participant before starting to collect the data. The study's purpose and nature were clearly communicated to the participants. Confidentiality was assured to all the participants.

MATERIALS AND METHODS

An Out-Patients-Department (OPD) based, observational study was conducted among individuals who were aged 30 years or above and attended the Gandhinagar Urban PHC of Jaipur city in the state of Rajasthan. The data was collected for one month from 10 January 2022 to 9 February 2022. The information was taken using a structured questionnaire that included specific questions about the gender, age, medical and family history of individuals and behavioural characteristics like alcohol and tobacco consumption, smokeless tobacco consumption, physical activity, and anthropometric measurements: height and weight. Blood Pressure was recorded, and Body Mass Index was calculated.

In this study, individuals who were ≥ 30 years, who visited the OPD of Gandhinagar urban primary health centre within the timeframe of one month were included. Therefore, the study was comprised of 328 people.

Measurement

Height and weight: Standardized techniques and calibrated equipment were used to measure height and weight. A weighing-scale was utilized to record the weight to the nearest 0.5 kilograms. Before measuring height, the subject was asked to remove his/her shoes and socks. The height was then measured in a standing position.

Blood-pressure: The standardized BP measurement procedure was followed as per the guidelines of the MoHFW, Government of India.^{13,14} The screening of hypertension was done by a physician or trained non-physician staff at the PHC. Before starting blood pressure measurements, participants were seated comfortably in calm and quiet surroundings for a minimum of 5 minutes. For measuring the blood pressure, an appropriate-sized cuff was placed at the level of the heart on the subject's arm. Then the cuff on the arm was inflated to 30 mm Hg and above the pressure at which the radial pulse is not heard anymore. The cuff was then deflated gradually at a pace of approx 2-3 mm per second. The BP measured values were taken to the nearest 2 mm Hg. Two readings were taken with at least 10 to 15 minutes of an interval between them. A third measurement was done if the two BP readings varied by more than 10 mm Hg, and the average was taken for all three readings. SBP and DBP were identified using the first and last audible Korotkoff sounds, respectively.^{13,14} The pressure at which the sound was audible was recorded as SBP and the pressure at which the sound was no more audible was recorded as DBP.^{13,14}

Data analysis and formulas used

Blood Pressure

The National Health Mission (NPCDCS) criteria was used to diagnose hypertension & pre-hypertension:^{13,14}

- **“Hypertension:** Systolic Blood Pressure ≥ 140 mm Hg and or diastolic blood pressure ≥ 90 mm Hg”
- **Hypertension:** Also if taking medicines for high blood-pressure.
- **“Pre-Hypertension:** Systolic Blood Pressure ≥ 120 and ≤ 139 mm Hg and or diastolic blood pressure ≥ 80 and ≤ 89 mm Hg”

Calculation of Prevalence: Formulas used

$$\text{Hypertension Prevalence: } \frac{\text{Number of hypertensive subjects}}{\text{Total no. of study subjects}} \times 100$$

$$\text{Pre-hypertension Prevalence: } \frac{\text{Number of Pre-hypertensive subjects}}{\text{Total no. of study subjects}} \times 100$$

Body Mass Index¹⁴

“Body mass index (BMI) was calculated using the formula weight in kilograms divided by the square of the height in meters”.

“**BMI:** Weight(kg) / Height(m²)”

As per the National Health Mission (NPCDCS), obesity in Asian Indians is defined as BMI $\geq 25\text{Kg/m}^2$

Other Factors

When an individual had first and second-degree relatives (i.e., a parent, grandparent, or sibling) who had hypertension then they were considered to have a positive family history.

