Original Article

DOI: 10.7860/JCDR/2023/58782.17443

Nursing Section

Correlation of Sleep Quality with Body Mass Index and Blood Pressure among the Healthcare Students in Karnataka: A Cross-sectional Study

NISHA[1], MAHADEV PRASAD[2], US PAVITHRA[3], DONA BABU[4], BENAZEERA[5], S PADMA PRIYA[6]

ABSTRACT

Introduction: A quality night sleep is essential for physical, cognitive, and emotional well-being. The amount of sleep may have an effect on both weight and metabolism. In India, for the last few years, decline in sleep duration has been noted with an average sleep duration of seven hours per night and one-third sleeping less than seven hours per night. Televisions and smartphones which came into households as remarkable source of information and entertainment has caused the voluntary sleep restriction.

Aim: To evaluate the sleep quality, Body Mass Index (BMI) and Blood Pressure (BP) of the healthcare students and also to find the correlation of sleep quality with BMI and BP.

Materials and Methods: The present cross-sectional study was conducted on 138 healthy males and females healthcare students residing in hostel premises of Yenepoya (Deemed to be University), Karnataka, India from November to December 2021. Pittsburgh Sleep Quality Index (PSQI) questionnaires administered to assess the sleep quality by adding the seven components of PSQI score ranging from 0-21. A weighing scale, sphygmomanometer, and stadiometer instruments were used to record the weight, BP and height. Data were computed in International Business Management (IBM) Statistical Package for Social Sciences (SPSS) software version 23.0 to analyse descriptive and inferential statistics.

Results: The mean age in present study was 23±0.72 years and 71 (51.4%) belonged to 22-23 years, majority 112 (81.2%) were female students. In present study, moderately obese students (33.15±0.72) and severely obese (35.39±0.10) had mean sleep score of 6.00±3.46 and 11, respectively indicating poor sleep quality. The underweight (16.91±1.17), normal weight (21.49±2.04) and overweight (26.49±1.48) had mean sleep score of 3.08±1.62, 3.08±1.12 and 4.66±3.05 respectively, which indicated good sleep quality. Students with hypotension, normal BP and hypertension stage-1 showed mean sleep score of 3.52, 2.71 and 4.77 respectively, showing good sleep quality. A statistically significant positive correlation of BMI was found with SBP (r-value 0.273, p-value 0.001) and DBP (r-value 0.181, p-value 0.033).

Conclusion: The BMI and BP were positively correlated with sleep quality. Therefore, creating awareness among healthcare students on healthy lifestyles such as exercise, healthy sleep and regular health supervision is essential to prevent prehypertension and maintain normal BMI status.

Keywords: Healthy lifestyle, Height, Hypertension, Weight

INTRODUCTION

Sleep deprivation causes issues with memory, attention, mood regulations [1], thought, motor responses to stimuli [2], and performance at work or college [3]. During college time, students experience freedom from parental supervision for the first time, also there is a burden of greater academic and erratic schedules [4,5]. Many factors such as unbalanced diet, detrimental habits as alcohol intake, smoking, and lack of sleep, prolonged mobile use can harm the students' well-being [6-8].

Using cell phones at night is common among children and adults as reported by them [9,10]. It has become a serious barrier to health development [11,12]. Sleep is a critical modulator of neuroendocrine function and glucose metabolism in children and in adults [13,14]. Short sleep alters metabolic as well as endocrine function which leads to reduced glucose level, decreased insulin sensitivity [15,16], increase in night time concentrations of cortisol [17,18] and decreased leptin levels. Cortisol is widely known as the "stress hormone." However, it has many important effects and functions throughout the body, aside from regulating the body's stress response. The exact way in which cortisol regulates BP in humans is unclear. However, elevated levels of cortisol can cause high BP, and lower-than-normal levels of cortisol can cause low BP. All of this results in more hunger and appetite [19]. So, short sleep duration is causing increased BMI and increased BP [20].

Sleep patterns among adolescents have been changing over recent decades, accompanying the social constraints, the increase of interaction with peers, school requirements and extracurricular activities. High BP during childhood acts as an indicator for the prevalence of coronary artery disease during adulthood [21]. In adults both hypertension and coronary artery disease have been associated with short sleep duration. According to World Health Organisation (WHO), hypertension is one of the main causes of premature death worldwide [22]. According to worldwide data, in India 20.6% of men and 20.9% of women are suffering from hypertension in 2005 and at these rates for hypertension is expected to go upto 22.9% for men and 23.6% women, respectively by 2025 [23,24].

