SUMMER INTERNSHIP REPORT

Under 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 of anthropometric characteristics and blood pressure between pre and post-menopausal women in poor urban area of Goyala vihar, Delhi

By

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ACKNOWLEDGEMENT

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And I would also like to thank my other batchmates for contributing beautifully and maintaining the team ethics. All were unique and creative and best at the work which helped me to grow in such positive environment.

Above all, to the great Almighty, the author of knowledge and wisdom, for his countless love.

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ABBREVIATIONS

S.NO.	ABBREVIATIONS	FULL FORM
1.	**ASHA**	Accredited social health activist
2.	**BP , SBP AND DBP**	Blood pressure, Systolic blood pressure and diastolic blood pressure
3.	**Wt**	Weight
4.	**Ht**	Height
5.	**WHR**	Waist hip ratio
6.	**CVD**	Cardiovascular disease
7.	**BMI**	Body mass index
8.	**HTN**	Hypertension
9.	**MAP**	Mean arterial pressure
10.	**CVF**	Cardiovascular failure
11.	**WC**	Waist circumference
12.	**HC**	Hip circumference

OBSERVATIONAL LEARNING

2.1 ORGANISATIONAL PROFILE:

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 important changes were made in the organisation and the activities of the IRFA. It was redesignated the Indian Council of Medical Research (ICMR) in 1949, considerably 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. The Council's research priorities coincide with the National health priorities such as control and management of communicable diseases, fertility control, maternal and child health, control of nutritional disorders, developing alternative strategies for health care delivery, containment within safety limits of environmental and occupational health problems; research on major non-communicable diseases like cancer, cardiovascular diseases, blindness, diabetes, hypertension and other metabolic and haematological disorders; mental health research and drug research (including traditional remedies). All these efforts are undertaken with a view to reduce the total burden of disease and to promote health and well-being of the population.

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 the 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 resource.

ABOUT DIRECTOR ICMR

"Nothing has such power to broaden the mind as the ability to investigate systematically and truly all that comes under thy observation in life.

Professor Balram Bhargava, Secretary, Department of Health Research, (Ministry of Health & Family Welfare), Government of India and Director General, Indian Council of Medical Research (ICMR) joined on 16th April, 2018. Prof. Bhargava is Professor of Cardiology at All India Institute of Medical Sciences (AIIMS), New Delhi and also serves as the Executive Director for Stanford India Biodesign Centre, School of International Biodesign (SiB). Professor (Dr) Balram Bhargava is an outstanding cardiologist, one of the foremost leaders in biomedical innovation, public health, medical education and medical research.

MAJOR ACTIVITIES OF ICMR

Network of 26 Institutes
Clinical Trial Registry India (CTRI)
National Cancer Registry Programme
Surveillance Networks (IDSP, Rotavirus, Polio, Antimicrobial Resistance etc.)

Nutrition

Provides Inputs for Policy Implementation

Provides Guidelines/Regulations

Isolation/characterization of new pathogens

Research support to medical colleges all over the country

Capacity building

ICMR LAST 3YRS OF CONTINOUS EXCELLENCE

Successful Outbreak/ Epidemic Investigation & Mitigation: COVID-19, Nipah, Zika; CDV in Gir Lions

- **Mission Mode Projects & Successful Demonstration projects in eliminable disease**: Establishment of MERA (Malaria Elimination Research Alliance) India & India Tuberculosis Research Consortium. Successful demonstration of CCMP &Mandla in Malaria Elimination; Triple Drug Therapy for Filariasis; Vaishali Model for Kala Azar; MIP in Leprosy.

- **National Prevalence & Sero-surveillance Surveys**: COVID-19, Tuberculosis, Dengue, Chikungunya, Diptheria, Rotavirus, Antimicrobial Resistance, Diabetes, Hypertension, Stroke, Cancer.

- **Affordable Technologies: Diagnostics**: TrueNAT for Covid-19, Nipah, Tuberculosis & Leptospirosis; COVID Kawach ELISA, Crimean-Congo haemorrhagic fever (CCHF) Sheep and Goat, Crimean Congo haemorrhagic fever (CCHF) in Cattle, Japanese Encephalitis virus (JEV) from Mosquito, Magnivisualizer. Vaccines: Covaxin for COVID-19; Shigella Vaccine; JENVAC for JE

- **Digital Interventions in Tackling NCDs**: Mission DELHI for heart attack, Mobile Stroke Unit in NE for stroke

- **Policy Interventions**: White paper on ENDS; Recommended Dietary Allowances; Bioethics & Stem Cell Guidelines.

- **Research Support to Ayushman Bharat**: Standard Treatment Workflows; Health Technology Assessment; National list of Essential Diagnostics, medicines & assistive technologies.

- **Infrastructure Development**: NIIH-Centre for Research, Management and Control of Haemolglobinopathies, Chandrapur; Centre for One Health, Nagpur; Regional Medical Research Centre, Gorakhpur; Samrat Ashok Tropical Disease Research Centre at RMRI, Patna; a field station at Keylong in Lahaul&Spiti district of Himachal Pradesh; NIN- Tata Centre of Excellence in Public Health Nutrition, Eco-friendly building of National Institute for Research in Environmental Health, Bhopal

ICMR CREATING HISTORY AND DOING ALL TO SERVE THE NATION

Indian Express (14th June 2022)

Managing type 1 diabetes

For the first time, the ICMR has issued guidelines on this rarer form of the disease, also called childhood diabetes. How is type 1 different from type 2, who is at risk, and what do the guidelines say on managing it?

ANONNA DUTT
NEW DELHI, JUNE 13

LAST WEEK, the Indian Council of Medical Research (ICMR) released guidelines for the diagnosis, treatment, and management for type-1 diabetes. This is the first time the ICMR has issued guidelines specifically for type 1 diabetes, which is rarer than type 2 — only 2% of all hospital cases of diabetes in the country are type 1 — but which is being diagnosed more frequently in recent years.

"Today, more and more children are being diagnosed with type 1 diabetes in our country. This may be because the actual prevalence of the disorder is going up in India. It may also reflect better awareness and therefore, improved diagnosis of type 1 diabetes. Finally, it could be that children are surviving more due to early diagnosis and better treatment," the guidelines said.

India is considered the diabetes capital of the world, and the pandemic disproportionately affected those living with the disease. Type 1 or childhood diabetes, however, is less talked about, although it can turn fatal without proper insulin therapy.