According to the National Health Mission, Physical activity was divided into two criteria: physical activity ≥ 150 minutes per week or ≤ 150 minutes per week.¹⁵

Tobacco is consumed in a variety of forms in India, individuals consuming cigarettes, bidi, and hookahs were classified as smokers.¹⁶ Chewing betel quid, gutka or any other form of chewing tobacco were classified as smokeless tobacco consumers.¹⁶ Also, it is difficult to measure the amount of tobacco consumed accurately so both former and current tobacco users were included in the study. Again accurate measurement of the amount of alcohol consumed was not considered. Participants who accepted to consume alcohol more than four times a month were described as consumers of alcohol.¹⁶

Alcohol consumption, Smoking, Smokeless tobacco consumption and family history of hypertension, all were divided into Yes and No categories.

Statistical Based Analysis

The data collection was done using “Microsoft-Excel”. “SPSS (Statistical Package for Social Sciences)” for Windows was utilized for the tabulation and analysis of the data. Chi-square tests were applied to statistically analyze if there is a significant association present between hypertension and its risk factors, The probability level of less than 0.05 (i, e: $P < 0.05$) was considered statistically significant.

RESULT

Characteristics of the Study Population

This study included 328 adults aged 30 years or more from Gandhinagar's urban primary health centre. Out of 328 individuals, 56.7% were males and 43.3% were females. Of the total population, 24.1% were in the age-group ≥ 60 , 29.9% were in the age-group 50-59 followed by 25.6% in the age-group 40-49 and 20.4% in the age-group 30-39. Among the total study population, 28.4% were obese ($BMI \geq 25\text{kg/m}^2$). A total of 31.7% of individuals consumed alcohol, 34.1% of individuals smoked and 16.5% consumed smokeless tobacco. 68.6% of people did physical activity ≤ 150 minutes/week. Family history of hypertension was present in 31.4% individuals of the total study population. (Characteristics shown in tables: 2, 3, 4, 5, 6, 7, 8, 9)

FIGURE 3: Population Distribution according to Age-group

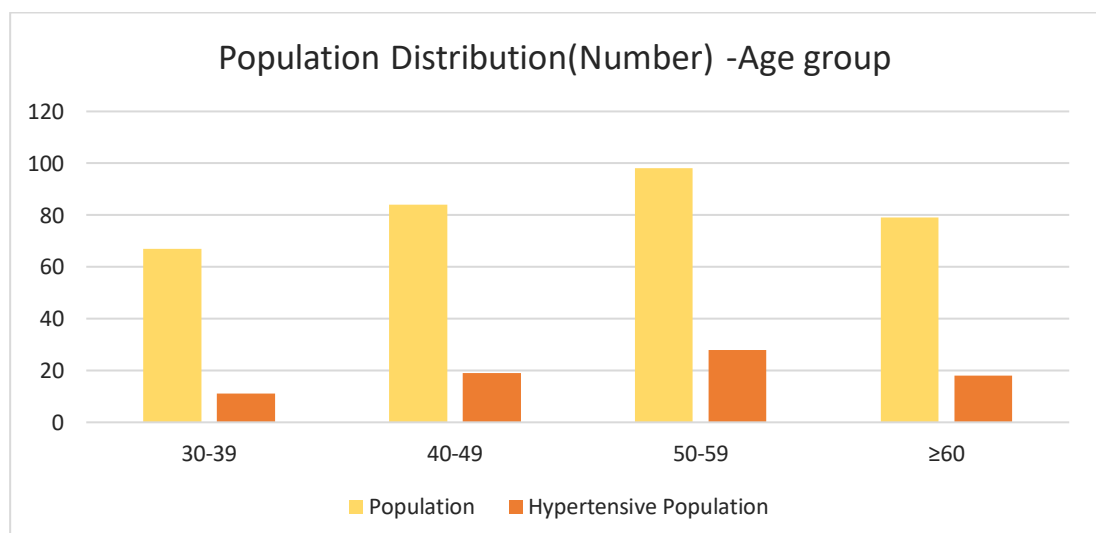
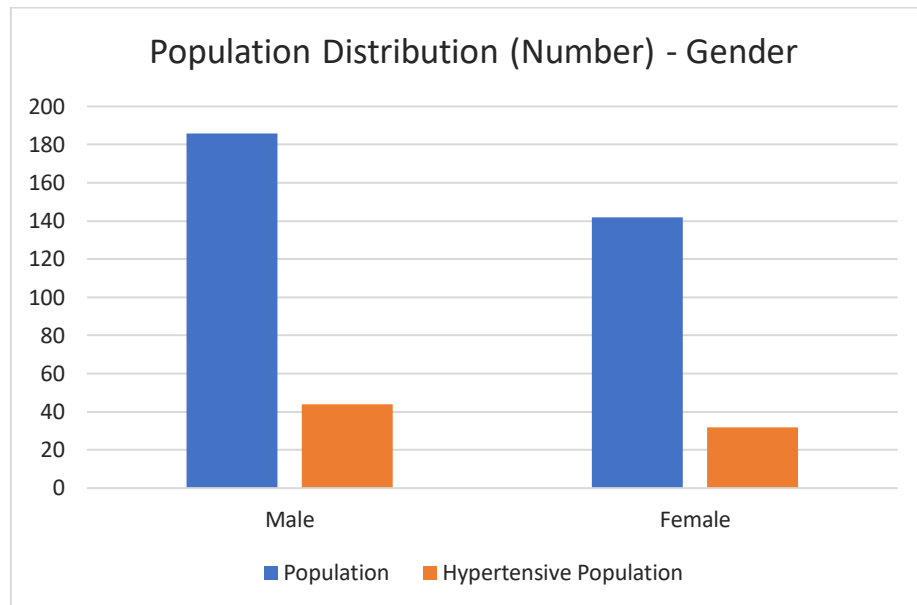


