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A Descriptive Observational Study Assessing the Level of Stress and to Correlate Stress Level with BP in Medical Students

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ABSTRACT
The aim of the present study was to assess the level of stress and to correlate stress level with BP in medical students. This is institution based cross sectional study done at Siddhartha medical college Vijayawada. A total of 100 subjects who were non-smokers with normal BMI, without any history of drug intake and acute illness were included. Subjects with any disease or condition that affects BP were excluded. The study was approved by the Institutional Ethical Committee. The study protocol was explained to the subjects, written and informed consent was obtained. The results showed that students had moderate stress for ARS and mild stress for IRS, TLRS, SRS and DRS. GARS had stress between mild and moderate levels. Pearson correlation was done to find the correlation between stress domains and BP levels. There was a significant correlation between diastolic BP (DBP), ARS and GARS ($p<0.05$). Medical students have mild to moderate degree of stress and there is a positive correlation between ARS, GARS and DBP. Proactive measures are to be taken to prevent the progression of elevated BP to hypertensive levels, to prevent complications related to hypertension and for well-being of the students.

INTRODUCTION

Modern, often sedentary, lifestyles are becoming the norm for many Indians as a result of urbanization and technology advancements. Jobs have become scarcer due to technological advancements, which has put a strain on young Indians already struggling to find work in the face of intense competition[1]. Age, sex, body size, obesity, changes in food habits, a family history of hypertension, level of physical activity, stress levels and a host of other environmental and genetic variables are all linked to hypertension[2]. High blood pressure is quickly becoming an epidemic. Hypertension has become more common and it is not limited to rural areas[3]. Hypertension affects an estimated 10-30.9% of the Indian population[4]. In the last 30 years, the prevalence of hypertension in adults has skyrocketed, going from 5-20-40% in cities and 12% to 17% in rural regions[5].

Both the systolic and diastolic phases of the heart's contractions contribute to the overall systemic arterial pressure, which is the result of the force applied by the cardiac debit on the walls of the blood arteries. Systolic arterial pressure in healthy persons is less than 120 mmHg and diastolic arterial pressure is less than 80 mmHg. A person's typical resting heart rate might range from sixty to one hundred beats per minute, which is known as cardiac frequency[6]. Systemic arterial hypertension (SAH) is a frequent result of changes to arterial blood pressure, which may occur due to a number of different reasons. This may affect homeostasis and is characterized by consistently high arterial pressure, more than 140 mm Hg systolic and more than 90 mm Hg diastolic[7].

Factors that are hard to change include heredity, gender, age and ethnicity variables that are easier to influence include things like being overweight, drinking excessively, smoking, being sedentary, experiencing psychosocial stress, having low socioeconomic status, and having sleep apnea, among other environmental factors that contribute to an unhealthy lifestyle[6]. Stress, a pathological shift in reaction to external stimuli, is a risk factor that significantly affects changes in arterial pressure and cardiac frequency. Since the social realm has evolved to link sedentary habits with violent behaviour, long work hours, unhealthy eating habits and a host of other variables that add up to emotional exhaustion, this causal agent has grown more prevalent in inducing SAH[8].

Medical students undergo a great deal of stress, which should be considered in light of the negative effects of stress on vital signs including blood pressure and heart rate. There is a significant prevalence of pain and suffering among this group because they are subjected to lengthy days of courses, long hours of study and pressure from both the academic community and their families. Students may be more prone to acquiring depressive disorders and experience significant disruptions in their personal and professional lives as a result of this misery. This class's stressful environment may lead to worse academic performance, social isolation, fatigue, and an increased susceptibility to acquiring numerous diseases, since the immune system is greatly affected by one's emotional and psychological condition[9,10]. This research set out to do two things:

- Measure medical student's stress levels
- Find a correlation between those levels and blood pressure

MATERIALS AND METHODS

This is an institutional based cross-sectional study done at Siddhartha medical college Vijayawada, Andhra Pradesh from November 2023 to mid-January 2024. MBBS 1st to finbal year students were the study participants. A group of 25 Normotensive students were randomly picked up from each batch to attain the sample size. A hundred healthy adults (non-smokers) without a history of substance abuse or serious disease were considered for inclusion in the study. People whose health was known to impact blood pressure were not included in the study. The institutional ethics board gave its stamp of approval to the research. Subjects gave their signed, informed permission after being briefed on the study's procedures. All topic's histories were compiled. All individuals had their anthropometric data, including weight and height, documented. Quetelet's index, which is weight (kg^1) $height^{-2}$ (m^2), was used to determine BMI. After a 10-min period of sitting quietly the patient's blood pressure was taken using a sphygmomanometer. The reading was recorded to the closest 2 mm Hg by utilizing the first and fifth Korotkoff sounds. The study was based on the mean of the two closest blood pressure readings out of three that were taken.