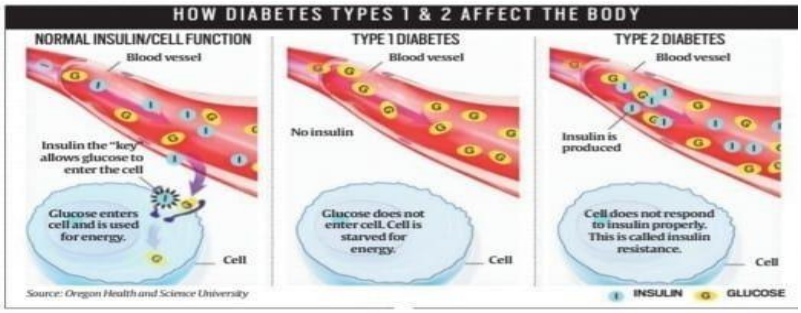
So, what is type 1 diabetes?

Type 1 diabetes is a condition where the pancreas completely stops producing insulin, the hormone responsible for controlling the level of glucose in blood by increasing or decreasing absorption to the liver, fat, and other cells of the body. This is unlike type 2 diabetes — which accounts for over 90% of all diabetes cases in the country — where the body's insulin production either goes down or the cells become resistant to the insulin.

"Type 1 diabetes is predominantly diagnosed in children and adolescents. Although the prevalence is less, it is much more severe than type 2. Unlike type 2 diabetes where the body produces some insulin and which can be managed using various pills, if a person with type 1 diabetes stops taking their insulin, they die within weeks. The body produces zero insulin," said Dr V Mohan, chairman of Dr Mohan's Diabetes Specialities Centre, and one of the authors of the guidelines.

"Before insulin was discovered 101 years ago, these children would die within months after diagnosis. Now, with better insulin and various innovations, they are living longer. My oldest patient with type 1 diabetes is now 90; he was diagnosed when he was 16," he said.

Children with the condition usually present to the hospital with severe symptoms of frequent urination, and extreme thirst, and nearly a third of them have diabetic ketoacidosis (a serious condition where the body has a high concentration of ketones, a molecule produced when the body isn't able to absorb glucose for energy and starts breaking down fats instead).



How rare is it?

There are over 10 lakh children and adolescents living with type 1 diabetes in the world, with India accounting for the highest numbers. Of the 2.5 lakh people living with type 1 diabetes in India, 90,000 to 1 lakh are under the age of 14 years. For context, the total number of people in India living with diabetes was 7.7 crore in 2019, according to the Diabetes Atlas of the International Diabetes Federation.

The guidelines, which distinguish type 1 diabetes from other less common forms, also talk about how increasing incidence of type 2 diabetes due to obesity in the younger population can lead to confusion. Among individuals who develop diabetes under the age of 25 years, 25.3% have type 2.

Who is at risk of type 1 diabetes?

The exact cause of type 1 diabetes is unknown, but it is thought to be an auto-immune condition where the body's immune system destroys the islets cells on the pancreas that produce insulin.

Genetic factors play a role in determining whether a person will get type-1 diabetes. The risk of the disease in a child is 3% when the mother has it, 5% when the father has it, and 8% when a sibling has it.

The presence of certain genes is also strongly associated with the disease. For example, the prevalence of genes called DR3-DQ2 and DR4-DQ8 is 30–40% in patients with type 1 diabetes as compared to 2.4% in the general population, according to the guidelines.

What are the guidelines?

Running into 173 pages, they have been developed by leading diabetologists including Dr Nikhil Tandon, head of the department of endocrinology at the All India Institute of Medical Sciences (AIIMS), New Delhi. "There were several guidelines from international agencies. However, these are the first truly Indian guidelines which look at everything from diagnosis, treatment, and management of type 1 diabetes. It gives detailed guidelines on managing the disease in different conditions such as when one is pregnant or when one is travelling," said Dr V Mohan.

The guidelines provide details on diet and exercise, insulin monitoring, and prevention and treatment of complications such as retinopathy, kidney disease, and nerve disease. Dr said the guidelines would hopefully act as a ready-reference book for all practicing physicians to improve care for children diagnosed and those living with the condition.

A similar guidebook for type 2 diabetes already exists.

How has treatment of type 1 diabetes evolved over the years?

The discovery of insulin helped children with the condition survive, Dr Mohan said, "but they still have to keep pricking themselves to deliver insulin through their life. Researche
are now looking for a cure and there are som
encouraging results from a stem cell therap
to increase islets cells".

"Every child in the world should get insuli
it is essential medicine. In India, half the peo
ple can afford it, and the other half can get it fr
free at most government hospitals. It cost
about Rs 5,000 per month," he said.

Dr Mohan said continuous glucose mon
toring devices and artificial pancreas hav
started to become available, although these ar
initial reports and it might take a few years fo
these to become available as treatment:
"Continuous glucose monitoring devices ca
help monitor the blood glucose levels through
out 24-hour with the help of a sensor. The a
tificial pancreas go a step further and alon
with monitoring the levels they can automat
ically deliver the insulin when needed," he sai

The guidelines state, "Cost consideration
remain an issue in India. Thanks to bette
management, diabetic ketoacidosis is becom
ing less common, although in rural areas, an
in peripheral centres, it still remains a bi
problem."

The guidelines also acknowledge moder
glucometers. Urine glucose monitoring (an
not blood glucose) was the norm before glu
cometers. And, initially, even glucometers wer
expensive, painful, expensive, and not so ac
curate. "Today, we have blood glucose mon
tors which are extremely precise and are les
painful. Cost of strips, however, still remains
challenge," the guidelines state.

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.

ABOUT THE DIRECTOR IIHMR, DELHI

Dr. Sutapa Bandyopadhyay Neogi , **Adjunct professor**

Dr Sutapa B Neogi is a public health specialist actively engaged in research and teaching at Indian Institute of Public Health- Delhi (IIPHD), Public Health Foundation of India (PHFI). An MBBS from Nil Ratan Sircar Medical College, Calcutta and MD in Community Medicine from Post Graduate Institute of Medical education and Research (PGIMER), Chandigarh, and Diplomate of National Board (DNB) in Maternal and Child Health, she has excellent academic credentials. She received the 'Kataria Memorial Gold Medal' for being the best outgoing student of PGIMER, Chandigarh. She has a rich experience in public health and is particularly interested in implementation of projects that is relevant to national policies and programmes. She has authored several research papers ad is a reviewer of many national and international journals. She is an associate Editor of BMC Pregnancy

and Childbirth. She offers her technical services to various academic and research bodies in the country. Her goal is to mentor students who can be change agents in future, those who can see through problems, explore them scientifically, be a link between disciplines (eg engineering and medicine, social science and medicine), generate synergy between research and programs and promote interdisciplinary research in the country by leading and being a part of an able team.

