

PREVALENCE OF HIGH BLOOD PRESSURE AND RISK FACTORS AMONG HEALTH CARE WORKERS DURING COVID-19 PANDEMIC

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ABSTRACT

BACKGROUND: During humanitarian crisis health-care professionals are the frontline workers to provide best services to the community. The health care professionals are potential to expose many stressors at work place is believed to provoke stress. The COVID-19 pandemic is creating lots of stress to everyone. The aim of this study is to find the prevalence of high blood pressure and cardiac risk factors among health care workers during COVID-19 pandemic.

METHODS: Total no of 137 health care professionals were selected based on inclusion criteria out of them 80 subjects were selected based on simple random sampling and included for the study.

RESULTS: The majority of subjects 38 (47.5%) are 25-35 years of age, 29 (36.2%) are 36-45 years of age and 13 (16.2%) are 46-55 years of age. With regards to gender, 42 (52.5%) were males and 38 (47.5%) were females. The findings of the present study speculate that all the male health care workers having high percentage of body fat as 26.06, the average heart rate was measured as 92.5 BPM. Further, 52.4% of them are having stage 1 hypertension. However, there is no abnormality was found in pulse pressure among the health care workers.

CONCLUSION: This study evidenced that 52.4% of the health care workers having high blood pressure and all the participants have high body fat percentage 26.06 with body mass index as overweight 25.4. Further, it evidences that they are under risk of developing hypertension.

KEY WORDS: High blood pressure, Body fat percentage, Body mass index, Pulse pressure, Health care workers.

I. INTRODUCTION

Healthcare workers are the one who provide a wide range of services to the society to maintain health and welfare (1). The healthcare providers are the certified medical professionals like doctors, nurses, physiotherapists, clinical pharmacist, laboratory technicians and supportive staffs. There are approximately 59 million healthcare workers worldwide (2). In current situation many studies with different methodological approaches have given evidence of the relation between job strain and their repercussions on workers' health. Among professional categories, health workers stand out, particularly those working in the hospital environment, in view of the countless exhausting circumstances in their daily work environment (3,4).

Blood pressure (BP) is the pressure exerted by circulating blood upon the walls of blood vessels. Blood pressure usually refers to the arterial pressure of the systemic circulation. During each heartbeat, BP varies between a maximum (systolic) and a minimum (diastolic) pressure. Hypertension is a cardiac condition in which the systemic arterial blood pressure is elevated. Hypertension is classified as either primary (essential) hypertension or secondary hypertension. Hypertension is a; non communicable disease, common, inevitable, preventable and it may produce serious complication. The World Health Organization has estimated that high blood pressure causes one in every eight deaths, making hypertension the third leading killer in the world. Globally, there are one billion hypertensive and four million people die annually as a direct result of hypertension (WHO, 2019). High blood pressure is the single most significant risk factor for heart disease. When the blood pressure stays within normal ranges, it reduces the work load of the heart, arteries, and kidneys. High blood pressure, also known as hypertension, it causes increased pressure in the arteries and stretches them beyond the normal limit. Due to that microscopic rupture can occur in the arteries and it forms a scar tissue during the healing process. This scar tissue develops plaque and white blood cells and reduces the size of arterial lumen. The blood pressure is manageable by and healthy habits like eating a heart-healthy diet, regular physical activity, maintaining a healthy weight and managing stress (National Heart Foundation, 2010).

