WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.632
Volume 11, Issue 5, 1919-1938 Research Article ISSN 2278 – 4357

ASSESSMENT OF MENTAL STRESS LEVEL AND ACADEMIC DIFFICULTIES AMONG THE STUDENTS DURING THE LOCKDOWN OF COVID-19 SECOND WAVE- AN ONLINE SURVEY

Srivastava Niraj[1]*, Saxena Varsha[2], Dadhich Nand Kishor[3], Jain Nishant Rai[4], Gehlot Sangeeta[5] and Singh B. M.[6]

[1]Professor and Head, Department of Kaumarbhritya/ Bal-Roga, Himalayiya Ayurvedic Medical College & Hospital, Doiwala, Dehradun, Uttarakhand 248140.
[2]Assistant Professor, Department of Shalya-Tantra, Main campus, Uttarakhand Ayurveda University (UAU). Dehradun, Uttarakhand.
[3]Associate Professor and Head, Department of Kriya Sharir, Main campus, Uttarakhand Ayurveda University (UAU). Dehradun, Uttarakhand.
[4]Associate Professor and Head, Department of Swasthvritta, Himalayiya Ayurvedic Medical College & Hospital, Doiwala, Dehradun, Uttarakhand 248140.
[5]Professor, Department of Kriya Sharir, Faculty of Ayurveda, IMS, BHU, Varanasi. India.
[6]Professor and Head, Department of Kaumarbhritya/Balroga, Faculty of Ayurveda, IMS, BHU. Varanasi. India.

Article Received on
14 March 2022,
Revised on 04 April 2022,
Accepted on 24 April 2022
DOI: 10.20959/wjpps20225-22059

***Corresponding Author**
Dr. Srivastava Niraj
Professor and Head, Department of Kaumarbhritya/ Bal-Roga, Himalayiya Ayurvedic Medical College & Hospital, Doiwala, Dehradun, Uttarakhand 248140.

ABSTRACT

Background: Coronavirus disease (COVID-19), a pandemic of the 21st century has affected the wellbeing of all the individuals and economies of almost all nations worldwide. COVID-19 pandemic has brought significant psychological influence on the professional education. The objective of the current questionnaire-based study was to access the level of mental stress and academic difficulties among the Ayurvedic college student of Dehradun, Uttarakhand (India) during lockdown of COVID- 19 second wave. **Methods:** An observational survey was undertaken among the first to final year students of two Ayurvedic colleges in Dehradun, Uttarakhand in the second phase of lockdown. A pretested self-administered questionnaire using Google forms was used for the data collection. Data were collected on demographic profile, perceived stress scale (PSS) and academic difficulties. The survey was conducted during 10 May to 10 June 2021 and active for a period of 30 days. **Results:** Total 311 students responded to the questionnaire. Mostly participants were female (64.3%) and belong to age group 21 to 24 years. In this study, 81.7 % of the

students had moderate stress, 14.1% had high stress. Students from all the four years reported being stressed and academic factors were one of the most important stressors. **Conclusion:** This study shows that COVID-19 pandemic has brought significant psychological influence on all the four years BAMS students. Stress is more common in female students during COVID-19 lockdown. It is suggested that mental health of college students should be monitored during such unusual circumstances as the pandemic and stress management education should be done as routine program. Less than 50% students revealed average response about online education.

KEYWORDS: COVID-19; Uttarakhand, second wave, Lockdown; Pandemic; Stress scale; Ayurveda.