A premier knowledge institution raising the bar in Sectoral Management Education, Research & Executive Education.

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 will be males and females aged 15 years and above at the time of baseline survey conducted under this study. Eligibility Criteria:

A. Inclusion criteria: - All men and women aged 15 years and above who have been staying in the study area since past 1 year and intend to stay for at least next 1 year, and those who provide informed consent to participate in the study.

B. Exclusion Criteria: - Pregnant women - All participants who are currently undergoing treatment for any disease other than Cardio- vascular disorders - Those who do not provide consent for the study. Study participants would also include service providers – ASHA, ANM, Medical Officer and other PHC staff.

Study Design: We will adopt Quasi-experimental study design which will be 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. The questionnaire collecting data on household and individual was made using KOBO tool. There were total 98 individual and 11 household questions to collect the data on physical activity, diet pattern, stress, tobacco and general identification data. The anthropometric measurements were also taken like BP, Pulse, Wt, Ht, Waist circumference, Hip circumference and WHR. The protocols were followed as trained to us while collecting the data. The mode of data collection was door to door survey of 1 PSU which had 450 houses under ASHA. It took 20 days to complete the area while the population was corporative and helpful.

GENERAL FINDING

3.1 OBSERVATIONAL LEARNING AND CONCLUSIVE LEARNING

-OBSERVATION DATA OF COMMUNITY:

1. The area was well facilitated by Public toilets under 'Swach bharat mission'. Also the area had Mohalla clinic too for accessible and affordable treatment along with private hospital.
2. The people were happy and satisfied with clinic.
3. As per data 57.1% urban poor lost jobs during Covid and the vulnerability was still seen in area.
4. The water supply was not proper in the area.

5. There was no yoga or open park for walk hence people were restricted to home especially women prefer to stay indoor hence physical activity was less done.
6. People lack awareness about NCDs and those who had were coping with it or the non-compliance to treatment leads to deterioration to condition.
7. Women empowerment and male education was need of the hour.
8. Anganwadi was well functional and workers had to timely report to the authority about food, children health through digital app which proved to enhance connectivity.
9. People were ignorant toward oral health too. There were certain people who used open grounds for defecation and had high fertility rate in families.
10. Smoking and tobacco consumption was prevelant among male.
11. The dairy in the area had poor condition and had risk of many communicable disease as there was interaction with animals. The workers were not vaccinated and their health was ignored.

STRENGTH AND GAP ANALYSIS:

STRENGTH	GAP ANALYSIS
The community was good and many were willing to change lifestyle to maintain health. The training provided to us was very helpful. Anganwadi and mohalla clinic was well functional in delivering good care. The way we all interested and went a step ahead to ask questions opened us about community mindset which was an amazing experience. ICMR with such projects monitor and check the condition for interventions to be applied.	The main loop hole is lack of connectivity due to which there was no follow up and ignorance to health. Digitalisation can reduce this gap and enhance health. The water supply and WASH need to be worked on along with HWC and yoga area or an open area to enhance physical activity. The visit by NGOs and students to be enhanced to remove social stigma and provide education. Immunisation status of dairy workers to be monitored. ASHA records to be digitalised.

PROJECT REPORT

A COMPARATIVE STUDY OF ANTHROPOMETRIC CHARACTERISTICS AND BLOOD PRESSURE BETWEEN PRE AND POST – MENOPAUSAL WOMEN IN POOR URBAN AREA, GOYALA VIHAR , DELHI

ABSTRACT

Background - Hypertension is a frequently encountered multifactorial disorder and its prevalence is reported to increase in postmenopausal females. Cardiovascular disease is the leading cause of death in women. Furthermore, there is evidence that hormonal changes also leads to anthropometric changes associated with hypertension.

Aim – To compare the anthropometric measures and blood pressure of pre and post-menopausal women and find the association between anthropometric measures and hypertension.

Methodology – A comparative study was conducted on 50 pre and 50 post-menopausal women. The sampling method was purposive sampling and conducted in Goyala Vihar of Delhi. The door to door survey was conducted and data was collected using kobo tool. The measurements of BP, weight, height, hip and waist circumference was done following the protocols. The data was analysed using SPSS software.

