SUMMER INTERNSHIP REPORT

Lifestyle intervention to reduce the risk and prevalence of hypertension among urban poor of Delhi: Quasi-experimental study.

Implemented by IIHMR, Delhi supported by ICMR, DELHI

(18Th April 2022 to 17Th June 2022)

A REPORT ON

A comparative study on blood pressure and body mass index levels among regular physical activity and no regular physical activity group from the Southwest region of New Delhi.

By

Pooja Shankar

PGDM (Hospital and Health Management)

Batch 2021-2023

International Institute of Health Management and Research, New Delhi

ACKNOWLEDGEMENT

I take this opportunity to thank all the people that have joined together to make this project a success.

With immense pleasure, I would like to show my sincere thanks to **Dr.Sutapa B Neogi, Director IIHMR, Delhi** for bringing such a great project in the hands of budding professionals.

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I would like to thank **Dr. Manika Khajuria, Research Officer, IIHMR Delhi.** She made sure we completed each task with sincerity and was a constant support from day one. Her suggestions enlightened me on this subject.

And I would also like to thank my batchmates for contributing and maintaining the team ethics. All were unique at their work and provided different inputs which helped me to grow and learn.

It is my pleasure to thank all my subjects who participated in this study, without them this study would not have been possible.

I thank my family, and to the great God Almighty, who are my source of strength.

(Completion of summer internship from respective organization)

The certificate is awarded is to

Name: POOJA SHANKAR

In recognition of having successfully completed her

Internship in the department of Public health

Title : A COMPARATIVE STUDY OF BLOOD PRESSURE AND BODY MASS INDEX LEVELS IN REGULAR PHYSICAL ACTIVITY AND NO PHYSICAL ACTIVITY GROUP FROM SOUTHWEST REGION OF NEW DELHI.

And has successfully completed her project

Date:17 June 2022

Organisation: IIHMR, DELHI

She comes across as a committed, sincere & diligent person who has a strong drive & zeal for learning

We wish him/her all the best for future endeavours

Organization supervisor

Head- HR/Department Head

FEEDBACK FORM

(IIHMR MENTOR)

Name of the Student: POOJA SHANKAR

Summer Internship Institution: ICMR PROJECT BY IIHMR DELHI

Area of Summer Internship: URBAN POOR AREA OF DELHI
GOYLA VIHAR

Attendance: 100%

Objectives met: Yes

Deliverables:
- Visit at PHC Centre
- feild visit
- Anthropometric Measurements

Strengths:
- Good Communication skills
- Highly Patience, and Calm at Work

Suggestions for Improvement:
Need to Improve on
Self Confidence

Signature of the Officer-in-Charge (Internship)

Date: 16/06/2022
Place: Delhi

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FEEDBACK FORM

(Organization Supervisor)

Name of the Student: Pooja Shankar

Summer Internship Institution: IIHMR, Delhi

Area of Summer Internship: Goyla dairy

Attendance: 99.2%

Objectives met: Yes

Deliverables:
- Made survey tool (questionnaire) on kobotool box
- Data collection
- Anthropometric measurements
- Completion of Summer internship Report

Strengths:
- Good communication skills
- Dedication towards work
- Embraces changes in a positive way and exhibits excellent ability to acquire new skills.

Suggestions for Improvement:
- Showcased good efforts during training and keep doing the good work.

Signature of the Officer-in-Charge (Internship)

BSingh

Date: 7/7/22
Place:

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TABLE OF CONTENT

ABBREVIATIONS

SR. NO	ABBREVIATIONS	FULL FORM
1	ASHA	Accredited social health activist
2	PSU	Primary Survey Unit
3	ANM	Auxiliary Nurse midwifery
4	HTN	Hypertension
5	PA	Physical activity
6	WHR	Waist to hip ratio
7	BMI	Body mass index
8	SBP	Systolic blood pressure
9	DBP	Diastolic blood pressure
10	WHO	World health organization

ORGANIZATIONAL LEARNING

2.1 ORGANISATIONAL PROFILE:

ICMR DELHI:

In 1911, the Government of India set up the Indian Research Fund Association (IRFA) with the specific objective of sponsoring and coordinating medical research in the country. After independence, several critical changes were made in the organization and the activities of the IRFA. It was redesignated the Indian Council of Medical Research (ICMR) in 1949, expanded scope of functions. The Indian Council of Medical Research (ICMR), New Delhi, the apex body in India for the formulation, coordination, and promotion of biomedical research, is one of the oldest medical research bodies in the world.

VISION

Translating Research into Action for Improving the Health of the Population.