1. INTRODUCTION

From the beginning of the 21st century, three coronaviruses have caused serious outbursts of respiratory system in human beings. Severe acute respiratory syndrome coronavirus (SARS-CoV) in 2002, Middle-East respiratory syndrome coronavirus (MERS-CoV) in 2012 and at present COVID-19 is the third coronavirus pandemic.[1] COVID-19 is a public health hazard threatening the worldwide, caused by the sudden appearance and spread of novel Coronavirus (2019-nCoV), or known as severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2).[2] Coronavirus disease or COVID-19 was first detected in Wuhan City, Hubei province in China country (East Asia) in December 2019.[3] The first case of COVID-19 in India was reported on 30 January in Thrissur, Kerala, among three Indian medical students who had returned from Wuhan, China.[4] WHO declared the outbreak a Public Health Emergency of International Concern (PHEIC) on 30 January 2020.[5] Prior to this, WHO declared five major PHEICs were 2009 for H1N1 flu (Swine flu), in 2014 for Polio and Ebola, in 2016 for Zika and in 2018 for Ebola virus outbreak.[6] World Health Organization (WHO) declared this disease as pandemic on 11th March 2020. The World Health Organization (WHO) defined pandemic as the spread of a certain disease global or across international borders, affecting a vast population. The concept of pandemic disease is revealed by *Acharya Charaka* in *Janapadodhwansa* Chapter in *Vimana Sthana*. *Acharya Charaka* has explained that for pandemic condition mainly four factors are responsible that are *Vayu* (air), *Jala* (water), *Desh* (soil & area) and *Kala* (time). *Acharya Charaka* described the whole concept of managing pandemic situation by *Panchakarma* (five procedures of purification), *Rasayana Chikitsa* (immuno-modulator therapy) and *Sadvritta* (good conduct).[7] Coronavirus disease (COVID-

19) pandemic has resulted in a strong impact on medical and health professional's students' wellbeing, with associated uncertainty about the future. Professional college life is a very important part of the time of every student. Students undergo a lot of hard work and sacrifice to qualify in National eligibility cum entrance test (NEET) for admission in Medical/ Ayurvedic colleges. Ayurvedic colleges/ institutes provide professional degree to the students, make them clinical expert, capable to face the challenges in life, to make lasting friendships and may be meet future life-partners also.[8] COVID-19 has caused destabilizing health systems and economy around the world in a very short period. Due to this pandemic, the mental state of humans especially students are extremely tested for its resistance. The notion of stress was first announced by Canadian endocrinologist Hans Seyle, who is recognized as "Father of stress research" also. The word stress represents both an agent and its consequences.[9] Stress reveals itself in different ways variable from mild irritation to severe problems that might consequence in interruption of physical and mental health. Stress can be physical, emotional or psychological.[10] Mental state is a vital term covering physical, psychological, social, and spiritual health which includes managing abilities of persons in society. A 2012 Lancet report also quoted that the 15-29 years of age group in India has the highest rate of suicide in the world.[11] In high academic stress, students mainly reported depression, anxiety, behavioral problems, irritability etc.[12] COVID-19 pandemic continues to mount stress and anxiety in medical students for academic difficulties and remain in a state of doubt about the future.[13] Due to high transmissibility of the COVID-19 and to prevent from person-to-person spread of disease lockdown was imposed on all schools and university to prevent and slow the spread of the virus.[14] Due to this situation, the Government of India declared a countrywide COVID-19 lockdown starting at midnight on March 24, 2020 and lasting for 3 weeks until April 14, 2020 (lockdown phase 1) (Ministry of Home Affairs, 2020).[15] The peak of the first wave was in September 2020 with the daily cases of around 0.1 million. On April 15, 2021, the number of new cases was about 0.2 million which is already more than double of the first peak value. In India, first and second waves are separated by about 5 months. The second wave of COVID-19 was beginning on February 11, 2021, presents a grim condition as the number of cases crossed 0.2 million a day on April 14, 202.[16] The sudden flow in the number of cases may be attributed to highly infectious double mutant variant of SARS-CoV-2 (B.1.617 lineage or Delta variant).[17] In second wave of COVID-19, lockdown was decided according to the guidelines given by state government. At initial stage Dehradun was relatively less affected by the COVID-19 but our students belong to various parts of Uttarakhand and various other states like Delhi, Punjab, Uttar Pradesh and

Haryana etc. Previous studies revealed that disease outbreaks impacted individual physical and mental health.[18] During the SARS outbreak, a population-based survey showed post-crisis mental distress.[19] During the MERS outbreak, the level of stress was also high in medical students.[20] As per knowledge, there are currently no studies that have assessed level of stress and academic difficulties among Ayurvedic college students during COVID-19 second wave lockdown. Therefore, this study aimed to explore the perceived stress level among students due to the lockdown and academic difficulty during that period.