FIGURE 4: Population Distribution according to Gender**HTN and Pre-HTN Prevalence**

The prevalence of HTN in this study was estimated to be 23.2%. Prevalence was slightly higher in males (23.7%) compared to females (22.5%). The prevalence of Pre-HTN was estimated to be 33.2%. The prevalence of individuals with No-HTN was 43.6%. The prevalences are shown in table:1 and Figure:5.

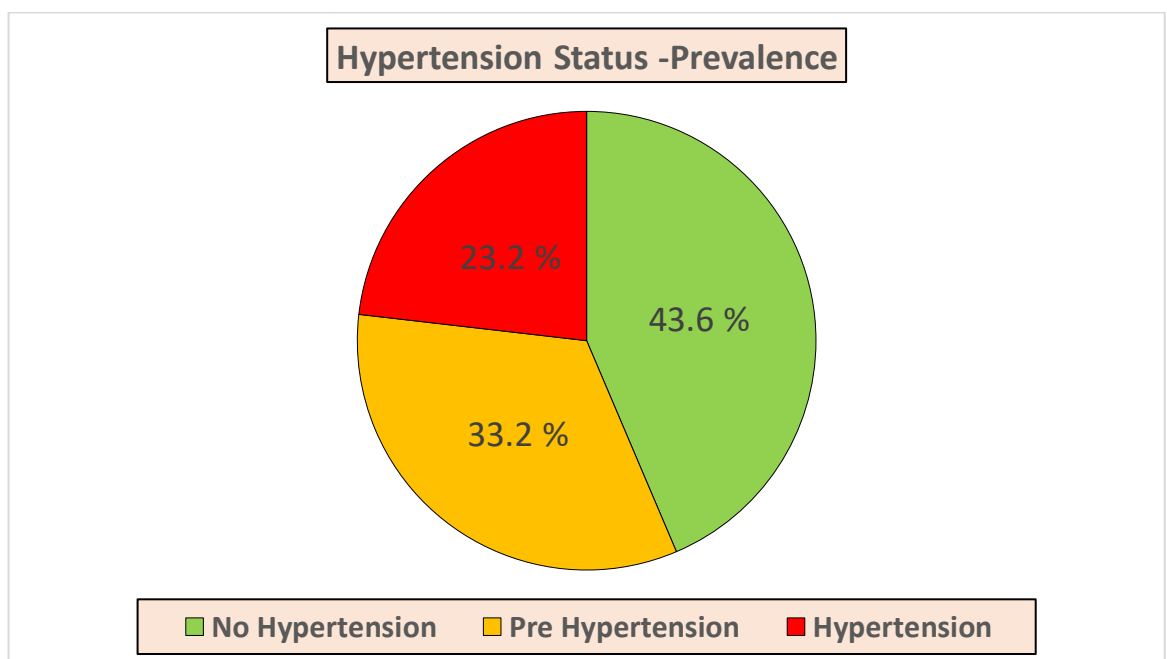
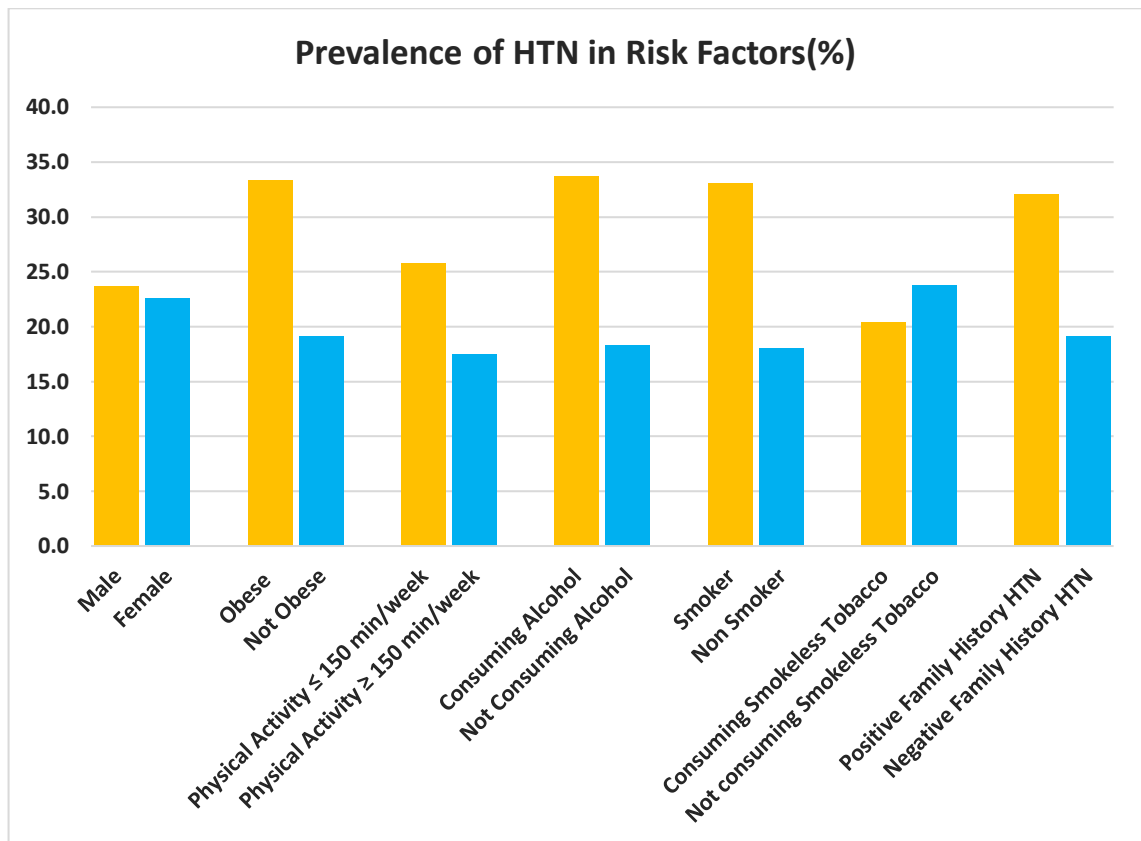
FIGURE 5: Prevalence of Hypertension, Pre-Hypertension and No-Hypertension