MISSION

- Generate, manage, and disseminate new knowledge.
- Increase focus on research on the health problems of the vulnerable, the disadvantaged and marginalized sections of society.
- Harness and encourage the use of modern biology tools in addressing health concerns of the country. Encourage innovations and translation related to diagnostics, treatment, methods/ vaccines for prevention.
- Inculcate a culture of research in academia, especially medical colleges, and other health research institutions by strengthening infrastructure and human resources.

IIHMR DELHI:

The International Institute of Health Management Research, New Delhi is part of the Society for Indian Institute of Health Management Research (IIHMR), which was established in October 1984 under the Societies Registration Act 1958.

CORE VALUES

- Quality
- Accountability
- Trust
- Transparency
- Sharing knowledge and information

MISSION

It is an institution dedicated to improvement in standards of health through better management of health care and related programs. It seeks to accomplish this through management research, training, consultation, and institutional networking in national and global perspective.

2.2 MODE OF DATA COLLECTION

Lifestyle Intervention to reduce the risk and prevalence of hypertension among urban poor of Delhi: Quasi-experimental study. In this study, an attempt is made to assess whether environmental or lifestyle (smoking, excess alcohol, urban living, psychological stress, reduced physical activity, unhealthy diet, excess salt intake, overweight and obesity etc.) factor are associated with high blood pressure in urban poor living.

Study Participants:

Study population were males and females aged 15 years and above at the time of baseline survey.

Eligibility Criteria:

1. Inclusion criteria: -

- All men and women aged 15 years and above
- Residents of the study area for the past year and intend to stay for at least the next year.
- Those who provided informed consent.
- Study participants would also include service providers – ASHA, ANM, Medical Officer and other PHC (Primary Health Centers) staff.

2. Exclusion Criteria: -

- Pregnant women
- All participants who were undergoing treatment for any disease other than Cardio-vascular disorders
- Those who did not provide consent for the study.

Study Design:

We adopted Quasi-experimental study design which was used to analyze the situation by comparing before and after intervention results among the study and control group.

The population of Goyala Vihar, Delhi was taken for the study and area under 8 ASHA will be studied while we studied the area under PSU-1 served by 1 ASHA worker. The questionnaire was added to KOBO collect mobile application for android devices. The app was used for data collection. There were 98 individual and 11 household questions to collect the data on PA, diet pattern, stress, tobacco, and general identification data. Anthropometric measurements were also taken like BP, Pulse rate, Wt., Ht, Waist circumference, Hip circumference and WHR. The protocols were followed as per the training given to us. Door to door survey of 1 PSU which had 450 houses under ASHA Kavita Sharma was performed. It took 20 days to complete the area.

GENERAL FINDING

3.1 OBSERVATIONAL LEARNING AND CONCLUSIVE LEARNING -

Observations of the community:

1. The area was well facilitated by public toilets under ‘Swachh Bharat Mission.’ Also, the area had Mohalla clinic for accessible and affordable treatment along with a private hospital nearby.
2. The people were happy and satisfied with the clinic and the doctor providing care at the clinic. However most complained of long waiting hours.
3. Most of the households had only borewell water facility, and without proper sewer system.
4. There was no open park for walking or other recreational activities. This forces many people to be restricted to theirs home especially women.
5. Women empowerment, health education is needed.
6. Anganwadi was well functional and workers had to timely report to the authority about food, children's health through digital app which enhanced their connectivity.
7. Smoking and tobacco consumption was prevalent among male.
8. The area had many milk diaries which were inaccessible due to safety issues.

Strength and gap analysis:

STRENGTH	GAP ANALYSIS
The doctor at Mohalla Clinic was appreciated by most of the people in the community for her care and services. Most of the people are humble, and supportive of each other. They were cordial and cooperative during the survey. Many people are willing to change their lifestyle but need proper information and support about the same. Spending time in the community gave us different learnings and it was a valuable experience overall.	The area requires a proper draining system. While most households have televisions, mobile phones and smart phones; it can be used for sharing information and providing knowledge on their health. The work done by ASHA workers can be digitalized for efficient work. Dairy farm workers are vulnerable and require health education. Lack of public park or open spaces discourages women and children to perform PA.

PROJECT REPORT

A COMPARATIVE STUDY ON BLOOD PRESSURE AND BMI LEVELS AMONG REGULAR PHYSICAL ACTIVITY AND NO REGULAR PHYSICAL ACTIVITY GROUP FROM SOUTHWEST REGION OF NEW DELHI.