2. MATERIAL AND METHODS

The methodology flow chart is shown in Figure 1.

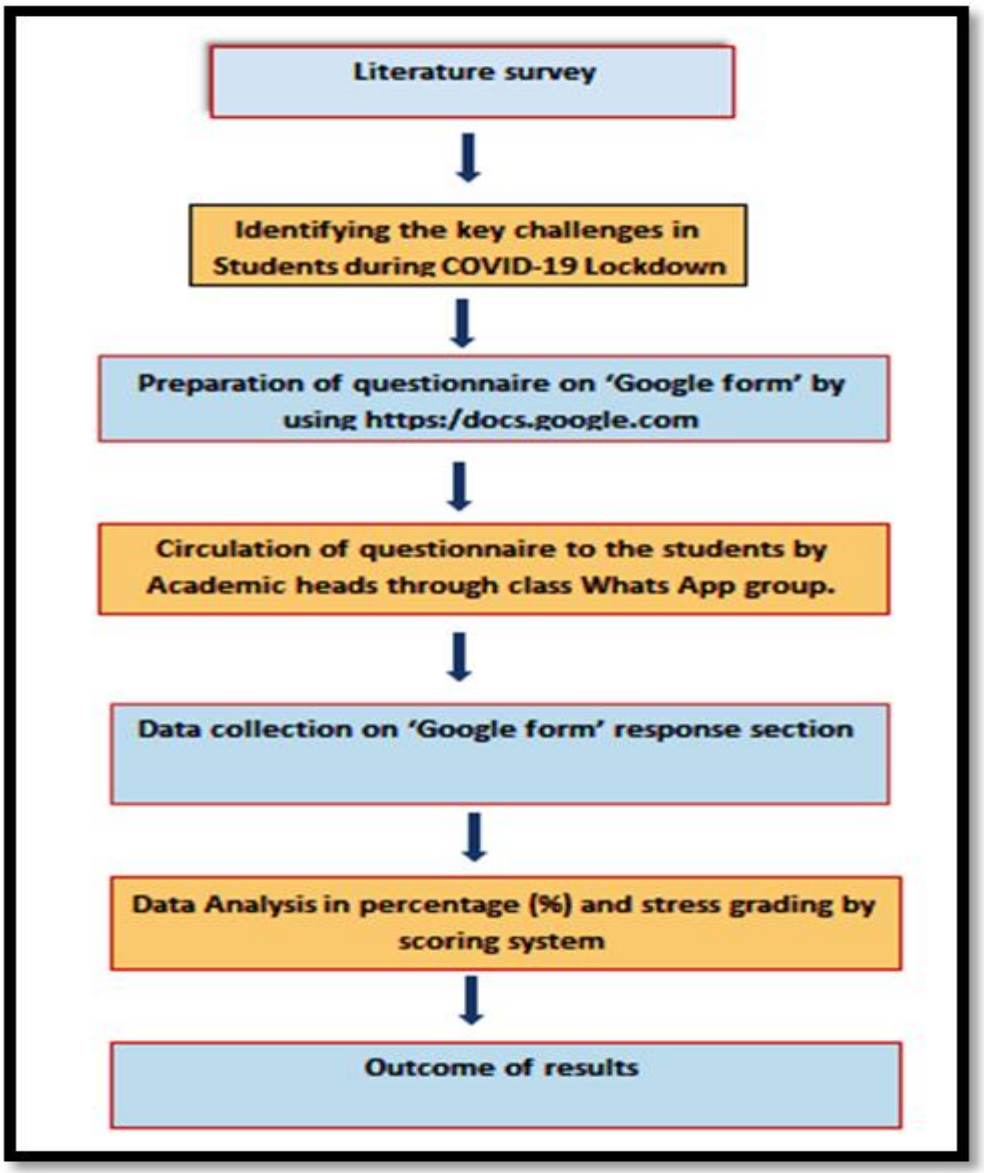

Figure 1: Flow chart of methodology.