Hypertension is one of the leading causes of death and disability among adults. Most of the health problems are preventable or controllable if it is anticipated or recognised and treated correctly. Hypertension is potentially a preventive disease. Most patients are unaware of the existences. It is the major cause for death which may lead to the myocardial infarction, stroke, renal failure and atherosclerosis. In addition to hypertension and family history there are other behavioural and physiological factors like smoking, obesity; high-fat diet, physical inactivity and elevated cholesterol level that can lead to increase in the risk of heart diseases. Lifestyle modification has a major impact on prevention of hypertension (5). The burden of hospital work results from permanent exposure to one or more factors that produce diseases or suffering, deriving from the nature of work itself and its organization, as evidenced by non-specific and psychic signs and symptoms (6). During humanitarian crisis, health-care professionals are the frontline workers to provide best services to the community. The health care professionals are potential to expose many stressors at work place is believed to provoke stress. The COVID-19 pandemic is creating lots of stress to everyone. The health-care workers are the targeted groups remain most affected (7). The recent AHA/ACC indicates American Heart Association/American College of Cardiology; BP, blood pressure guidelines for the diagnosis and management of hypertension have radically redefined what constitutes high blood pressure (BP) and normal BP. This redefinition of the new guidelines will have impact on the prevention and management of hypertension globally but particularly in countries like India (with the previous definition of hypertension $\geq 140/90$ mm Hg) (8). The aim of this study is to find the prevalence of high blood pressure and cardiac risk factors among health care workers during COVID-19 pandemic.

II. METHODS AND MATERIALS

A non-experimental correlation design was used in this study to assess selected risk factors of hypertension among health care professionals. The study was conducted with young and older adult group aged between 25 to 55 years both the genders, available at the time of data collection and those who are working in the hospital at the time of covid-19 pandemic were selected as the subject. Total no of 137 health care professionals were selected based on inclusion criteria out of them 80 subjects were selected based on simple random sampling and included for the study. The study was approved by the institutional review board. Formal permission was obtained from the concerned Medical Officer SIMATS, university hospital. The investigator has collected the data pertaining to demographic variables using structured interview schedule. The dependent variables were selected as they were found to be reliable and best indicator for hypertension risk factors. The investigator has thoroughly reviewed the available scientific literature pertaining to hypertension risk factors from textbooks, journals, periodicals, magazines, research papers, through internet from various search machines. The feasibility criteria, availability of instrument and the relevance of the variables were given special consideration for the study and also the test items involved in this study were included as they were found valid.

III. ORIENTATION OF THE SUBJECTS

Before collection of data, the subjects were oriented about the purpose of the study. The investigator explained the procedure of each test in detail to the subjects. A written informed consent form was obtained from the participants before enrolment in the study. The purpose of the study, anonymity and withdrawal options was explained.

IV. CRITERION MEASURES AND TESTER RELIABILITY

By glancing the literature and consultation with the professional experts, the following variables have been selected (Table -1). To ensure standardization and reliability of testing procedures, the investigator learned the procedures and methods to handle and operate the instrument to administer the test. Measurements were taken by the investigator during the practice sessions of the testing procedures. Tester reliability was established by test and retest process. The tester corrected the data from ten subjects to determine the reliability of the measurements (Table-1).

Table -1: Physiological and hemodynamic test items and unit of measurement

SL.N0	Criterion Variables	Test Items	Unit of Measurement	Correlation Co-efficient
Physiological variables				
1	Body fat percentage	OMRON BF306 hand-held body fat monitor	Percentage	0.79*
2	Body mass index (BMI)	Standard calibrated weighing machine, Stadiometer	Numbers	0.98*
3	Resting heart rate	Heart rate monitor	Beats/minute	0.80*
Hemodynamic variables				
1	Systolic blood pressure	Sphygmomanometer	mm hg pressure	0.90*
2	Diastolic blood pressure	Sphygmomanometer	mm hg pressure	0.89*
3	Pulse pressure	Sphygmomanometer	mm hg pressure	0.83*

*Significance at 0.05 level of confidence

V. PROCEDURE

BODY FAT PERCENTAGE

The purpose of this test is to find out the body fat percentage and body mass index (BMI) of the participants. OMRON BF-306 hand-held body fat monitor (Impedance Analyser) was used for administration of the test. The participants were instructed to stand with the feet shoulder width apart, turn on the machine and enter the height, weight, age and sex, hold and wait for a reading. The palm of each hand should be in contact with the bottom two electrodes and inside part of each thumb should be in contact with the top two electrodes and hold straight in front at shoulder level and press start. The measurement of the body fat will be displayed within 60 seconds. All the participants were instructed to do the measurement either before or after 2 hours of meal. The score was recorded as in percentage.