ABSTRACT:

Background: The burden of Hypertension and cardiovascular diseases are enormous with over a billion people affected by hypertension. Modifiable risk factors such as lifestyle changes, including regular physical activity and reducing body weight have been shown to significantly reduce blood pressure levels and hypertension rates.

Aim: To compare blood pressure and BMI levels among individuals who perform regular PA in a week and those who do not perform PA in a week from southwest region of New Delhi.

Methodology: Convenient sampling was done and 196 individuals of ages 18 –64 were included in the study. Informed consent was taken from all the participants. A semi structured questionnaire was used to collect data on sociodemographic variables, type of PA performed (Vigorous or moderate), no of days of activity, time spent in the activity. BP was measured under standard protocols; height was weight was measured for calculating BMI. Data was collected on KOBO collect android application and analyzed on MS excel.

Results: A total of 94 participants performed regular PA (Time spent in a week on PA >=150 Min) and the remaining 102 performed No PA (No time spent in a week on PA). It was observed that there is no significant difference ($p<0.05$) in the means of the systolic BP (P value= 1.74) and BMI (0.23) of the two groups. However, there is a significant difference in the means of the diastolic BP (P value = 0.000301) of the two groups.

Conclusion: A significant difference in the diastolic blood pressure was seen among the two groups. Previous studies have indicated that regular physical activity has beneficial health effects and is known to avert hypertension, reduce blood pressure levels and other cardiovascular diseases compared to individuals who do not engage in physical activity.

Keywords: Physical activity, Hypertension, BMI

INTRODUCTION

Hypertension (HTN) or the" Silent Killer" affects over a billion people worldwide. The number of adults with HTN has nearly doubled from 594 million in 1975 to 1.13 billion in 2015 with a significant increase seen in low- and middle-income countries. An estimated 46% of adults are unaware that they have HTN[1]. Most of the cardiovascular complications such as cerebrovascular accidents e.g., stroke, chronic renal failure etc. occur silently and often results in premature deaths worldwide[2]

Smoking, physical inactivity and abnormal BMI are the risk factors that are strongly associated to deterioration in overall health status and are among the most important modifiable risk factors for chronic disease and premature death[3].

The WHO guidelines on PA recommends that adults between ages 18 to 64 should engage in regular PA and should do at least 150– 300 minutes of moderate-intensity aerobic PA; or at least 75–150 minutes of vigorous intensity aerobic PA; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week, for substantial health benefits[4]

Moderate- intensity physical activity **Requires a moderate amount of efforts and accelerates the heart rate.**	**Vigorous-intensity Physical activity** **Requires a large amount of efforts with rapid breathing and substantial increase in heart rate.**
• Brisk walking • Dancing • Gardening • House work and domestic chores • Water aerobics • Bicycling slower than 10 miles per hour • General building tasks (roofing, thatching, painting) • Traditional hunting and gathering • Active involvement in games/ sports with children/ walking domestic animals • Carrying/ moving moderate loads (<20kg)	• Race walking, jogging, or running • Fast swimming • Aerobics • Fast Bicycling • Walking/ climbing briskly up a hill • Jumping rope • Heavy gardening (continuous digging) • Hiking uphill or with a heavy backpack • Competitive sports and games (traditional games, football, volleyball, hockey, basketball) • Digging ditches • Carrying /shifting heavy loads (>20 kg)

RATIONALE

As per the WHO data, 1 in 4 adults do not meet recommended levels of PA on a global scale. Up to 5 million deaths could be averted per year only if people were more active. Global estimates of physical inactivity indicate that in 2016, 27.5% of adults did not meet the 2010 WHO recommendations and trend data show limited global improvement during the past decade[4]

In adults, physical activity confers benefits for the following health outcomes: improved all-cause mortality, cardiovascular disease mortality, incident hypertension, incident site-specific cancers, incident type-2 diabetes, mental health (reduced symptoms of anxiety and depression); cognitive health, and sleep; measures of adiposity may also improve. (Who)

Evidence reaffirmed an inverse relationship between physical activity and incident hypertension among adults with normal blood pressure, and that physical activity reduces blood pressure among adults with prehypertension and normal blood pressure.

India is facing a huge challenge of increasing burden of NCDs (Non-Communicable Disease) because of rapid epidemiological transition. Almost 10% of all deaths and 4.6% of all disability-adjusted life years in India can be attributed to hypertension. Several modifiable risk factors are a causative factor for HTN but Modifications of these lifestyle risk factors, such as increased exercise levels and lower body weight, have been shown to significantly decrease BP levels and hypertension rate

Regular aerobic exercises can reduce the systolic blood pressure average of 4 mmHg and diastolic BP by an average of 2.5 mmHg (MOHFW)

This study was conducted with the purpose of assessing the level of physical activity performed by the study population and comparing their BP and BMI levels in order to understand the difference between

OBJECTIVES

General Objective:

To compare the BP and BMI levels among adults who perform regular PA with those who do not perform regular PA.