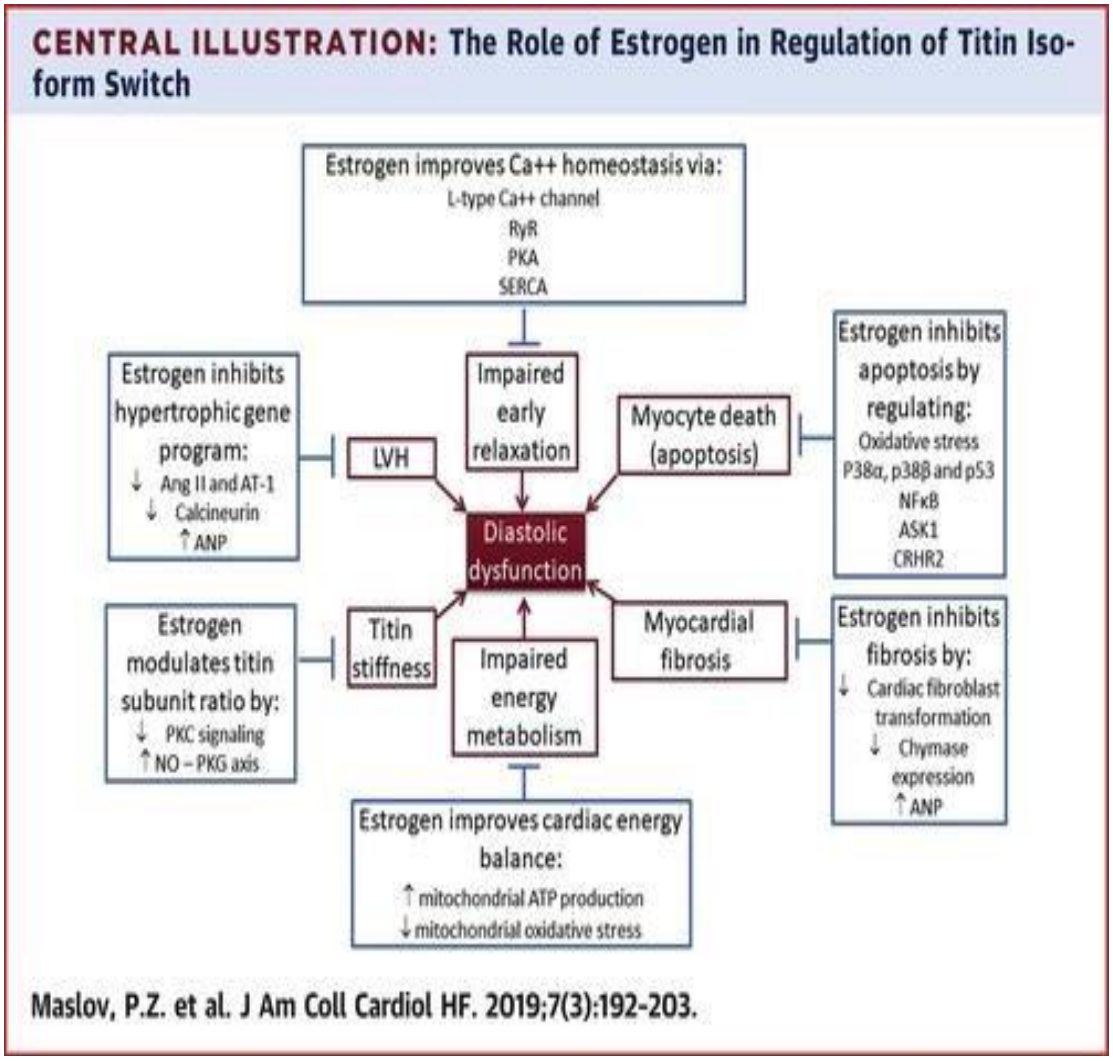
Result and conclusion – The result was significant for all variables (Age, Wt, BMI, HC, WC,WHR and BAI) except Ht. Independent T test was used to compare. Correlation and regression depicted that age is the predictor for diastolic blood pressure in pre- menopausal women and for post- menopausal women age, Ht, Wt, BMI, WC and HC are predictor of diastolic blood pressure. Women in post- menopausal stage were at high risk of HTN compared to pre-menopausal women.

Keywords- Anthropometric measures, HTN, pre-menopausal women and post- menopausal women.

INTRODUCTION

Hypertension is a common but dangerous condition. High blood pressure increases risk for heart disease, stroke, kidney disease, cancer, osteoporosis and dementia. As per National Family Health Survey-4, 2015-16, prevalence of hypertension for men and women are 14.8% and 11% respectively but many (46%) are unaware they have it because there are no warning signs, which is why it's called the " silent killer"[1]. WHO provides alarming data which says 2/3rd of these cases are in low and middle income country which make difficult to achieve the Global target of reducing the prevalence by 33% between 2010 and 2030 with poor health infrastructure[2] .The prevalence and severity of hypertension rise markedly with age, and blood pressure control becomes more difficult with aging in both genders, particularly in women. In addition, there are forms of hypertension that occur exclusively in women, e.g., hypertension related to menopause, oral contraceptive use, or pregnancy (e.g., chronic hypertension, gestational hypertension, pre-eclampsia or eclampsia)[3]. A women in her lifetime pass through many biological changes specifically in pre and post-menopausal stage. Cardioprotective effect on premenopausal women is believed to be imposed by adequacy of endogenous estrogen level produced during menstrual cycle. This could be the possible reason for declined rate of coronary heart disease in fertile women than men . However, by the end of reproductive life ovaries fail to produce significant amount of estrogen instigating postmenopausal women more prone to disease associated with estrogen deficiency like heart diseases (atherosclerosis), osteoporosis, and dyslipidemia [4]. Estrogens have been shown to be antioxidative and to modulate both vasoconstrictor and vasodilator systems. For example, estradiol is known to increase NO synthase synthesis and activity and to reduce expression of the angiotensin (Ang) type 1 receptor (AT_1R). Therefore, loss of estrogen production with menopause should be associated with increases in oxidative stress mediated by the renin–Ang system (RAS) because of increased expression of AT_1Rs[5].

POISSON'S EQUATION (R)= 8 Π L /n r^4(atherosclerosis and HTN)



Obesity is a well-established risk factor of atherosclerosis and cardiovascular events. However, a generalized obesity index such as body mass index (BMI) cannot fully reflect the risk of obesity-related metabolic complications . Instead, waist circumference (WC) and waist-to-hip ratio (WHR) are widely used, because anthropometric measures of abdominal obesity appear to be more strongly associated with metabolic risk factors[6]. The body mass index is commonly used as an index to assess the degree of body fat and various studies shown that with normal body BMI with increased waist hip ratio have two fold increases in cardiovascular dysfunction. WHR is a better predictor to assess the risk of development of CVD in women compared to BMI . The measurement of WHR, BP is easy and aid as non-invasive and effective tool to assess the health status of women[7]. Hence the purpose of this study is to establish the relationship of BMI, WHR and BP and to identify their effectiveness to screen the postmenopausal women.

NEED FOR STUDY

1.Post – menopausal guidance, knowledge and awareness is less among common population and the needs are generally ignored.

2. Status of women in Indian society is among vulnerable population and are liability as considered whether in pre or post- menopausal phase.

3.To understand and assess health needs of post-menopausal clinics and HRT.

OBJECTIVES

-GENERAL OBJECTIVES :

1. To compare the anthropometric and blood pressure results of pre and post menopausal women in Goyala Vihar, Delhi.

-SPECIFIC OBJECTIVES:

1. To compare the findings of pre and post-menopausal women.

2. To check the association of anthropometric measure with blood pressure of pre and post-menopausal women.

RESEARCH QUESTION

Is there high risk of hypertension among post-menopausal women along with anthropometric changes compared to pre-menopausal women of urban poor area Goyala Vihar, Delhi?

METHODOLOGY

Study Design: A comparative study, quantitative study.