BODY MASS INDEX (BMI)

The purpose of the test is to assess the body mass index based on their weight and height. Standard calibrated weighing machine and stadiometer were used to administer the test. The subject's body weight is measured through a weighing machine placed on a level surface and adjusted the scale at zero before the testing process. The subjects were asked to stand upright, with their hands by their sides on the centre of the platform with minimum clothing. Accurate measurement was taken to the nearest kilogram in the scale. The height of the subject is measured with use of a wall mounted stadiometer. Standing height was measured by the maximum distance from the floor to the highest point on the head when the subject is standing upright against the wall. The subjects are instructed to remove the shoes, keep the feet together and keep the buttocks and upper back in contact with the wall during the measurement is made. The body mass index (BMI) is calculated by measuring the person's weight and dividing by their height squared. $BMI = \text{Weight in Kilograms} / \text{Height in Meters} \times \text{Height in Meters}$. The score was recorded as in point.

RESTING HEART RATE

The purpose of this test is to assess the heart rate to compare the efficacy of the interventions. The lower the heart rate the fitter the subject and faster heart beat is the key indicator for the cardiovascular risk. A stop watch and heart rate monitor was used to administer the test. The investigator was explained the procedure well for all the participants that the resting heart rate should be measured after 10 minutes of rest period. The investigator was used his fingers to feel the pulse not the thumb to avoid feeling of own pulse. The radial pulse was assessed for all the participants for that the investigator had placed his index and middle fingers together on the participants opposite wrist, about 1/2 inch on the inside of the wrist joint, in line with the index finger. Once the pulse was felt the number of beats was counted for one-minute period. the score was recorded number / minute.

VI. HEMODYNAMIC VARIABLES

BLOOD PRESSURE

All the participants were explained about the procedure completely and make them understand that the recording of blood pressure is part of the research study. The proper sized cuff was selected for the participants to give an accurate reading. The test was performed when the participants were advised to take rest for at least five minutes to avoid false outcome of the reading.

A manual sphygmomanometer was used in this study a stethoscope was placed over the artery then the cuff connected with the sphygmomanometer was inflated until the artery gets occluded and no sound was heard through the stethoscope than the valve of the hand bulb pump was slowly opened not more than 5 mm Hg / second to deflate the pressure until the point where a tapping sound was heard over the artery. This point was noted as the systolic pressure. The pressure in the cuff was released continuously until the point which the noise no longer heard this point was noted as diastolic blood pressure. The score was recorded as mm hg pressure.

PULSE PRESSURE

The purpose of this test is to identify the difference between systolic and the diastolic blood pressure. The amount of pulse pressure depends on the arterial wall elastic properties and stroke volume. The acute mental stress can produce a sustain increase in arterial wall stiffness and associated with increased pulse pressure. The elevated pulse pressure is an important indicator for coronary heart disease. It was also calculated to compare the treatment effects before and after the interventions. The score was measured in mm hg pressure. (Pulse pressure = Systolic blood pressure – Diastolic blood pressure).

VII. RESULTS:

Table 2 indicates the majority of subjects 38 (47.5%) belong to the age group of 25-35 years, 29 (36.2%) belong to the age group of 36-45 years and 13 (16.2%) belong to the age group of 46-55 years. With regards to gender, majority of subjects 42 (52.5%) were males and 38 (47.5%) were females.

According to occupational status, majority of subjects 33 (41.2%) were nursing professionals, 19 (23.7%) were laboratory technicians, 12 (15%) were duty doctors, 9 (11.2%) were clinical physiotherapists and 7 (8.7%) were supportive staffs.