Specific objective:

1. To assess the type of PA and the time spent in PA among adults
2. To assess the level of blood pressure among those who perform PA >= 150 min per week (moderate PA) and those who do not perform PA in a week.
3. To assess the BMI range of individuals who perform PA>=150 min per week and those who do not perform PA in a week.
4. To compare the findings of the two groups.

HYPOTHESIS

Null Hypothesis H_0: There is no significant difference in the BP and BMI levels of the regular PA group and No regular PA group

Alternate Hypothesis H_1: There is a significant difference in the blood pressure and the BMI levels of the regular PA group and No regular PA group.

METHODOLOGY

Study Design: A Cross-Sectional Study

Study Setting: The study was conducted in an urban poor community of approximately 450 households served by an ASHA worker in the Southwest region of New Delhi (Goyala Vihar)

Study Population: Individuals residing in streets 3, 3C, 4, 4A, 4B, 4C, 4D, 4E, 5, 6 under PSU 1 served by 1 ASHA (Mrs. Kavita Sharma).

Sampling Technique: Convenient sampling technique was carried out for the study based on feasibility and accessibility to collect maximum information from the participants.

Eligibility Criteria:

Inclusion Criteria:

1. Males and Females between 18-64 years of age.

Exclusion Criteria:

1. Pregnancy
2. Disabilities
3. Individuals who perform irregular PA (<150 min of PA per week)
4. Individuals who did not give consent

Sample size: 196 individuals who gave informed consent were included in the study.

Study Duration: April'2022 to June'2022

Method of Data collection and Analysis:

1. Household data and individual data were collected and entered KoboCollect android application, containing a structured questionnaire (11 household questions, 98 individual questions).

2. The questionnaire included close-ended questions related to demographic details, diet, stress, PA, alcohol, and tobacco intake along with anthropometric measurements considering the guidelines by WHO and NFHS-5.

3. The data was analyzed using an independent t test on both groups.

4. Anthropometric measurements taken were: Blood pressure was measured using digital apparatus in a sitting and relaxed position. Three readings were taken and the average was calculated.

Individuals were interviewed regarding their current level of PA, and the type of PA performed. The number of days and minutes exercised was used to assess if they met the WHO recommended guidelines on PA

REVIEW OF LITERATURE

1. **Kini S, Kamath VG, Kulkarni MM, Kamath A, Shivalli S (2016) Pre-Hypertension among Young Adults (20–30 Years) in Coastal Villages of Udupi District in Southern India: An Alarming Scenario:** A community based cross sectional study was conducted in 6 coastal villages of Udupi Taluk Karnataka, India to assess the magnitude and factors associated with prehypertension among young adults of ages 20-30 years. 1152 young adults were selected by stratified random sampling methods for the study. A semi structured pre tested questionnaire was used to collect sociodemographic data. Anthropometric measurement and blood pressure were collected and serum cholesterol was measured in sub sample to the study populations. Multivariate logistic regression was applied to identify the independent factors that correlate to prehypertension. The prevalence was found out at 45.2%. Important findings from the multivariate logistic regression analysis revealed that age group of 25–30 years (adj OR: 4.25, 95% CI: 2.99–6.05), pre-obese (adj OR: 1.66, 95% CI: 1.03–2.67) and obese (adj OR: 9.16, 95% CI: 2.54, 36.4), using refined cooking oil (adj OR: 0.53, 95% CI: 0.29–0.95), extra salt in meals (adj OR: 2.46, 95% CI: 1.52–3.99), salty food items (adj OR: 6.99, 95% CI: 3.63–13.48) were the significant correlates of pre-hypertension.

2. **Hadgraft NT, Winkler E, Climie RE, et al. Effects of sedentary behavior interventions on biomarkers of cardiometabolic risk in adults: Systematic review with meta-analyses, Br J Sports Med Epub (2020)**: A systematic review with meta-analysis was performed using six electronic databases for sedentary behavior interventions in adults and 15 biomarker outcomes were evaluated. All the participants were of ages 18 and above. The study was performed to reduce sedentary behavior alone or combined with an increase in PA. Non clinical populations from North America, Europe and Australia comprised much of the evidence base. Individuals who received interventions between 2 weeks and < 6 months showed small significant effects on waist circumference, body fat %, SBP, insulin and high-density lipoprotein cholesterol.