Study Area and Study Population: Study was conducted in collaboration with urban primary health centre (UPHC) covered under National Urban Health Mission and undertaken in the community served by ASHAs PSU 1 under Ms. Kavita Sharma (approximately 500 households) in southwest region of Delhi.

Sampling Technique: Purposive sampling technique was carried out for the study on the basis of feasibility and accessibility in order to collect maximum information from the participants.

Eligibility Criteria:

Inclusion Criteria: The women who gave consent from street no. 3,4B,4C,5A,6 above 25yrs.

Exclusion Criteria: The women of dairy were excluded along with the one in lactating or pregnant stage. Women undergoing issues related to regular menstrual cycle. Also resident of street no. 1,2, 4A, 4D and 5B.

Sample size: 100 women, 50 pre and 50 post menopausal women**.**

Study Duration: 20 days of door to door field visit.

Method of Data collection and Analysis:

1. Household data and individual data were collected and entered in a Kobo Collect 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, physical activity, alcohol and tobacco details along with this measurements were taken considering the guidelines by WHO.

3. The data was analysed using independent t test, Pearson's correlation and regression on both groups.

4. ANTHROPOMETRIC MEASUREMENTS TAKEN WERE:

1. Blood pressure measured using digital apparatus in sitting and relaxed position. Three readings were taken and average was calculated.

	SBP	DBP
NORMOTENSIVE	<140	<90
MILD-HTN	140-180	90-105
BORDERLINE HTN	140-160	90-95
MODERATE TO SEVERE HTN	>180	>105
ISOLATED SYSTOLIC HTN	>140	<90

2. BMI (B0dy-mass Index) = weight in kg/ height in m^2

BMI	INTERPRETATION
<18.4	underweight
18.5-24.9	normal
25-29.9	overweight
>30	obese

3. WAIST HIP RATIO = waist circumference at naval level in cm/hip circumference in cm

MALE	FEMALE	RISK LEVEL
<0.95	<0.80	LOW
0.95-1	0.80-0	
>1		

4. BASAL ADIPOSITY INDEX = [hip circumference (cm) ÷ height (m) $^{1.5}$] – 18

5. MEAN ARTERIAL PRESSURE= MAP = DP + 1/3(SP – DP)

The readings were recorded as per WHO guidelines. The data was analysed using SPSS software.

REVIEW OF LITERATURE

1.(Chalwe JM et al, 2021)[8] This study was conducted in Twatasha Compound of Kitwe and Ndeke Community of Ndola. Blood pressure (BP), weight, height and dietary intakes (24-h recall) were measured in 153 women (> 50 years) from households. The South African Hypertension Society (SAHS), the World Health Organization (WHO) and estimated average requirements (EARs) guidelines were followed for HT, obesity and dietary intake definitions, respectively. Statistical Package for the Social Sciences (SPSS) version 26 was used for descriptive and inferential statistical analyses.Prevalence of HT was 70%, whilst 37.25% and 28.10% of the participants were overweight and obese, respectively. The median interquartile range (IQR) dietary intakes showed inadequate intakes for most nutrients, except for carbohydrates (170 g [133; 225]). The total fat intake represented 14% of total energy intake. All median fatty acid intakes and sodium intakes (409 mg [169; 662]) were below the recommended levels. Only body mass index (BMI) correlated with HT (r = 0.268; p = 0.001).

2. (Liu S etal, 2018)[9] A case-control design, clinical and laboratory data were collected. Conditional logistic regression with stratified analysis was conducted to identify the association between GPER and hypertension. The GPER level was significantly lower in the case group than in the control group (126.3 ± 21.6 vs. 133.6 ± 27.3, P=0.000). The GPER levels of the hypertension cases with and those without menopause were significant (120.5 ± 11.8 and 127.2 ± 12.1, P=0.000). No significant difference in the GPER level between the controls with and those without menopause was observed (P=0.241). Logistic regression revealed that the GPER quartile was related to hypertension (odds ratio [OR]: 0.63, 95% confidence interval [CI]: 0.13-0.93, P=0.018) after adjusting for potential confounding factors. Stratified analysis revealed that the GPER quartile was not associated with hypertension in premenopausal women, and the fourth GPER quartile showed a predictive association with hypertension (OR: 0.43, 95% CI: 0.29-0.90) in menopausal women.

3. (Muchanga m et al, 2016)[10]The study aimed to assess the prevalence of prehypertension and its associated factors in a population of Congolese pre and postmenopausal women. We had consecutively recruited 200 women (100 premenopausal and 100 postmenopausal) aged 40 - 60 years at the department of Gynecology and Obstetrics, University of Kinshasa Hospital, and AKRAM Medical Center in Kinshasa, DRC. An interview was carried out using a questionnaire that comprised questions related to lifestyle, menses characteristics, medical

history of diabetes, CVD, hypertension, current antihypertensive medication and use of traditional medicine. In addition, physical examination and biological measurements were performed. Multivariate logistic regression analysis was used to assess associated factors with prehypertension.Of the participants, 34% were normotensive, 38.5 % prehypertensive and 27.5% hypertensive. Compared to normal blood pressure, prehypertension was common in the older (age>50 years of age) women. Menopause, the use of traditional medicine and older age were associated with prehypertension. However, only menopause (aOR: 2.71; 95%CI: 1.10-3.52) and the use of traditional medicine (aOR: 2.24; 95% CI: 1.07-4.7) remained associated with prehypertension in a multivariate logistic regression analysis.

4. (Garauet et al,2002)[11]The association of systolic and diastolic blood pressure with body mass index, waist hip ratio, the sum of three trunk skinfolds, the sum of the six skinfolds, the ratio of the sum of the trunk to the sum of the extremity skinfolds and relative fat pattern index and the correlations between each of these were examined among 30 hypertensive and 30 normotensive post menopausal women of Udaipur city. Anthropometric measurements and indices like weight, height, WHR, abdominal obesity, body mass index were higher in hypertensive women. Adiposity measures had consistant relationship with blood pressure. The correlation coefficients of the adiposity measure and blood pressure are intercorrelated with a few exceptions in both groups.