So, in view of significantly increasing BMI and prevalence of hypertension in relation to short sleep duration among medical college student, this study was planned. Additionally, epidemiological studies have repeatedly shown that excessive sleep is statistically associated to both morbidity and mortality [25,26] and no studies on the relationships between sleep quality, BMI, and BP were carried out in Karnataka.

Chronic partial sleep deprivation causes feelings of fatigue which may lead to reduced physical activity. Sleep deprivation may also have neuro-hormonal effects that increase caloric intake [27]. In addition to maintaining normal brain functioning, sleep has an important role in controlling the functions of many other body systems, and this becomes very evident in a state of sleep deprivation [28]. Therefore, sleep is a critical modulator of neuroendocrine and glucose metabolism function. Hence, present study was conducted to evaluate the sleep quality, BMI and BP of the healthcare students and also to find the correlation of sleep quality with BMI and BP.

MATERIALS AND METHODS

A cross-sectional study was conducted in Yenepoya (Deemed to be University), Karnataka, India, from November to December 2021. Ethical approval was obtained from Ethics Committee-2, Yenepoya (Protocol No: YEC2/795). The principles of the Declaration of Helsinki guidelines adopted to conduct the study. Informed consent from the participants was obtained.

Inclusion criteria: Healthy male and female undergraduate students of physiotherapy, pharmacy, nursing residing in hostel premises between age group of 18-25 years were included.

Exclusion criteria: Healthcare students with a history of long term intake of medication for any acute or chronic illness causes, history of hypertension, those who have taken tea or coffee or heavy breakfast, exercised within 30 minutes of BP monitoring were excluded from the study.

Sample size calculation: The sample size was calculated using a single population proportion with 95 percent power and a level of significance of 5%, as recommended by Bisht RS et al., [29]. G* power was used in the calculation and sample size was calculated of 138.

Study Procedure

The demographic characteristics of the participants included age, gender, hours of sleep, family history of hypertension, co-morbidity, smoking habits, alcohol consumption, physical activity, and medication history. The sleep quality of the participants was measured by using PSQI [30,31]. It consists of seven components:

- Subjective sleep quality,
- Sleep latency,
- Sleep duration,
- Habitual sleep efficiency,
- Sleep disturbances,
- Use of sleeping medications,
- Daytime dysfunction over the last month.

Each item is weighted on a 0-3 interval scale. The global PSQI score is then determined by adding the results from each of the seven components, yielding a total score ranging from 0-21, with score <5 indicating better sleep quality and a total score of "5" or more indicating poor sleep quality.

The weighing scale, sphygmomanometer, and stadiometer instruments were used to assess the participants' weight, BP, and height. The weight of the participants was taken while wearing only the most basic attire, such as bare feet and light clothing. A stadiometer was used to measure height with the person barefoot, the heels, hip, shoulder and the head in a neutral position. BMI was calculated by dividing weight in kg by body height in metres squared (kg/m^2). BMI of students were classified according to body type classification for health ministry and diabetes foundation of India in 2015 which consists of normal weight (18.5-≤24.9), overweight (25-≤29.9), moderately obese (30-≤34.9), severely obese (35-≤39.9) very severely obese (>40 kg/m^2) [32].

Participants were informed to sit for atleast five minutes in a quiet room while measurements were taken, preferably in a sitting position. The researchers classified the participants' BP as normal (SBP 120 mmHg, DBP 80 mmHg), elevated (SBP 120-129 mmHg, DBP 80 mmHg), hypertension stage 1 (SBP 130-139 mmHg, DBP 80-89 mmHg), hypertension stage 2 (SBP 140 mmHg or higher, DBP 90 mmHg or higher), and hypertension crisis (SBP >180 mmHg, DBP >120 mmHg) according to the recommendation of the American Heart Association [33].

STATISTICAL ANALYSIS

Data were computed in IBM SPSS software version 23.0. Descriptive statistics of sleep quality and BMI were analysed in terms of frequency and percentage. Systolic BP (SBP) and Diastolic BP (DBP) of the male and female were summarised by mean and standard deviation. Karl Pearson's Correlation coefficient was used to identify correlation between sleep qualities, BMI and BP. Chi-square test was used to study the association of sleep quality with demographic characteristics of the participants.

