National Journal of Physiology, Pharmacy and Pharmacology

RESEARCH ARTICLE

Prevalence of elevated blood pressure, stress, and anxiety and its association with cognitive failure among medical students – A cross-sectional study

Sureka Varalakshmi V[1], Sanjana Karthick[2], Jeeva Jothy[3]

[1]Department of Physiology, ACS Medical College and Hospital, Chennai, Tamil Nadu, India, [2]Medical Student, ACS Medical College and Hospital, Chennai, Tamil Nadu, India, [3]Department of Community Medicine, ACS Medical College and Hospital, Chennai, Tamil Nadu, India

Correspondence to: Sureka Varalakshmi V, E-mail: surekaramesh@hotmail.com

Received: January 02, 2020; **Accepted:** January 30, 2020

ABSTRACT

Background: The cognitive failure is prevalent among student population and is preventable to some extent. Factors that can affect cognition include stress and anxiety which can elevate normal blood pressure (BP). Prehypertension is a silent risk factor. **Aims and Objectives:** The aim of the study is to find out the prevalence of prehypertension, stress, and anxiety and its correlation with cognitive failure. **Materials and Methods:** One hundred and fifty students, both male and female, were recruited and questionnaires were administered to assess cognition (cognitive failures questionnaire [CFQ]), stress (Cohen stress scale), and anxiety (Generalised anxiety depression (GAD) questionnaire). BP was measured under basal conditions. **Results:** Of the 150 students recruited, equal distribution of male and female was seen. The mean age of students was between 18 and 26 years. About 45.7% of students had prehypertension and 7.9% were hypertensives. CFQ assessment shows that 51.7% of students had severe cognitive failure. No significant association was seen between cognitive failure and prehypertension ($P < 0.05$). Wide prevalence of stress (76.2%) and anxiety (42.4%) was seen. A positive correlation was seen between these variables with an increase in stress and anxiety affecting cognition. **Conclusion:** Evaluation of BP and counseling the students whose BP falls within prehypertensive and hypertensive range will help understand the importance of healthy lifestyle good mental and physical well-being can reduce stress and anxiety and improve cognition.

KEY WORDS: Prehypertension; Cognition; Stress; Anxiety

INTRODUCTION

The epitome of the 21st-century lifestyle change on physical health is high blood pressure (BP).[1] There is consistent evidence from multiple studies that hypertension is a primary causative factor in several frank cerebrovascular and cardiac complications.[2] However, only limited research has been conducted on the association between hypertension with neuropsychological attributes such as cognitive and recall deficit[3,4] because of the general tenet that it is only induced by more menacing threats such as drugs and alcohol. This study aims to find the prevalence of hypertension among students and correlation of cognition with hypertension.

Studies have shown the prevalence of prehypertension among medical students to be nearly 51%[5] and it is a pointer toward hypertension in later age. Assessment of this risk factor among medical students is our primary aim for carrying out this project. Stress and anxiety are two important determinants for elevated BP and these psychophysiological

Access this article online	
Website: www.njppp.com	Quick Response code
DOI: 10.5455/njppp.2020.10.001012020300012020	

markers are key factors in the development of cardiovascular disorders.[2] The plan, therefore, is to assess the stress[6] and anxiety[7] of undergraduate medical students using validated questionnaires. The studies in the middle-aged population have proved that high systolic hypertension decreases memory, acquisition, and retrieval of information.[3,8] The decline in cognitive ability is generally subtle and slow,[9] but marked over a long-term period. Studies in students have shown that high systolic BP reduces cognition and stress and anxiety are key factors in inducing hypertension.[10]

MATERIALS AND METHODS

The study was carried out at ACS Medical College and Hospital. After obtaining clearance from the Institutional Ethical Committee, 150 male and female students of age between 18 and 26 years were recruited for the study using simple random sampling.[5] Students who gave consent were only allowed to participate in the study. Students on antihypertensive and antidepressants were excluded from the study.

The objectives of the study were as follows:
- BP status of students
- To screen students suffering from stress, anxiety, and cognitive failure
- Association of cognition with BP.

BP was measured with a mercury sphygmomanometer in the sitting position after the subject has rested for 5 min. Self-administered Cohen's stress questionnaire and depression (GAD) questionnaires were used to assess stress and anxiety scores. The cognitive failures questionnaire (CFQ) validated by the British Association of Psychology was given to students.[9] These questionnaires will help to screen the students for any cognitive defect based on three factors, namely, forgetfulness, distractibility, and false triggering.