Table-2: Frequency and percentage of demographic variables

S/No	Demographic variables	N=80	%	
1.	Age in years	25-35	38	47.5
		36-45	29	36.2
		46-55	13	16.2
2.	Gender	Male	42	52.5
		Female	38	47.5
3.	Occupational status	Doctors/ Physicians	12	15
		Nurses	33	41.2
		Physiotherapists	9	11.2

	Laboratory technicians	19	23.7
	Supportive staffs	7	8.7

Table 3 reveals the means of age wise comparison of body fat percentage, body mass index (BMI), resting heart rate, Blood pressure, and pulse pressure. In reference with body fat percentage, 16.2% of older adult group aged between 46-55 years was scored 27.3, 36.2% of adults aged between 36 to 45 years scored 26.5 and 47.5% of adult health care workers aged between 25 to 35 years scored 24.3. In reference with body mass index (BMI) 16.2% of older adult group aged between 46 to 55 years are scored 27.3, 36.2% of adults aged between 36-45 years scored 25.06 and 47.5% of adult health care workers aged between 25 to 35 years scored 24.08. The age wise comparison of resting heart rate was observed 16.2% of older adult group aged between 46 to 55 years are scored 91.35, 36.2% of adults aged between 36 to 45 years scored 95.45 and 47.5% of adult health care workers aged between 25 to 35 years was 90.70 respectively. Further, the age wise comparison of blood pressure (systolic and diastolic) was observed as 135/92 mm hg, 132/91 mm hg and 128/87 mm hg among the age groups of 46 to 55, 36 to 45 and 25 to 35 years respectively. The average value of pulse pressure between the age groups of 46 to 55, 36 to 45 and 25 to 35 years was documented as 42.9 mm hg, 40.8 mm hg and 40.5 mm hg respectively.

Table-3: Frequency and percentage of physiological and hemodynamic risk factors

S/No	Variables in Average	Age in Years			Mean	S.D
		25-35	36-45	46-55		
1	BF%	24.35	26.55	27.30	26.06	1.53
2	BMI	24.08	25.06	27.3	25.48	1.5
3	RHR/min	90.70	95.45	91.35	92.5	2.57
4	SBP/mm hg	128.20	132.75	135.15	132.03	3.45
5	DBP mm hg	87.70	91.90	92.20	90.6	2.51
6	PP/mm hg	40.5	40.8	42.9	41.43	1.30

VIII. DISCUSSION:

This study was done to find out the high blood pressure and its risk factors among health care workers during covid-19 pandemic. The findings of the present study speculate that all the male health care workers in this study were having high percentage of body fat as 26.06 (9). The average heart rate was measured as 92.5 beats per minute were considered as normal according to American Heart Association (10). However, the age group between 36-45 years has higher heart rate compared with subjects aged between 46-55 years. Further, 52.4% of health care professionals aged between 36 to 55 years have stage 1 hypertension according to the 2017 new classification of American Heart Association/American College of Cardiology (AHA/ACC); BP, blood pressure guidelines. However, there is no abnormality was found in pulse pressure among the health care workers during covid pandemic. The current threshold for BP control in India is unpredictable. To achieve hypertension control, the country should adopt and enforce hypertension screening and diagnosis programs on a massive scale and increase awareness (8). There was no measurable difference over 9 years in the rate of change in heart rate variability among those with and without hypertension (11). There is a need to provide comprehensive healthcare support to the shift workers is important, including specific occupational strategies to minimize the impact of these cardiovascular risk factors on their health and ensure good quality of life (12), there were 40 nurses' pre, during, and post change-of-shift report blood pressures and heart rates were taken. The blood pressures and heart rates were higher (p less than .0001) in front of a group than in front of an individual (13). The similarities and differences in beliefs about hypertension among health care workers in Nigeria need significant implications for management of hypertension (14). Our group has conducted research relevant to physiotherapeutic intervention on various neurological and musculoskeletal ailments (15-24), and warrants further experimental research by our group in signifying the results.

IX. CONCLUSION

Based on the results of this study evidenced that 52.4% of the health care workers having high blood pressure and all the participants have high body fat percentage 26.06 with body mass index as overweight 25.4. Further, it was

evidences that most of the health care professionals are under risk of developing hypertension. This study recommends to implement coping strategy to manage work stress and awareness about developing risk factors for hypertension and ischemic cardiac disease. Future study can be conducted to find the efficacy of coping strategy.

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