5.(Warsy A et al, 2012)[12] This study was carried out to identify the nature of correlation between anthropometric measures and hypertension in pre- and post menopausal Saudi females. The study group comprised of 126 females (18 to 75 years), grouped as premenopausal (94) and postmenopausal (32). The body mass index (BMI), waist/hip ratio and hip circumference were significantly lower ($p<0.001$) in the premenopausal females (27.015.45 Kg/m2, 0.770.06, 81.3812.4 cm, respectively) compared to their postmenopausal counterpart (29.853.63 Kg/m2, 0.870.07 and 96.77.2 cm, respectively), though the weight and waist circumference did not differ significantly. The systolic blood pressure (bp) range (mean ±2SD) was 111.111.42 mm/Hg in the premenopausal and 124.7218.98 mm/Hg in postmenopausal females ($p<0.001$), while the diastolic bp range was 72.310.10 mm/Hg and 74.6611.35 mm/Hg in the two groups, respectively ($p>0.05$). Prevalence of abnormality of systolic and diastolic bp was significantly higher in the postmenopausal females (37.5 % and 28.13 %, respectively), compared to 4.3 % and 7.4 % in the premenopausal group. Both BMI and waist/hip ratio showed a significant and

positive correlation with systolic and diastolic blood pressure ($p< 0.001$). It was concluded that the both systolic and diastolic blood pressure are higher in the postmenopausal Saudi females.

6.(Hernández-Ono et al,2002)[13] A cross-sectional population-based random sample study.Ninety-eight postmenopausal women (age 50–65 y). Visceral and subcutaneous fat areas by computer axial tomography, anthropometry, lipid profile, fasting glucose and insulin, diet, physical activity, smoking status and alcohol intake.Compared to women with low VAT, women with high VAT (>117.8 cm^2) had a less favorable metabolic profile with significantly higher fasting glucose (120±50 *vs* 98±39), insulin (7.9±10 *vs* 5±8), triglycerides (172±69 *vs* 127±72), apolipoprotein B (119±24 *vs* 98±32) and significantly lower HDL-C (38±10 *vs* 46±14) values in the whole sample (*n*=98). A similar profile was found in women without diabetes and hypertension (*n*=39). In multiple regression models, VAT explained a portion of the variance of TG (6.2%) in the entire sample and of total cholesterol (12.4%), LDL-C (15.8%), triglycerides (16.3%), apolipoprotein B (11.6%), and fasting glucose (28.4%) in the group of non-diabetic or hypertensive women. Our VAT cut-off point of 117.8 cm^2 corresponded to a waist circumference of 84 cm.

7. (Kaur N et al,2010)[14] Different anthropometric measurements such as body mass index (BMI), waist to hip ratio (WHR), waist and hip circumferences (WC and HC) and skin fold thickness are the important indicator to investigate the risk factors for cardiovascular diseases. Therefore, this cross-sectional study was undertaken to assess the interrelationship between blood pressures with body mass index (BMI), waist to hip ratio (WHR) and subcutaneous fat. Three hundred university-going Punjabi Sikh and Hindu females were surveyed for blood pressures, pulse rate, height, weight, waist and hip circumferences, four skin folds (biceps, triceps, subscapular and suprailiac). All these measurements were taken from each subject using standard procedure. The relation between blood pressure and different anthropometric variables were assessed in multiple regression models. No significant differences of all the measured mean values of the traits have found between these two groups. However, further analysis of the data showed that BMI, WHR and skin folds measurements have significant ($p < 0.05$) effect on blood pressure phenotypes. The results of the present cross-sectional study indicated that BMI and WHR would be the good predictors for the chronic disease like hypertension. Primarily among female WHR should be used as a good predictor for elevated blood pressure.

8. (Deibert, P et al,2007)[15] The present study examines changes in body weight, fat mass, metabolic and hormonal parameters in overweight and obese pre- and postmenopausal women who participated in a weight loss intervention.Seventy-two subjects were included in the analysis of this single arm study (premenopausal: 22 women, age 43.7 ± 6.4 years, BMI 31.0 ± 2.4 kg/m^2; postmenopausal: 50 women, age 58.2 ± 5.1 years, BMI 32.9 ± 3.7 kg/m^2). Weight reduction was achieved by the use of a meal replacement and fat-reduced diet. In addition, from week 6 to 24 participants attended a guided exercise program. Body composition was analyzed with the Bod Pod®. Blood pressures were taken at every visit and blood was collected at baseline and closeout of the study to evaluate lipids, insulin, cortisol and leptin levels.BMI, fat mass, waist circumference, systolic blood pressure, triglycerides, glucose, leptin and cortisol were higher in the postmenopausal women at baseline.Both groups achieved a substantial and comparable weight loss (pre- vs. postmenopausal: 6.7 ± 4.9 vs 6.7 ± 4.4 kg; n.s.). However, in contrast to premenopausal women, weight loss in postmenopausal women was exclusively due to a reduction of fat mass (-5.3 ± 5.1 vs -6.6 ± 4.1 kg; $p < 0.01$). In premenopausal women 21% of weight loss was attributed to a reduction in lean body mass.Blood pressure, triglycerides, HDL-cholesterol, and glucose improved significantly only in postmenopausal women whereas total cholesterol and LDL-cholesterol were lowered significantly in both groups

9. (Esmaillzadeh et al, 2006)[16]This study was conducted on 5073 women aged 18–74 years, participants of the Tehran Lipid and Glucose Study. Demographic data were collected. Anthropometric indices were measured according to standard protocols. Mean (±standard deviation) age of women was 39.9 ± 14.6 years; mean BMI, WC, WHR and WHtR were 27.1 ± 1.5 kg m−2, 86.5 ± 13.5 cm and 0.83 ± 0.08 and 0.55 ± 0.08, respectively. Of the four anthropometric measures, WC had the highest sensitivity and specificity to identify subjects with risk factors in both the 18–39 year and the 40–74 year age categories. WC was seen to have a higher percentage of correct prediction than BMI, WHR and WHR.

DATA ANALYSIS AND INTERPRETATION

OBJECTIVE 1. To compare the blood pressure and other anthropometric measurements of pre and post-menopausal women of Goyala Vihar, Delhi (table 1).