Statistical Analysis

The data were entered and analyzed using SPSS software. All continuous variables presented as mean ± standard deviation. A Chi-square test was used for the analysis of categorical variables.

RESULTS

The findings of the present study are presented in Tables 1–5 and Figure 1.

DISCUSSION

The study shows that students have a high prevalence of prehypertension. Nearly 45% of students had prehypertension.

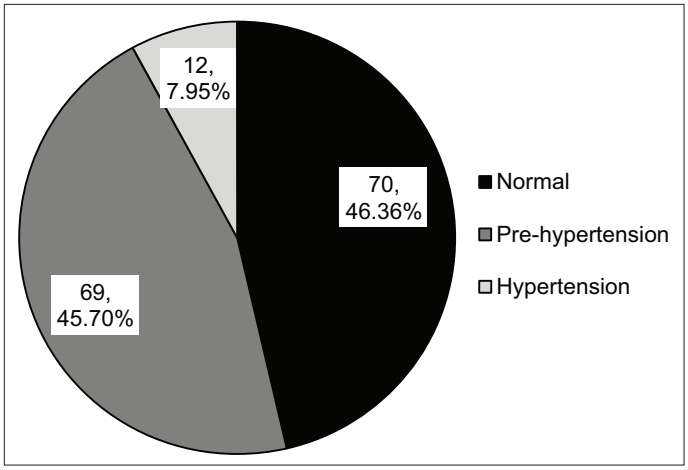

Figure 1: Prevalence of prehypertension

Table 1: Demographic data

Variable	Classification of variable	Percentage
Age (years)	18–20	70.2
	21–23	27.8
	24–26	2.0
Gender	Male	50.3
	Female	49.7

Table 2: Stages of anxiety

Anxiety	Frequency	Percentage
Mild	58	38.4
Moderate	64	42.4
Severe	29	19.2

Table 3: Cohen score for stress assessment

Cohen score	Frequency	Percentage
Average	36	23.8
High	115	76.2

Table 4: CFQ score

CFQ score	Frequency	Percentage
Normal	17	11.3
Less affected	56	37.1
Severely affected	78	51.7

CFQ: Cognitive failures questionnaire

Table 5: Association between systolic BP and cognition

Systolic BP	Cognition (CFQ)			Total (percentage)
	Normal	Less affected	Severe	
Normal	17.1	32.9	50	46.36
Prehypertension	7.2	40.6	52.2	45.69
Hypertension	0	41.7	58.3	7.94

CFQ: Cognitive failures questionnaire, BP: Blood pressure

About 42.4% of students suffer from moderate anxiety and 76% of students suffer from severe stress. About 51.7% of students have cognition below normal which includes forgetfulness, distractibility, and ability to recollect. There was no positive association between prehypertension and cognition about stress and anxiety had a positive correlation with cognition.

Age of the students recruited for the study was between 18 and 26 years [Table 1] with 70% of students in the age group of 18–20 years. Equal distribution of students regarding gender was seen with 50.3% of males and 49.7% of females.

Generalized anxiety scores show 42.4% from moderate anxiety [Table 2] and 19.2% from severe anxiety.[10] Studies done on the prevalence of stress and anxiety in college students show that academic performance, pressure to succeed, and future plans were anxiety-causing reasons.[11,12] Gerald Mathews, in 1988, studied the correlates of anxiety and cognition and found significant correlates between self-consciousness, anxiety, and cognition.[13] Learning disabilities were seen in pediatric anxiety also.[10] Cognitive modification tests showed that anxiety increases in cognition failure in test going students.[14] The prevalence of stress was high among students (76%) and results show [Table 3] that there was a significant association between stress and cognition. Studies have shown that cognitive failure is seen in stressful subjects as they lose the ability to cope up.[13] Based on CFQ data [Table 4], the prevalence of cognitive failure shows that 51.7% of students have a cognitive failure.[14] Reasons for low cognition can be due to a diet with low folate levels or due to interpersonal behavior and perceptions of college life.[15] On the evaluation of the prevalence of BP, 7.9% were in the hypertensive range and 45.7% of students were in the prehypertensive range [Figure 1]. The previous studies also have reported a prevalence of prehypertension in students and significance was seen between prehypertension and stress.[5] On the evaluation of students with hypertension for cognition, there was no association between cognition and variations in BP [Table 5]. However, studies[16] have proved that inadequate BP regulation in relation to change in posture has been linked to depression and lack of interpersonal skills. Hypertension has also been found to be a risk factor in vascular dementia.[17]

Maximum participants for this study were 1st year students fresh from their schooling. Adjustment to college life, including new friends, academics, hostel life, and financial status of parents, would have created stress and thought about future will give them anxious moments. This could have caused a low cognition. Future studies on the 2nd and final year students will give us a clear picture of the role of stress and its affect on cognition.