RESULTS

In present study, the mean age of the 138 participants was 23±0.72 years and 112 (81.2%) were female students. The 32 (23.2%), 56 (40.6%), 46 (33.3%), and 4 (2.9%) had 5-6 hours, 7-8 hours, 9-10 hours, and 11-13 hours of sleep, respectively. None of them had history of hypertension, or smoking history. A total of 104 (75.4%) did not report any history of hypertension in the family and 136 (98.6%) did not have any chronic illness. Two (1.4%) reported that they had been suffering with asthma since childhood. A total of 96 (69.6%) had no interest in daily exercise and 133 (96.4%) did not have any medication history, while 2 (1.4%) were taking medication for asthma, and 3 (2.2%) were taking antianxiety medication. A significant association found between sleep quality score with hours of sleep as the calculated value was <0.05 level of significance [Table/Fig-1].

S. No.	Demographic variables	n (%)	Mean sleep quality score	χ^2	df	p-value
1	**Age in years**					
	18-19	2 (1.4)	4.50	1.28	3	0.733
	20-21	31 (22.5)	3.47			
	22-23	71 (51.4)	3.40			
	24-25	34 (24.6)	3.58			
2	**Gender**					
	Male	26 (18.8)	3.80	0.002	1	0.962
	Female	112 (81.2)	3.46			
3	**Sleep duration (hours)**					
	5-6 hours	32 (23.2)	4.53	9.191	3	**0.023***
	7-8 hours	56 (40.6)	3.32			
	9-10 hours	46 (33.3)	3.19			
	11-13 hours	4 (2.9)	2.25			
4	**History of hypertension in their family**					
	Yes	34 (24.6)	4.02	1.367	1	0.242
	No	104 (75.4)	3.36			
5	**Chronic illnesses**					
	Yes	2 (1.4)	3.50	1.194	1	0.274
	No	136 (98.6)	3.52			
6	**Habit of taking alcohol**					
	Yes	2 (1.4)	6.00	1.194	1	0.274
	No	136 (98.6)	3.49			
7	**Doing any exercise**					
	Yes	42 (30.4)	4.02	1.684	1	0.194
	No	96 (69.6)	3.31			
8	**Taking any medications**					
	Yes	5 (3.6)	4.02	1.377	1	0.241
	No	133 (96.4)	3.31			

[Table/Fig-1]: Association of demographic variables with mean sleep quality score.
Level of significant=<0.05, df=Degree of freedom, *=significant
Pearson's Chi-square test (χ^2)

The moderately obese students (33.15±0.72) and severely obese (35.39±0.10) had mean sleep score of 6.00±3.46 and 11, respectively indicating poor sleep quality. The underweight (16.91±1.17), normal weight (21.49±2.04) and overweight (26.49±1.48) had mean sleep score of 3.08±1.62, 3.08±1.12 and 4.66±3.05, respectively, which indicated good sleep quality. The association between BMI and sleep score was not statistically significant [Table/Fig-2].

BMI	f (%)	Mean BMI±SD	Mean sleep score±SD	p-value
Underweight	36 (26.08)	16.91±1.17	3.08±1.62	0.10
Normal weight	86 (62.31)	21.49±2.04	3.08±1.12	0.25
Overweight	12 (8.69)	26.49±1.48	4.66±3.05	0.43
Moderately obese	3 (2.17)	33.15±0.72	6.00±3.46	0.22
Severely obese	1 (0.72)	35.39±0.10	11.00±0.00	-

[Table/Fig-2]: Association of Body Mass Index (BMI) classification and mean sleep score.
Severely obese was one sample found in the study, value is not obtained

The mean sleep score of hypotension, normal BP and hypertension stage-1 indicated good sleep quality. There was no significant association found between BP and mean sleep scores. None of the participants had hypertension stage-II or hypertension crisis [Table/Fig-3].

Blood Pressure (BP)	Mean BP±SD (mmHg)	Mean sleep score±SD	p-value
Hypotension	107.76±4.78	3.52±2.25	0.474
	63.63±4.92		
Normal BP	120.00±.00	2.71±2.02	0.574
	80.00±.00		
Hypertension stage 1	130.00±.00	4.77±3.63	0.086
	90.00±.00		

[Table/Fig-3]: Association of Blood Pressure (BP) and Mean sleep score.

A positive correlation of sleep quality was found with SBP and DBP, BMI but was not statistically significant. A statistically significant positive correlation of BMI was found with SBP (r-value 0.273, p-value 0.001) and DBP (r-value 0.181, p-value 0.033) [Table/Fig-4].