3. **Lee Min-I, Shiroma E, Lobelo F et.al Effect of physical inactivity on major non communicable diseases worldwide: an analysis of burden of disease and life expectancy (Lancet 2012):** The study was conducted to estimate how much of the non-communicable diseases could be prevented/ averted if the inactive population became active. It also tried to estimate how much life expectancy would increase in the population. Electronic databases like Medline and embase was searched. Population attributable fraction (PAF) was calculated for each outcome by country. The prevalence of inactivity in population with coronary heart disease was found to be 35.2% (22.3-40.5). Among these the people who eventually developed the outcome was 42.2% (23.0-56.2). For coronary heart disease, median PAFs (Population Attributable Fraction) associated with physical inactivity, calculated with adjusted RRs, ranged from 3·2% (in southeast Asia) to 7·8% (in the eastern Mediterranean region), with an overall median of 6%. These results suggest that 6% of the burden of disease worldwide due to coronary heart disease can be eliminated if all inactive people become active. The burden of disease was 7% for type 2 diabetes (ranging from 3·9% to 9·6%), 10% (5·6–14·1) for breast cancer, and 10% (5·7–13·8) for colon cancer. Removal of physical inactivity had the largest effect on colon cancer, and the smallest on coronary heart disease, in terms of percentage reduction. However, with respect to the number

of cases that can potentially be averted, coronary heart disease would have a far larger effect etc. than colon cancer because of its higher incidence.

4. **Ekelund U, Steene-Johannessen J et al. Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonized meta-analysis of data from more than 1 million men and women. Lancet. 2016 Sep 24:** A systematic review on six databases (PubMed, PsycINFO, Embase, Web of Science, Sport Discus, and Scopus) was performed for prospective cohort studies that had individual level exposure and outcome data. Daily sitting and physical activity time; reported effect estimates for all-cause mortality, cardiovascular disease mortality, or breast, colon, and colorectal cancer mortality was searched. Data from 16 studies was included. 13 studies including 1,005,791 provided data on sitting time and all-cause mortality. These individuals were followed up for 2–18·1 years, during which 84,609 (8·4%) died. Compared with the referent group (i.e., those sitting <4 h/day and in the most active quartile [>35·5 MET-h per week]), mortality rates during follow-up were 12–59% higher in the two lowest quartiles of physical activity (from HR=1·12, 95% CI 1·08–1·16, for the second lowest quartile of physical activity [<16 MET-h per week] and sitting <4 h/day; to HR=1·59, 1·52–1·66, for the lowest quartile of physical activity [<2·5 MET-h per week] and sitting >8 h/day). Compared with the referent (<4 h of sitting per day and highest quartile of physical activity [>35·5 MET-h per week]), there was no increased risk of mortality during follow-up in those who sat for more than 8 h/day but who also reported >35·5 MET-h per week of activity (HR=1·04; 95% CI 0·99–1·10). By contrast, those who sat the least (<4 h/day) and were in the lowest activity quartile (<2·5 MET-h per week) had a significantly increased risk of dying during follow-up (HR=1·27, 95% CI 1·22–1·31).

5. **Singh RB, Fedacko J, et al; Prevalence and risk factors for prehypertension and hypertension in five Indian cities. Acta Cardiol. 2011 Feb:** A Cross sectional survey screened 6940 subjects over 25 years of age. There were 5 cities included in the study, namely Kolkata (n=900), Nagpur (n=894), Mumbai (n=1542), Thiruvananthapuram (n=1602), Moradabad (n=2002). Prehypertension criteria was BP 130-139/85-89 mm

of Hg and for hypertension BP >= 140/90 mm of Hg based on European Society of Cardiology criteria. The study found that prevalence of prehypertension and hypertension was significantly greater in Thiruvananthapuram, Mumbai, Moradabad, Kolkata, respectively. Multivariable logistic regression analysis revealed strong positive associations of hypertension with age, central obesity, BMI, sedentary lifestyle, salt and alcohol intake and oral contraceptive usage (W). Fruit, vegetable, and legume intake showed inverse associations, tobacco intake showed none. One in four with hypertension was aware of their diagnosis and of those receiving treatment, one in three had well-controlled hypertension.