CONCLUSION

Based on data from our students, we can state that students suffer from anxiety and stress and it has a positive correlation with cognition. Even though students in the prehypertensive range are very high, no significance is seen with cognition. Including physical activity in the curriculum can reduce stress among students. Also diet rich in antioxidants rich in Vitamin C[18] has shown to improve symptoms of stress and anxiety. Furthermore, regular interactions with student counselors can have a positive impact on the mental and physical well-being of students and improve their quality of life both professionally and personally.

REFERENCES

1. Senthil S, Krishnadasa SN. Prehypertension and its determinants in apparently healthy young adults. J Clin Diagn Res 2016;10:CC05-8.
2. Krantz DS, Manuck SB. Acute psychophysiologic reactivity and risk of cardiovascular disease: A review and methodologic critique. Psychol Bull 1984;96:435-64.
3. Wallace RB, Lemke JH, Morris MC, Goodenberger M, Kohout F, Hinrichs JV. Relationship of free-recall memory to hypertension in the elderly. The Iowa 65+ rural health study. J Chronic Dis 1985;38:475-81.
4. Saxby BK, Harrington F, McKeith IG, Wesnes K, Ford GA. Effects of hypertension on attention, memory, and executive function in older adults. Health Psychol 2003;22:587-91.
5. Abeetha S, Sureka V, Brinda S, Ganesh M, Olickal JJ, Sujatha K. Prevalence of prehypertension and its association with levels of stress and anxiety among students of various disciplines in Chennai-a cross-sectional study. Nat J Physio Pharm Pharmacol 2018;8:1599-604.
6. Cohen S, Janicki-Deverts D, Miller GE. Psychological stress and disease. JAMA 2007;298:1685-7.
7. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: The GAD-7. Arch Intern Med 2006;166:1092-7.
8. Skoog I. Hypertension and cognition. Int Psychogeriatr 2003;15:139-46.
9. Broadbent DE, Cooper PF, FitzGerald P, Parkes KR. The cognitive failures questionnaire (CFQ) and its correlates. Br J Clin Psychol 1982;21:1-6.
10. Adams HR, Szilagyi PG, Gebhardt L, Lande MB. Learning and attention problems among children with pediatric primary hypertension. Pediatrics 2010;126:e1425-9.
11. Jing H, Xiao-Mei Y, Fei X, Liang YQ, Wang ZY. Association between depression and hypertension-a case-control study. Chin J Public Health 2008;24:281.
12. Beiter R, Nash R, McCrady M, Rhoades D, Linscomb M, Clarahan M, *et al*. The prevalence and correlates of depression, anxiety, and stress in a sample of college students. J Affect Disord 2015;173:90-6.
13. Matthews G, Wells A. Relationships between anxiety, self-consciousness, and cognitive failure. J Cogn Emot 1988;2:123-32.
14. Meichenbaum DH. Cognitive modification of test anxious college students. J Consult Clin Psychol 1972;39:370-80.
15. Rohrkemper MM. The influence of teacher socialisation style on students social cognition and reported interpersonal classroom behaviour. Elem Sch J 1984;85:245-75.
16. Rawson HE, Bloomer K, Kendall A. Stress, anxiety,

depression, and physical illness in college students. J Genet Psychol 1994;155:321-30.
17. Chandra SR, Yadav R, Puneeth CS, Saini J, Issac TG. 'The spectrum of vascular dementia'--a retrospective study from South India. J Assoc Physicians India 2014;62:498-503.
18. Sangeetha A, Mohan SK, Kumaresan M. Chronic administration of Vitamin C increases cognitive function in chronic stress induced rats. Natl J Physiol Pharm Pharmacol 2017;7:1190-4.

How to cite this article: Varalakshmi VS, Karthick S, Jothy J, Prevalence of elevated blood pressure, stress, and anxiety and its association with cognitive failure among medical students – A cross-sectional study. Natl J Physiol Pharm Pharmacol 2020;10(03):232-235.

Source of Support: Nil, **Conflicts of Interest:** None declared.