A validated tool for identifying causes of stress in medical students the medical student stressor questionnaire (MSSQ)[11], was used to measure stress levels. The 20 items that make up the MSSQ are based on potential sources of stress in medical students that have been found in the literature. These sources have been categorized into six main areas academic stress, intrapersonal and interpersonal stress, teaching and learning stress, social stress, drive and desire stress, and group activities related stress. There was no time restriction and students were asked to answer all of the questions. Respondents filled out the survey while the investigators were present to address any questions.

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Results

The results showed that students had moderate stress for ARS and mild stress for IRS, TLRS, SRS and DRS. GARS had stress between mild and moderate levels. Pearson correlation was done to find the correlation between stress domains and BP levels. There was a significant correlation between diastolic BP (DBP), ARS and GARS ($p<0.05$).

DISCUSSIONS

The word "stress" encompasses not only the mental and emotional challenges that people face, but also the physical ones. Hans Selye distinguished between eustress and distress as types of stress[12]. A person experiences eustress when their performance improves in response to stress and distress when their stress levels remain high despite efforts to alleviate them[12]. In addition to dealing with lifestyle and career-related concerns, medical school may place a heavy psychological burden on students[13]. Stressors such as academic pressure, workload, financial difficulties and lack of sleep are likely to blame for the 28% higher prevalence of stress among medical students globally compared to age-matched peers and non-medical students, according to a meta-analysis. Poor academic performance, drug addiction, damaged interpersonal connections, medical school dropout, low self-esteem and thoughts of suicide are all possible outcomes of chronic stress and anxiety. Medical students are at increased risk for both mental and physical health issues due to high levels of untreated stress[14].

Students reported low stress levels for IRS, TLRS, SRS and DRS and moderate levels for ARS, according to the data. Stress levels in GARS ranged from low to severe. The link between stress domains and blood pressure levels was determined using Pearson correlation. A link between diastolic blood pressure (DBP), arterial stiffness (ARS) and glomerular filtration rate (GARS) was found ($p<0.05$). Another research found the same thing that schoolwork was the primary source of student's high levels of stress[11]. Previous research has also shown that medical students whose stress levels are high do poorly in the classroom, whereas those whose stress levels are manageable tend to do better[14]. In a very short amount of time, medical students are expected to absorb and acquire a great deal of information and abilities. Aside from academics, they are also required to cultivate strong interpersonal communication skills in order to effectively connect with coworkers, patients and their attendants. While previous research has demonstrated that academic-related activities create a high degree of stress, the current study found that the individuals had mild to moderate stress. This could be because to variations in personality, upbringing and coping mechanisms[11,15].

Serious pathological concerns may arise from the medical decisions linked to an unhealthy lifestyle. Factors that contribute to psychological stress include current events, issues at work and at home, feelings of isolation, financial difficulties and violent acts[8]. Because of the interconnected nature of these issues,

Table 1: Descriptive statistics of the study participants

Parameters	Mean±SD
Height (cm)	162.058±9.1502
Weight (kg)	65.75±63.357
BMI (kg m^{-2})	21.464254±2.9181688
SBP (mm Hg)	114.76±10.450
DBP (mm Hg)	78.72±7.543

Table 2: Stress levels in the six domains of MSSQ in medical students

Stress domains	Mean±SD
ARS	1.942445±0.6481312
IRS	1.278682±0.7592512
TLRS	1.218414±0.7107520
SRS	1.328420±0.6502490
DRS	0.8046±0.75024
GARS	1.5604±0.76216

Table 3: Correlation between BP and stress domains in medical students

BP components	Correlation	ARS	IRS	TLRS	SRS	DRS	GARS
SBP	Pearson correlation Significant (2-tailed)	0.124 *R*	0.024	−0.116	0.007	0.096	0.179
		0.248 (P)	0.836	0.275	0.965	0.356	0.087
DBP	Correlation Pearson correlation	0.225 (R)	0.157	0.056	0.082	0.042	0.266
	Significant (2-tailed)	0.0304 (P)	0.0132	0.132	0.448	0.703	0.011

medical students have increased rates of academic failure, relationship breakdown, drug misuse, and suicide, all of which contribute to their psychological distress[9,10]. The literature also describes other factors, such as not having a plan for studying, having a restless night the night before a test and eating poorly at that time[16]. Furthermore, students may be at risk for stress due to the rigid test schedules and the absence of psycho-pedagogical care, which may develop into a pathological process in medical school. Having said that the disparity was insignificant.

CONCLUSION

There is a positive relationship between ARS, GARS and DBP and medical students experience mild to severe stress. In order to ensure the pupil's health and stop their blood pressure from rising to dangerously high levels, it is necessary to take preventative actions.

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