TABLE 1: Hypertension Status (Prevalence)

Hypertension Status	Males		Females		Total	
	Number	%	Number	%	Number	%
No Hypertension	85	45.7	58	40.8	143	43.6
Pre-Hypertension	57	30.6	52	36.6	109	33.2
Hypertension	44	23.7	32	22.5	76	23.2

Hypertension Prevalence in variables

The age-group with the highest HTN prevalence was 50-59 (28.6%) followed by 22.8% in individuals aged ≥ 60 , the prevalence of HTN was 22.6% in the age-group 40-49 and was lowest in the age-group 30-39 (16.4%) (shown in table:3). For the non-obese person, the prevalence of hypertension was 19.1% while in obese it was found to be 33.3% (shown in table:4 and figure:6). For individuals doing physical activity ≤ 150 minutes per week, the prevalence of HTN was 25.8%. While for individuals doing physical activity ≥ 150 minutes per week the prevalence of HTN was 17.5% (shown in table:6 and figure:6). In Alcohol consumers the prevalence of HTN was 33.7% and in non-alcohol consumers, the prevalence was 18.3% (shown in table:7 and figure:6). In Smokers, the prevalence of HTN was found to be 33% while in nonsmokers the prevalence was 18.1% (shown in table:8 and figure:6). Individuals consuming smokeless tobacco had HTN prevalence of 20.4% and individuals not consuming smokeless tobacco had HTN prevalence of 23.7% (shown in table:9 and figure:6). For individuals with a positive family-history of hypertension, the HTN prevalence was 32% and individuals with no family-history of hypertension had HTN prevalence of 19.1% (shown in table:5 and figure:6).

FIGURE 6: Hypertension Prevalence in Risk factors**TABLE 2: Hypertension Prevalence according to Gender and Hypertension association with Gender**

Gender	Number	(%)	HTN	(%)	χ^2	p-value
Male	186	56.7	44	23.7	0.057	0.812
Female	142	43.3	32	22.5		
Total	328	100.0	76	23.2		

TABLE 3: Hypertension Prevalence according to Age group and Hypertension association with Age group

Age Group	Number (%)		HTN (%)		x ²	p-value
30-39	67	20.4	11	16.4	3.343	0.342
40-49	84	25.6	19	22.6		
50-59	98	29.9	28	28.6		
≥60	79	24.1	18	22.8		
Total	328	100.0	76	23.2		

TABLE 4: Hypertension Prevalence according to BMI and Hypertension association with BMI

BMI	Number (%)		HTN (%)		x ²	p-value
Obese (≥25 Kg/m ²)	93	28.4	31	33.3	7.531	0.006
Not Obese (<25 Kg/m ²)	235	71.6	45	19.1		
Total	328	100.0	76	23.2		

TABLE 5: Hypertension Prevalence according to Family-History and Hypertension association with Family-History

Family History of HTN	Number (%)		HTN (%)		x ²	p-value
Present	103	31.4	33	32.0	6.633	0.010
Absent	225	68.6	43	19.1		
Total	328	100.0	76	23.2		

TABLE 6: Hypertension Prevalence according to Physical activity and Hypertension association with Physical activity

Physical Activity	Number	(%)	HTN	(%)	χ^2	p-value
≤ 150 min/week	225	68.6	58	25.8	2.736	0.098
≥ 150 min/week	103	31.4	18	17.5		
Total	328	100.0	76	23.2		

TABLE 7: Hypertension Prevalence according to Alcohol consumption and Hypertension association with Alcohol consumption

Alcohol Consumption	Number	(%)	HTN	(%)	χ^2	p-value
Yes	104	31.7	35	33.7	9.401	0.002
No	224	68.3	41	18.3		
Total	328	100.0	76	23.2		