RESULTS

A total of 196 eligible adults of ages 18-64 participated in the study. Table 1 shows the key findings of the study population like mean age of the group, mean age of males, mean age of females. Among the total number of participants 48% performed regular PA (n=95). These participants were part of the regular PA group who performed weekly >=150 min of PA and met the WHO recommended guidelines for adults of age 18-64. The second group included participants who did not perform any PA during the week. 52% (n=101) of participants did not meet the WHO recommended guidelines. Figure 1 represents the % of individuals in the two study groups. The findings of the 2 groups are mentioned in Table 2. Independent T test assuming unequal variances was performed and the p value was calculated to find the difference in the means of the different variables for the two groups.

Table 1.	Males (n=76)	Females (n=120)	Total
Regular PA	42	53	95
No PA	34	67	101
Mean Age of Regular PA group	37.76	38.22	38.3
Mean Age of No PA group	45.38	40.64	42

Table 2.
T test: Two sample

	Systolic		Diastolic		BMI	
	Regular PA	No PA	Regular PA	No PA	Regular PA	No PA
Mean	118.0106	127.9069	77.58511	81.19706	24.5817	25.01327
Observations	94	102	94	102	94	101

Hypothesis Mean	0		0		0	
p value	1.74E-06		0.000301		0.231402	
	H0 Accepted		H0 Rejected		H0 Accepted	

Table 2 shows that the difference in the means for the systolic BP, and BMI was insignificant I.e., P value is >0.05 among the two groups. Hence, we accept the null hypothesis in these two cases.

It was found that for diastolic BP the p value is <0.05, hence we reject the null hypothesis and conclude that the observed difference between the mean diastolic BP of the exercising and non-exercising group is statistically significant.

DISCUSSION

Our study included 196 participants among which 94 came under the regular PA group and the remaining 102 came under No PA group. Independent T test was performed for statistical analyses and results obtained showed that the diastolic BP was significantly different among the two groups (P<0.05). Hypertension's prevalence has increased over the decades with poor control rates, and severe health outcomes. Randomized control trials and other clinical studies have indicated that increase in PA decreases BP and lowers the risk of developing HTN {Nwankwo T, Yoon SS, Burt V, Gu Q. Hypertension among adults in the United States: National Health and Nutrition Examination Survey, 2011–2012. NCHS Data Brief. 2013 Oct. (133):1–8.}. In the case of HTN, PA and regular exercise have become cornerstone lifestyle therapy for preventive, treatment, and control purposes. A study performed by Xuemei Sui, Mark A. Sarzynski et.al. On Longitudinal patterns of cardiorespiratory fitness predict the development of hypertension among men and women concluded that the cardiorespiratory

fitness pattern was associated with lower odds of HTN in the baseline category. The findings also indicate that early changes and implementation of physical activity can prevent HTN. Another study conducted by Steven N. Blair et al. On Physical fitness and all- cause mortality showed lower mortality rates in higher fitness categories, this delayed all-cause mortality due to lowered rates of cardiovascular disease and cancer. A reduction of 5mm of Hg in the DBP over a period of 5 years can reduce incidences of stroke and coronary heart disease by 34% and 21% respectively. A study conducted on over 600 men and women reported lower daytime BP of 8/4 mm of Hg in men and 9/5 mm of Hg in women who had high- moderate level of fitness when compared to low fitness individual's BP. The national health portal of India also suggests that all forms of physical activity can provide health benefits if undertaken regularly. These advantages outweigh potential harm (from accidents) for all ages.

The SBP and BMI variables showed insignificant difference in the two groups. These could be due to several limitations of this study which should be considered when interpreting the results.

RECOMMENDATION

1. Prehypertensive individuals could be included in a similar study to check the effect of PA on averting hypertension.
2. The PSU we collected data from lacks parks or open spaces. Many people are limited to PA due to this reason, especially women.
3. Few women are motivated to performing regular PA but they do not have enough space or dedicated time among other household responsibilities. There is an opportunity to

educate the community on effect of regular PA on both men and women and encourage regular activity outside of work and chores for both sexes.

4. IEC (Information Education and Communication) material on healthy lifestyle habits and benefits of implementation can be provided to individuals and families.
5. To increase awareness of national guidelines for physical activity and sedentary behavior. Educate and encourage use of free sources/ materials to implement positive lifestyle changes towards physical activity as a preventive/ treatment measure to HTN.

LIMITATION

1. Self-reporting on type of PA performed and time spent in the activity could result in some under and/or over reporting by the individuals.
2. A small sample size of 196 participants with only ~38% male participants.
3. There could be confounders.