Parameters		Correlation (r)	p-value
Sleep quality	**SBP**	0.146	0.086
	DBP	0.098	0.254
	BMI	0.162	0.058
BMI	**SBP**	0.273	**0.001****
	DBP	0.181	**0.033***

[Table/Fig-4]: Correlation of sleep quality with Blood Pressure (BP) and Body Mass Index (BMI).
p≤0.05 level of significant*, p≤0.01 level of significant**
Karl Pearson correlation coefficient®; SBP: Systolic blood pressure; DBP: Diastolic blood pressure

DISCUSSION

A total of 138 samples were examined for anthropometric measurements like weight and height, as well as participants' early-morning BP readings. Moderately obese students and severely obese had mean sleep score of 6 and 11 respectively indicating poor sleep quality. The underweight, normal weight and overweight had mean sleep score of 3.08±1.62, 3.08±1.12 and 4.66±3.05 respectively, which indicated good sleep quality. Students with hypotension and hypertension stage-1 had mean sleep score of 3.52 and 4.77 respectively, showing good sleep quality. In contrast to normal BP and stage 1 hypertension, the mean sleep score of hypotension showed good sleep quality.

A recent study done on healthcare students in the context of BMI, BP and sleep, indicated shorter sleep duration was highly significantly associated with higher BMI and with higher SBP. Sleep duration was also significantly associated with DBP in both male and female student participants [29]. A longitudinal study revealed that longer sleep duration and increased BP were found in females, but no significant association was found for males, and sleep durations shorter than 8 hours were found to be associated with increased hypertension [8,14].

In the last two decades, high BMI has become one of the biggest public health problems worldwide. BMI greater than 25 kg/m^2 in the general population has been well-documented as a risk factor for cardiovascular, metabolic, and musculoskeletal diseases [34]. In the present study, 80.4 percent had good sleep quality, and 19.6 percent had poor sleep quality. There are supportive studies where, 81.5, 73.2, 64.84, and 52.4 percent of participants had good sleep quality [35-39]. In contrast to the present study, 65.9 percent had poor sleep quality and 35.1 percent had good sleep quality.

A variety of advantageous outcomes, like improved health, reduced daytime sleepiness, enhanced well-being, and better psychological functioning, are related to high-quality sleep. One of the distinguishing characteristics of persistent insomnia is poor sleep quality [40]. Despite the fact that the concept of sleep quality is widely used, a review of the empirical literature suggests that it is not yet fully understood. In the present study, a statistically significant association was found between hours of sleep and the sleep quality scores of the participants. It could be due to the usage of smartphones at night being higher among medical students as they are busy during the morning on clinical duty and they spend more on the completion of academic requirements at night [40].

No other demographic was associated because the majority of participants were from one hostel premises. A study has shown that there is a significant association between the duration of sleep and BMI and BP [41,42]. Our measure of sleep assessment is based on self-reported sleep quality as per the PSQI. However, many studies conducted previously to assess sleep quality used the same tool, which has shown better sleep quality measurement worldwide.

Limitation(s)

The present study was conducted only in hostel premises, and the majority of the female healthcare students were included to assess the sleep quality. Studies need to be conducted across the institutions to generalise the results to the target population.

CONCLUSION(S)

Present study found overweight, moderate obesity and severe obesity had shown poor sleep quality. Good sleep quality found with normal BMI and underweight and hypotension, normal blood pressure and hypertension stage-1. A positive correlation of sleep quality was found with SBP and DBP, BMI but was not statistically significant. Subsequent follow-up of sleep quality, weight gain and blood pressure measurement over time would be ideal for combating promotion of healthy sleep among the healthcare students.

Acknowledgement

The authors are thankful to the participant for being a part of the study and showing interest. The authors are grateful to the hostel authority for providing permission to carry out the present study.

REFERENCES

[1] Youngstedt SD, Goff EE, Reynolds AM, Kripke DF, Irwin MR, Bootzin RR, et al. Has adult sleep duration declined over the last 50+ years? Sleep Med Rev. 2016;28(5):69-85.
[2] Zielinski MR, McKenna JT, McCarley RW. Functions and mechanisms of sleep. AIMS Neurosci. 2016;3(1):67-104.
[3] Ruthig J, Haynes T, Stupnisky R, Perry R. Perceived academic control: Mediating the effects of optimism and social support on college students' psychological health. Soc Psychol Educ. 2009;12(2):233-49.
[4] Arnett JJ. Emerging adulthood. American Psychological Association. 2006;2(6):19-17. https://nobaproject.com/modules/emerging-adulthood.
[5] Bjorvatn B, Sagen IM, Oyane N, Waage S, Fetveit A, Pallesen S, et al. The association between sleep duration, body mass index and metabolic measures in the Hordaland Health Study. J Sleep Res. 2007;16(1):66-76.