TABLE 8: Hypertension Prevalence according to Smoking and Hypertension association with Smoking

Smoking	Number	(%)	HTN	(%)	χ^2	p-value
Yes	112	34.1	37	33.0	9.297	0.002
No	216	65.9	39	18.1		
Total	328	100.0	76	23.2		

TABLE 9: Hypertension Prevalence according to Smokeless-Tobacco Consumption and Hypertension association with Smokeless-Tobacco Consumption

Smokeless Tobacco Consumption	Number (%)		HTN (%)		χ^2	p-value
Yes	54	16.5	11	20.4	0.258	0.594
No	274	83.5	65	23.7		
Total	328	100.0	76	23.2		

Risk factors association with hypertension(HTN)

The HTN prevalence according to gender, age group, BMI, family history and behavioural factors like physical activity, alcohol consumption, smoking and smokeless tobacco consumption are given in tables:2,3,4,5,6,7,8,9 respectively. The study findings reveal that gender, age, physical activity, and smokeless tobacco consumption was not significantly associated with HTN (shown in tables:2,3,6 and 9). Alcohol consumption with p-value 0.002(table:7), smoking with p-value 0.002 (table:8), BMI with p-value 0.006(table:4) and family history with p-value 0.010(table:5) showed significant association with HTN.

DISCUSSION

According to the NCD Risk Factor Collaboration, From the year 1990 to 2019, the number of individuals with hypertension doubled.¹⁷ In 1990 there were 317 million males and 331 million females with hypertension but in the year 2020, the number of hypertensive males and females increased to 652 million and 626 million respectively.¹⁷ HTN is a major risk factor for many serious medical conditions such as stroke, diabetes, cardiac disease, and renal disease.⁵ Hypertension directly contributes to morbidity and mortality.⁵ As hypertension is a multi-factorial disease, thus research on its prevalence and related risk factors play a major part in its management. The HTN prevalence in our study was 23.2%. The result was closer to some studies like a study conducted in the Barmer district of Rajasthan stated that the prevalence was 22% for hypertension.⁷ Another study with a similar result was a cross sectional comparative research done in the urban and rural areas of Jaipur district by Kumar et al in which the hypertension prevalence was reported to be 24.25% in the urban area of Jaipur district.¹⁸ A study by Geldsetzer P et al reported the hypertension prevalence in the urban area of Rajasthan as 25.3%.⁷ There are also other studies that show a higher prevalence of HTN like a study done by Galav et al in the year 2013 at Udaipur, Rajasthan reported the hypertension prevalence as 32.67%.¹⁹ Anchala R et al reported that the hypertension overall prevalence was 29.8% in India.¹⁰ As the above-mentioned study considered Jaipur in west India the reported hypertension prevalence for urban western India was 35.8%.¹⁰ “The great India blood pressure survey” done by Ramakrishnan et al found the overall hypertension prevalence to be 30.7%.⁹

The findings of our study revealed that pre-hypertensive subjects contributed a significant proportion of the study participants, i.e. 32.3%. Even though pre-HTN is not considered in any category of disease, it is a reference used to identify individuals who are at higher risk of developing HTN. Therefore, pre-hypertensive people must be recommended to practise lifestyle changes to decrease their likelihood of developing hypertension in the coming years.

The study reported a slightly higher hypertension prevalence in males, higher prevalence in obese, in individuals doing physical activity ≤ 150 min/week, consuming alcohol, smoking and positive HTN family history. But the higher prevalence of male gender, obesity and physical activity ≤ 150 min/week were not statistically significant. This study reports that obesity ($\text{BMI} \geq 25 \text{ kg/m}^2$), alcohol consumption, smoking and family-history of HTN were significant risk determinants for HTN.