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ANNEXURE

Consent Form:

क्तिगत सर्वेक्षण के लिए परिचय और सूचित सहमति

नमस्ते। मेरा नाम है _____। मैं इंटरनेशनल इंस्टीट्यूट ऑफ हेल्थ मैनेजमेंट (आईआईएचएमआर दिल्ली) के साथ काम कर रहा/रही हूं। इस सर्वेक्षण में भाग लेने के लिए आपको यादृच्छिक रूप से चुना गया है और इसलिए हम आपका साक्षात्कार करना चाहते हैं। यह एक सरकार / भारतीय चिकित्सा अनुसंधान परिषद (आईसीएमआर) द्वारा समर्थित अध्ययन है जो इंटरनेशनल इंस्टीट्यूट फॉर हेल्थ मैनेजमेंट रिसर्च (IIHMR), दिल्ली के द्वारा संचालित किया जा रहा है। अध्ययन का शीर्षक है " दिल्ली के शहरी गरीबों के बीच उच्च रक्तचाप के ख़तरे और संभवता को कम करने के लिए जीवनशैली में बदलाव: अर्ध-प्रायोगिक अध्ययन"।

हम यह निर्धारित करने की कोशिश कर रहे हैं कि क्या पर्यावरण या जीवन शैली (धूम्रपान, अधिक शराब, शहरी जीवन, मनोवैज्ञानिक तनाव, कम शारीरिक गतिविधि, अस्वास्थ्यकर आहार, अधिक नमक का सेवन, अधिक वजन और मोटापा आदि) कारक शहरी गरीब जीवन में उच्च रक्तचाप से जुड़े हैं ? आपके द्वारा प्रदान की जाने वाली जानकारी से हितधारकों को उच्च रक्तचाप को रोकने और नियंत्रित करने के लिए स्वास्थ्य सेवाओं की योजना बनाने में मदद मिलेगी।

साक्षात्कार में लगभग 20-25 मिनट का समय लगेगा। मैं आपसे इसके बारे में प्रश्न पूछूँगी:

कुछ व्यक्तिगत/ निजी जानकारी
आहार और शारीरिक गतिविधि सहित आपकी जीवनशैली की गतिविधियाँ जो आप आम तौर पर करते हैं
आपके द्वारा अनुभव की गई कोई भी स्वास्थ्य समस्या और आपके द्वारा प्राप्त किया गया उपचार
आप जिन स्वास्थ्य देखभाल केंद्रों का उपयोग करते हैं और उन्होंने आपकी आवश्यकताओं के प्रति कितनी अच्छी प्रतिक्रिया दी है।

आपके द्वारा प्रदान की जाने वाली जानकारी पूरी तरह से गोपनीय है और किसी को भी इसका खुलासा नहीं किया जाएगा। इसका उपयोग केवल अनुसंधान उद्देश्यों के लिए किया जाएगा। आपका नाम, पता और अन्य व्यक्तिगत जानकारी प्रश्नावली से हटा दी जाएगी, और आपकी पहचान किए बिना आपके नाम और आपके उत्तरों को जोड़ने के लिए केवल एक कोड का उपयोग किया जाएगा। सर्वेक्षण टीम आपसे फिर से तभी संपर्क कर सकती है जब सर्वेक्षण की जानकारी को पूरा करना आवश्यक हो।

सर्वेक्षण में भागीदारी आपकी इच्छा है। अगर मैं आपसे कोई प्रश्न पूछती हूं जिसका आप उत्तर नहीं देना चाहते हैं, तो बस मुझे बताएं और मैं अगले प्रश्न पर जाऊंगी या आप किसी भी समय साक्षात्कार को रोक सकते हैं।

इसके अलावा, यदि आप सहमति देते हैं, तो हम आपका रक्तचाप, वजन और कमर का घेरा मापेंगे। हम आपकी अनुमति के बिना इस साक्षात्कार को रिकॉर्ड नहीं करेंगे और न ही कोई फोटो खींचेंगे।

यदि इस सर्वेक्षण के बारे में आपके कोई प्रश्न हैं तो आप मुझसे पूछ सकते हैं
(किसी भी प्रश्न का उत्तर दें और उत्तरदाता की चिंताओं को संबोधित करें)

यदि इस सर्वेक्षण के बारे में आपके कोई और प्रश्न हैं तो आप इस कार्ड पर सूचीबद्ध व्यक्ति से संपर्क कर सकते हैं
(संपर्क जानकारी के साथ कार्ड दें)

क्या आप इस सर्वेक्षण में भाग लेने के लिए सहमत हैं? इस सहमति पर हस्ताक्षर करना दर्शाता है कि आप समझते हैं कि आपसे क्या अपेक्षा की जाएगी और आप इस सर्वेक्षण में भाग लेने के इच्छुक हैं।

उत्तरदाता द्वारा पढ़ा गया [ ] साक्षात्कारकर्ता द्वारा पढ़ा गया [ ]

माना [ ] मना कर दिया [ ]

उत्तरदाता _____

साक्षात्कारकर्ता _____
नाम: _____
तारीख _____

यदि उत्तरदाता सहमत है तो साक्षात्कार शुरू करें

यदि उत्तरदाता इनकार करता है, तो उत्तरदाता को धन्यवाद दें और साक्षात्कार समाप्त करें।

रिकॉर्ड समय घंटे .....
मिनट .....