[6] Makarem N, St-Onge MP, Liao M, Lloyd-Jones DM, Aggarwal B. Association of sleep characteristics with cardiovascular health among women and differences by race/ethnicity and menopausal status: Findings from the American heart association go red for women strategically focused research network. Sleep Health. 2019;5(5):501-08.
[7] Aldabal L, Bahammam AS. Metabolic, endocrine, and immune consequences of sleep deprivation. Open Respir Med J. 2011;5(1):31-43.
[8] Anic GM, Titus-Ernstoff L, Newcomb PA, Trentham-Dietz A, Egan KM. Sleep duration and obesity in a population-based study. Sleep Med. 2010;11(5):447-51.
[9] Paciencia I, Araujo J, Ramos E. Sleep duration and blood pressure: A longitudinal analysis from early to late adolescence. J Sleep Res. 2016;25(6):702-08.
[10] Bal C, Ozturk A, Cicek B, Ozdemir A, Zararsız G, Unalan D, et al. The relationship between blood pressure and sleep duration in Turkish children: A cross-sectional study. J Clin Res Pediatr Endocrinol. 2018;10(1):51-58.
[11] Patel SR, Hu FB. Short sleep duration and weight gain: A systematic review. Obesity Silver Spring. 2008;16(3):643-53.
[12] Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: Analysis of worldwide data. Lancet. 2005;365(9455):217-23.
[13] Kim J, Jo I. Age-dependent association between sleep duration and hypertension in the adult Korean population. Am J Hypertens. 2010;23(12):1286-91.
[14] Knutson KL, Van Cauter E, Rathouz PJ, Yan LL, Hulley SB, Liu K, et al. Association between sleep and blood pressure in midlife: The CARDIA sleep study. Arch Intern Med. 2009;169(11):1055-61.
[15] Guo X, Zheng L, Li Y, Yu S, Liu S, Zhou X. Association between sleep duration and hypertension among Chinese children and adolescents. Clin Cardiol. 2011;34(12):774-81.
[16] Javaheri S, Storfer-Isser A, Rosen CL, Redline S. Sleep quality and elevated blood pressure in adolescents. Circulation. 2008;118(10):1034-40.
[17] Lu K, Chen J, Wu S, Chen J, Hu D. Interaction of sleep duration and sleep quality on hypertension prevalence in adult Chinese males. Journal of Epidemiology. 2015;26(4):131-35.
[18] Chenji SK, Rao CR, Sivanesan S, Kamath V, Kamath A. Cross-sectional analysis of obesity and high blood pressure among undergraduate students of a university medical college in South India. Family Medicine and Community Health. 2018;6(2):63-69.
[19] Park SK, Jung JY, Oh CM, McIntyre RS, Lee JH. Association between sleep duration, quality and body mass index in the Korean population. J Clin Sleep Med. 2018;14(8):1353-55.
[20] Alfarhan, FA. Association between sleep pattern and body mass index among undergraduate health colleges students at Qassim University, Saudi Arabia. J Nurs Educ Pract. 2018;8(8):76-86.
[21] Kaur M. Correlation between body mass index and blood pressure in adolescents. Pakistan Journal of Physiology. 2016;12(1):44-47.
[22] Oghagbon K, Odili V, Nwangwa E, Pender K. Body mass index and blood pressure pattern of students in a Nigerian University. International Journal of Health Research. 2009;2(2):32-38.
[23] Shahzad HS, Ahmad S, Imran HM, Sarwar M, Wattoo Y, Rasul F. Association of body mass index with lifestyle behaviours among students of Punjab University. International Journal of Medical and Dental Sciences. 2020;9(1):1823-29.
[24] Covassin N, Singh P. Sleep duration and cardiovascular disease risk: Epidemiologic and experimental evidence. Sleep Med Clin. 2016;11(1):81-89.
[25] Khullar S, Singh J, Singh M, Kaur H. To study the association between duration of sleep and BMI in young indian adults. Journal of Clinical & Diagnostic Research. 2018;12(8):124-28.
[26] Anchala R, Kannuri NK, Pant H, Khan H, Franco OH. Hypertension in India: A systematic review and meta-analysis of prevalence, awareness, and control of hypertension. J Hypertens. 2014;32(6):1170-77.
[27] Martinez SM, Tschann JM, Butte NF, Gregorich SE, Penilla C, Flores E, et al. Short sleep duration is associated with eating more carbohydrates and less dietary fat in Mexican American children. Sleep. 2017;40(2):47-57.
[28] Patel SR, Malhotra A, Gottlieb DJ, White DP, Hu FB. Correlates of long sleep duration. Sleep. 2006;29(7):881-89.
[29] Bisht RS, Walia L, Agrawal BK. An analytical study of sleep duration, BMI and blood pressure reactivity among Medical College students. Indian Journal of Public Health Research & Development. 2019;10(10):23-28.
[30] Nurismadiana I, Lee K. Factors associated with sleep quality among undergrauate students at a Malayisian Public University. International Journal of Public Health and Clinical Sciences. 2018;5(6):373-91.
[31] Misra A. Ethnic-Specific criteria for classification of body mass index: A perspective for Asian Indians and American Diabetes Association Position Statement. Diabetes Technol Ther. 2015;17(9):667-71.
[32] Kushkestani M, Parvani M, Ebrahimpour Nosrani S, Bathaeezadeh SY. The relationship between body composition with blood pressure and sleep quality in male dormitory student at Allameh Tabatabai University. New approaches in sport sciences. 2019;1(2):77-92.
[33] Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Res. 1989;28(2):193-213.
[34] World Health Organization. Global Strategy on Diet, Physical Activity and Health. WHO; Geneva, Switzerland: 2010.
[35] Fatima Y, Doi SA, Mamun AA. Sleep quality and obesity in young subjects: A meta-analysis. Obes Rev. 2016;17(11):1154-66.
[36] Flack JM, Adekola B. Blood pressure and the new ACC/AHA hypertension guidelines. Trends in Cardiovascular Medicine. 2020;30(3):160-64.
[37] Surani AA. Seep quality among medical students of Karachi, Pakistan. J Pak Med Assoc. 2015;65(4):380-82.
[38] Saygın M, Onder Ozturk TG, Has M, Hayri UB, Kurt Y, Yaglı MA, et al. Investigation of sleep quality and sleep disorders in students of medicine. Turkish Thoracic Journal. 2016;17(4):132.
[39] Rafiee E, Khaledi M. The correlation between blood pressure and BMI in students of Shahrekord University of Medical Sciences in 2013-14. International Journal of Ayurvedic Medicine. 2019;10(1):113-17.
[40] Linderman GC, Lu J. Association of body mass index with blood pressure among 1.7 million Chinese adults. JAMA Netw Open. 2018;1(4):181-91.
[41] The Emerging Risk Factor Collaboration Separate and combined associations of body-mass index and abdominal adiposity with cardiovascular disease: Collaborative analysis of 58 prospective studies. Lancet. 2011;377:1085-95.
[42] Kristicevic T, Stefan L, Sporis G. The associations between sleep duration and sleep quality with body-mass index in a large sample of young adults. Int J Environ Res Public Health. 2018;15(4):758.