The study findings for obesity or high BMI were consistent with other studies like the research done by Gupta R et al observed that higher BMI was associated statistically with HTN in the urban residents of Jaipur.²⁰ Ghosh et al found that obesity/overweight was an important predictor of hypertension.²¹ Hossain et al study analysed the association between HTN and higher BMI in the population of South Asia and reported a positive association of high BMI with hypertension in India, Bangladesh, and Nepal.²²

The present study reports that hypertension was significantly associated with smoking. Most of the studies reported similar findings. Like smoking was observed to be a significant determinant of HTN in the research by Gupta R et al.²⁰ A systematic review by Devi P et al reported smoking as a common determinant for increasing the risk of hypertension.²³ However, Consuming smokeless tobacco was not associated significantly with HTN in this study.

Alcohol consumption was found to be statistically associated with HTN in this study. A similar result was present in research conducted by Kurjogi MM et al, where consumption of alcohol was recognized as a risk factor for HTN.⁵ On the other hand some studies reported alcohol consumption as not a significant factor like a study by Gupta R et al.²⁰ Many studies also reported the association based on dose, frequency and pattern of alcohol and smoking consumption. In this study, this was not considered and might have led to overreporting or underreporting/bias.

Family history was also associated significantly with HTN in our study. Kumar K et al conducted a study in the Jaipur district and found positive HTN family-history as a significant determinant of hypertension.¹⁸ Chandrasekhar Rao et al also reported positive HTN family-history as a risk factor of significance for HTN.²⁴ People with a family-history of HTN may be considered as a risk population for developing hypertension and therefore timely identification of these individuals may benefit as timely targeted intervention can be provided.

In many studies, the male gender showed significance with hypertension. Like in a study conducted in Barmer Rajasthan by Godara R et al men had significantly higher hypertension prevalence.⁷ Another study by Ghosh S et al also revealed a higher hypertension prevalence among the male sex.²¹ However, no such significant gender-wise trend is seen in this study.

This study also did not find the significance of age with hypertension, but many studies have noted a higher HTN prevalence with increasing age. Gupta R et al reported a statistically significant relation between hypertension with increasing age.²⁰ Study by Kumar DV et al reported statistical significance between increasing age and hypertension.²⁵

Physical activity ≤ 150 minutes/week did not show any significance. Some studies reported physical activity as significantly associated with hypertension like Gupta R et al and Laxman S et al.^{20,26} As the data for this was purely based on self-reporting and may have led to over or under-reporting and this could have been the reason for physical activity not showing significance with hypertension.

LIMITATIONS

The major limitation of this research was that a single day blood pressure measurement was considered for estimating the hypertension prevalence in the people. Also, the participants of the study were selected from the outpatient department of the Gandhinagar urban primary health centre and thus they may not represent the entire population of Jaipur. As single day measurements were considered there was no follow-up of the individuals involved in the study and this could have resulted in overestimation or underestimation of the HTN prevalence in the population. Another limitation is that the possibility of bias in self-reporting of lifestyle behaviour like smoking, alcohol consumption, and physical activity cannot be ruled out. The study also did not consider waist-hip ratio measurements, dietary factors like sodium intake, occupation, and stress level which could be contributory factors in the development of hypertension.

CONCLUSION

Overall, the results of this study show that the HTN & Pre-HTN prevalence was significant in the study-population of the Gandhinagar UPHC, Jaipur. This study also reports that obesity, alcohol consumption, smoking and positive family history were significant risk factors for hypertension. Studying the disease prevalence and its relationship with lifestyle behaviours provides the information needed to develop intervention strategies. In the absence of lifestyle changes, individuals referred to as prehypertensive are at high risk of developing HTN in the coming years which could pose major challenges in the future. Early detection and timely intervention will reduce the effect of high BP thus decreasing the risk of developing CVDs, stroke, and renal impairment. Therefore, special care should be provided to individuals with pre-hypertension to avoid its further progression. NPCDCS should also consider addressing this problem of pre-hypertension in their future action plans.

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