Questionnaire:

	गतिविधियाँ अपने काम के हिस्से के रूप में करते हैं?		
4.3	आप एक सामान्य दिन में अपने काम पर जोरदार-तीव्रता वाली गतिविधियों को करने में कितना समय व्यतीत करते हैं?	.....। घंटा .....। मिनट	
2 शारीरिक गतिविधि : मनोरंजनात्मक (कार्य और परिवहन को छोड़कर)			
4.4	क्या आप एक सप्ताह में कोई खेल/फिटनेस/मनोरंजक शारीरिक गतिविधि करते हैं? [संकेत: तेज चलना (तेज चलना), सीढ़ियाँ चढ़ना, टहलना, साइकिल चलाना, नृत्य करना, खेल-कूद करना और खेल खेलना, योग करना, मध्यम भार उठाना (<20 किलोग्राम), आदि]	हां .....। 1 नहीं 2	
4.5	आप किस प्रकार के खेल/फिटनेस/मनोरंजक गतिविधि करते हैं?	जोरदार-तीव्रता वाली गतिविधियाँ जो सांस लेने या हृदय गति में बड़ी वृद्धि का कारण बनती हैं जैसे [दौड़ना या फुटबॉल]... 1 मध्यम-तीव्रता वाली गतिविधियाँ जो सांस लेने या हृदय गति में थोड़ी वृद्धि का कारण बनती हैं जैसे तेज चलना, [साइकिल चलाना, तैरना, बीचबॉल]... .. 2	
4.6	एक सामान्य सप्ताह में, आप कितने दिन खेलकूद, फिटनेस या मनोरंजक (अवकाश) गतिविधियाँ करते हैं?	..... दिन	
4.7	आप एक सामान्य दिन में लगातार कितना समय खेल, फिटनेस या मनोरंजक (अवकाश) गतिविधियों में लगाते हैं?	.....। घंटा .....। मिनट	
4.8	क्या आप एक हफ्ते में वॉर्मिंग अप या योगा एक्टिविटी करते हैं?	हर दिन ..... 1 किसी दिन ..... 2 बिलकुल नहीं 3	
4.9	**क्या आप सप्ताह में कम से कम 150 मिनट के लिए कोई शारीरिक गतिविधि करते हैं?**	हफ्ते में कम से कम 150 मिनट ..... 1 एक हफ्ते में 150 मिनट से भी कम ..... 2 बिलकुल नहीं 3	
2. शारीरिक गतिविधि: गतिहीन व्यवहार सोने को छोड़कर (काम पर बैठना या झुकना, घर पर रहना, स्थानों से आना-जाना, या दोस्तों के साथ डेस्क पर बैठना, दोस्तों के साथ बैठना, कार, बस, ट्रेन में यात्रा करना, , पढ़ना, ताश खेलना , या टेलीविजन देखना)			
4.10	आप आमतौर पर एक सामान्य दिन में बैठने या लेटने में कितना समय लगाते हैं?	.....। घंटा .....। मिनट	

4. शारीरिक गतिविधि : कार्य संबंधित			
4.1	आपका काम कितना शारीरिक रूप से मांगलिक है? **[संकेत: तीव्र गतिविधियाँ** : वे जो तेजी से सांस लेने का कारण बनती हैं जैसे दौड़ना, एक पहाड़ी पर तेज चलना, भारी भार उठाना, भारी फावड़ा चलाना, खाई खोदना, तेज तैराकी और प्रतियोगी खेल **मध्यम गतिविधियां:** सांसों को थोड़ा तेज करना जैसे तेज चलना, बागवानी, नृत्य, घर के काम, खेल में शामिल होना, निर्माण कार्य, भार ढोना]	जोरदार या तीव्र गतिविधियाँ हैं ..... 1 गतिहीन या मध्यम गतिविधियाँ हैं 2	
4.2	एक सामान्य सप्ताह में, आप कितने दिनों में जोरदार- तीव्रता वाली	..... दिन	