PARTICULARS OF CONTRIBUTORS:

1. Undergraduate Student, Yenepoya Nursing College, Yenepoya Deemed to be University, Mangalore, Karnataka, India.
2. Undergraduate Student, Yenepoya Nursing College, Yenepoya Deemed to be University, Mangalore, Karnataka, India.
3. Undergraduate Student, Yenepoya Nursing College, Yenepoya Deemed to be University, Mangalore, Karnataka, India.
4. Undergraduate Student, Yenepoya Nursing College, Yenepoya Deemed to be University, Mangalore, Karnataka, India.
5. Assistant Professor, Department of Child Health Nursing, Yenepoya Nursing College, Yenepoya Deemed to be University, Mangalore, Karnataka, India.
6. Associate Professor, Department of Obstetrics and Gynaecology, Yenepoya Nursing College, Yenepoya Deemed to be University, Mangalore, Karnataka, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Benazeera,
Assistant Professor, Department of Child Health Nursing, Yenepoya Nursing College,
Yenepoya Deemed to be University, Mangalore, Karnataka, India.
E-mail: benzi407@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Jul 01, 2022
- Manual Googling: Oct 07, 2022
- iThenticate Software: Oct 12, 2022 (22%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Jun 30, 2022**
Date of Peer Review: **Jul 26, 2022**
Date of Acceptance: **Oct 14, 2022**
Date of Publishing: **Feb 01, 2023**