	PRE-MENOPAUSAL WOMEN		POST-MENOPAUSAL WOMEN					
VARIABLE	(Mean ± SD)	SEM	(Mean ± SD)	SEM	T Stat	P value	T critical	S/NS
Age (yrs)	34.58± 5.904305	0.14199	59.4 ± 7.90763	0.1451	-17.7838	2.30E-03	1.986377	S
Ht (cm)	153.92± 4.91495	0.062	151.56 ± 7.0628	0.081134	1.939373	0.065	1.987608	NS
Wt (kg)	58.8± 8.905	0.1856	63.228 ± 12.05383	0.21438	-2.08448	0.039949	1.986675	S
BMI (kg/m	24.87± 3.91	0.117	27.45757 ± 4.608759	0.124385	-3.02336	0.003206	1.984984	S
WC (cm)	87.0196± 12.29155	0.1863	93.5576 ± 9.667703	0.141351	-2.9563	0.003946	1.985802	S
HC (cm)	100.7224± 9.61881	0.1355	103.1096 ± 9.229634	0.128543	-1.26625	0.208424	1.984467	S
WHR	0.862451± 0.0714	0.01	0.907941 ± 0.0606633	0.008999	-3.39713	0.000996	1.985251	S
SBP	115.06± 13.30706	0.175443	139.38 ± 21.75643	0.260617	-6.57799	4.73E-09	1.99045	S
DBP	78.54± 9.14107	0.145871	84.44 ± 10.59295	0.163026	-2.98173	0.003633	1.984984	S
MAP	90.7133± 10.0222	0.148814	102.7533 ± 12.56255	0.175265	-5.11676	1.69E-06	1.986086	S
BAI	34.82639± 5.405919	0.1295	37.44771 ± 5.942969	0.137343	-2.30718	0.023171	1.984723	S

TABLE 1- Descriptive statistics for different characteristics of 50 pre and 50 post menopausal women of urban poor area Goyala Vihar, Delhi.

Table 1 is the data analysed using independent T test, shows standard deviation and comparison of different measurements (age, Ht, Wt, BMI, WC, HC, WHR, SBP, DBP &MAP, BAI) of pre and post- menopausal women. The means of all except height was significantly($p<0.05$) higher in post- menopausal women. Hence, we reject the H0 for other variables and accept for height.

H0= There is no difference between the variable of the two groups. (NS)

H1=There is difference between the variable of the two group. (S)

OBJECTIVE 2. To check the association of anthropometric measure with blood pressure of pre and post-menopausal women (table 2, 3 and 4).

	PRE-MENOPAUSAL			POST-MENOPAUSAL		
VARIABLES	SBP	DBP	MAP	SBP	DBP	MAP
Age(yrs)	0.3115058*	0.17255	0.24279	0.044768	0.29889*	-0.14218
Ht(cm)	0.0621697	-0.10168	-0.03431	-0.11271	0.279508*	0.092059
Wt(kg)	0.05939	0.09485	0.08396	-0.02064	0.465730**	0.249892
BMI(kg/m^2)	0.026899	0.126681	0.088935	0.043011	0.398986**	0.249117
Waist circumference(cm)	0.070827	0.125079	0.1074	0.141109	0.347654*	0.276892
Hip circumference(cm)	-0.05703	0.007765	-0.0205	0.179507	0.270297	0.255572
Waist hip ratio	0.185673	0.198909	0.203124	-0.00298	0.207237	0.114775
BAI	-0.08555	0.051604	-0.00649	0.219843	0.044173	0.151744

TABLE 2 DEPICT PEARSON'S CORRELATION

* correlation is significant at 0.05 level(2-tailed) ** correlation is significant at 0.01 level

The person's correlation was done on SPSS as shown in table 2. Depicts that in pre-menopausal women age are positively associated with SBP while in post – menopausal women age, Ht , Wt, BMI were positively associated with DBP.

	PRE MENOPAUSAL WO	MEN	POST-MENOPAUSAL WOMEN	
VARIABLES	SBP	DBP	SBP	DBP
	REGRESSION ± SE	REGRESSION ± SE	REGRESSION ± SE	REGRESSION ± SE
Age(yrs.)	0.327371 ± 0.060	0.100374 ± 0.90	0.045942 ± 0.052	0.28155 ± 0.10
Ht(cm)	0.056313 ± 0.053	0.1033 ± 0.077	0.114244 ±0.0466	0.264355 ± 0.094
Wt.(kg)	0.055936±0.1121	0.09441± 0.1625	0.020878 ± 0.080	0.4644066 ± 0.148
BMI (kg/m^2)	0.0269 ± 0.045	0.12607±0.065	0.043069 ±0.0308	0.406153± 0.058

Waist circumference (cm)	0.070828±0.132988	0.12507 ± 0.1925	0.141109 ± 0.063	0.3476 ±0.123
Hip circumference (cm)	0.05704 ±0.104	0.0077 ± 0.15	0.1795 ± 0.060	0.27029 ± 0.1210
Waist hip ratio	0.185± 0.00077	0.1989± 0.001	0.002983 ± 0.000406	0.2072 ± 0.06
BAI	0.08555± 0.058	0.051604± 0.085	0.2198 ± 0.038	0.044173 ± 0.0808

TABLE 3 – Shows result of regression and standard error

STEP-WISE REGRESSION ANALYSIS:

VARIABLES	PRE-MENOPAUSAL				POST MENOPAUSAL			
	CONFIDENCE ± SE	F VALUE	SIGNIFICANT	P-VALUE	CONFIDENCE± SE	F VALUE	SIGNIFICANT	P VALUE
Age(yrs)	0.702±0.309	5.159	0.028	<0.05*	0.400±0.185	4.709	0.035	<0.05*
Ht(cm)					0.419±0.208	4.068	0.049	<0.05*
Wt(kg)					0.409±0.112	13.295	0.01	<0.05*
BMI(kg/m^2)					0.917±0.304	9.088	0.04	<0.05*
Waist circumference(cm)					0.381±0.148	6.599	0.013	<0.05*
Hip circumference(cm)					0.310±0.159	3.783	0.05	<0.05*
Waist hip ratio								
BAI								
					SBP			
					DBP			

TABLE 4: Result of step-wise regression analysis: significant predictor variable and regression coefficient

Table 3 and 4 Regression and step-wise regression depicted that age is the predictor for systolic blood pressure in pre- menopausal women and for post- menopausal women age, Ht, Wt, BMI, WC and HC for DBP. Women in post- menopausal stage were at high risk of HTN compared to pre-menopausal women as $p<0.05$.

DISCUSSION

The present study has shown that post- menopausal women have comparatively high blood pressure and other anthropometric measurements. There are other studies who have shown that:

1. The sample of the cross-sectional study was collected from June to October 2010 and 165 consecutive menopausal women who had attended the Health and Treatment Centre and Endocrine Research Centre of Firoozgar Hospital in Tehran, Iran were assessed. Age, weight, height, WC, waist-hip ratio(WHR), CI and fat mass were measured. Systolic and diastolic blood pressure (SBP and DBP), fasting blood glucose, insulin, low-density lipoprotein cholesterol (LDL-C), high density lipoprotein cholesterol (HDL-C) and total cholesterol (TC) levels were also determined. All statistical analyses were performed by SPSS version 17 (SPSS Inc, Chicago, IL, USA). Results showed that BMI was positively and significantly associated with SBP ($r = 0.21$; $p = 0.009$). WC was positively and significantly correlated with SBP ($r = 0.26$; $p = 0.02$) and DBP ($r = 0.16$; $p = 0.05$). WHR was also significantly and positively associated with SBP ($r = 0.29$; $p = 0.001$). Age and WC were associated with CI quartiles at the 0.05 significance level. The correlation of CI quartiles with SBP and weight were at the 0.01 significance level. We showed a significant association of WC with SBP and DBP, and that BMI could be an important determining factor of SBP[17].

2. The CoLaus/OsteoLaus cohort included 1,500 postmenopausal women (age range 50-80). We analyzed correlations between: 1) measurements of body composition assessed by anthropometric measures, BIA, and DXA. In the 803 included participants (mean age 62.0 ± 7.1 y, mean body mass index 25.6 kg/m2 ± 4.4), correlations between total fat mass measured by BIA and total fat mass, android fat, gynoid fat, or VAT measured by DXA are very strong (from $r = 0.531$, [99% confidence interval (CI), 0.443-0.610] to $r = 0.704$, [99% CI, 0.640-0.758]). Body mass index and waist circumference have a higher correlation with VAT ($r = 0.815$, [99% CI, 0.772-0.851] and $r = 0.823$ [99% CI, 0.782-0.858], respectively) than BIA ($r = 0.672$ [99% CI, 0.603-0.731]). Among the anthropometric measurement and the measurements derived from DXA and BIA, VAT is the parameter most strongly associated with cardiometabolic risk factors[18].

3. A Cross-sectional study on 136 premenopausal and 193 postmenopausal Chinese women with body mass index (BMI)<30 kg/m^2. Significant correlation coefficients between age, general obesity, central obesity and cardiovascular disease risk factors were noted. Through the menopausal transition, the BMI and total body fat percentage were increased significantly. After adjustments for age and BMI, the postmenopausal women showed higher android fat percentage, centrality index, glycosylated hemoglobin A_{1c}, serum concentrations of total cholesterol, low-density lipoprotein (LDL) cholesterol and atherogenic indices than the premenopausal women[19].

4. A comparative study on mortality, nonfatal coronary heart disease (CHD), and congestive heart failure (CHF) risk across BMI categories in white, African American, and Hispanic women was conducted, with a focus on severe obesity (BMI ≥ 40), and examine heterogeneity in weight-related CHD risk.Mortality, nonfatal CHD, and CHF incidence generally rose with BMI category. For severe obesity versus normal BMI, hazard ratios (HRs, 95% confidence interval) for mortality were 1.97 (1.77-2.20) in white, 1.55 (1.20-2.00) in African American, and 2.59 (1.55-4.31) in Hispanic women; for CHD, HRs were 2.05 (1.80-2.35), 2.24 (1.57-3.19), and 2.95 (1.60-5.41) respectively; for CHF, HRs were 5.01 (4.33-5.80), 3.60 (2.30-5.62), and 6.05 (2.49-14.69). CVRF variation resulted in substantial variation in CHD rates across BMI categories, even in severe obesity. CHD incidence was similar by race/ethnicity when differences in BMI or CVRF were accounted for[20].

5. The results of comparative study on association between blood pressure phenotypes and menopause with respect to certain other metric variables were examined in a random sample of 489 pre- and 191 post-menopausal Punjabi women. Post-menopausal women had a higher blood pressure and pulse rate than pre-menopausal women[21].

RECOMMENDATION

1. Post – menopausal health awareness to all women.

2. Male education and health awareness campaign in area with use of IEC material.

3. Yoga, park to be established to enhance physical activity.

4. College students and NGOs visit to such area.

5. Digitalize ASHA work like Anganwadi workers and use of notifications for follow up.

6. Elderly clubs could be set up.

LIMITATION

1. Male dominant society.

2. The blood investigation on blood glucose would enhance the finding and would also suggest many precautions to be followed.

CONCLUSION

The study was significant for all variables (Age, Wt, BMI, HC, WC, WHR and BAI) except Ht. Independent T test was used to compare results. Correlation and regression depicted that age is the predictor for blood pressure in pre- menopausal women and for post- menopausal women age, Ht, Wt, BMI, WC and HC are predictor of diastolic blood pressure. Women in post- menopausal stage were at high risk of HTN compared to pre-menopausal women hence must undergo regular health check-up and maintain healthy lifestyle.

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CERTIFICATE OF APPROVAL

The Summer Internship Project of title "A comparative study of anthropometric characteristics and blood pressure between pre- and post- menopausal women in poor urban areas of Goyala Vihar, Delhi" at ICMR, DELHI is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **Post Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed, or conclusion drawn therein but approve the report only for the purpose it is submitted.

Dr. Pankaj Talreja

Assistant Professor

IIHMR,Delhi

FEEDBACK FORM

(Organization Supervisor)

Name of the Student: Jyoti Yadav

Summer Internship Institution: IIHMR, Delhi

Area of Summer Internship: Goyla dairy

Attendance: 99%.

Objectives met: Yes

Deliverables:
- Data Collection
- Anthropometric measurement
- Completion of Summer Internship Report

Strengths:
- Good Communication & technical skills
- Dedication towards work
- Hard working.

Suggestions for Improvement:

keep doing good work.

Signature of the Officer-in-Charge (Internship)

Date: 7/7/22
Place:

(Completion of summer internship from respective organization)

The certificate is awarded is to

Name: JYOTI YADAV

In recognition of having successfully completed her

Internship in the department of Public health

Title: A COMPARATIVE STUDY OF ANTHROPOMETRIC CHARACTERISTICS AND BLOOD PRESSURE BETWEEN PRE AND POST-MENOPAUSAL WOMEN IN POOR URBAN AREAS OF GOYALA, VIHAR, 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