2.1 Study design: The data for this study were obtained from a cross-sectional survey, which was conducted between10 May to 10 June 2021during the lockdown of COVID- 19 second wave in Uttarakhand, India.

2.2 Sample population: This study included both gender students of first to final year from Himalayiya Ayurvedic medical college & Hospital (Private Institute) and Main campus of Uttarakhand Ayurved University (Government Institute) in Dehradun (Uttarakhand).

2.3 Ethical approval: All the students were informed about the objectives of the study including confidentiality of the data. As they volunteered themselves in this non-experimental study, but ethical approval was taken.

2.4 Recruitment: Students of all the four professionals were communicated and given all the information on class WhatsApp group, and they were asked their participation on a voluntary basis. All the participants were fully informed about the aims of the study and about the confidentiality of the data, and they were also assured that the data would be used only for the purpose of the research and refusal to participate would not disturb their current and future course of study in any way. Informed consent was obtained from each student prior to participating in the study. Overall, 311 students voluntarily enrolled in the study and completed online Google form.

2.5 Data collection: A pretested self-administered questionnaire having 23 questions by Google Survey form was used for the data collection. It was restricted to one response per student. The design of the questionnaire was made simple so that the students can respond by utilizing their smart gadgets or a personal computer from their residing places. All the questions in a survey were mandatory and the incomplete replies were not considered for inclusion. Data of categorical variables has been expressed in percentage (%) and scoring system.

2.6 Questionnaire description: Questionnaire for Google Survey was drafted by six faculty teachers from Banaras Hindu University (BHU), Himalayiya Ayurvedic medical college & Hospital and Main campus of Uttarakhand Ayurved University (UAU), Dehradun. The Questionnaire included three sections.

- **Section 1:** Demographic profile of participants included three Questions related to age, gender and year of professional education.
- **Section 2:** Questionnaire of perceived stress scale (PSS) for the assessment of Stress level is based on the Sheldon Cohen scale consist of ten questions that are used to measure the perception of stress experienced by the participants during lockdown period [21-22]. It

includes 5-point Likert scale that captures responses ranging from never (0) to very often.[4] Total mean scores of 0 to 13 are considered to be low stress, 14 to 26 indicates moderate stress, and 27 to 40 indicates high stress. The PSS is an easily and widely used tool for grading stress level of participants in research.[23-24]

- **Section 3:** Academic difficulties and Coping Strategies of participants included 10 Questions.

3. RESULT

A total of 311 students responded to the questionnaire-based survey which is approximately 65% of the students who are currently pursuing the BAMS course in Himalayiya Ayurvedic medical college & Hospital and Main campus of Uttarakhand Ayurved University (UAU), Dehradun. Some of the students live in remote areas where internet connectivity is a major issue due to which some responses could not be documented.

3.1 Demographic characteristics

In the first section of this survey, the demographic characteristics of the students were assessed (**Table 1)**. Mostly students who participated in this study were female (64.3%) (Figure-2), belong to age group 21 to 24 years (70.1%) (Figure-3) and belong to BAMS I & II professional (31.8% & 32.5%) (Figure-4).

Table 1: Demographic characteristics of participants (n **=311).**

	Low stress (n=13)	**Moderate stress (n=254)**	**High stress (n=44)**	**Total (n=311)**	**P-value**
Gender:					
Female	7 (3.5%)	160 (80%)	33 (16.5%)	**200 (64.3%)**	0.971
Male	6 (5.4%)	94 (84.7%)	11 (9.9%)	**111 (35.7%)**	
Age:					
17 to 20 years	5 (6.4%)	55 (70.5%)	18 (23.1%)	**78 (25.1%)**	0.154
21 to 24 years	8 (3.7%)	186 (85.3%)	24 (11%)	**218 (70.1%)**	
> 24 years	0 (0.0%)	13 (86.7%)	02 (13.3%)	**15 (4.8%)**	
Educational level:					
BAMS I professional	4 (4.0%)	77 (77.8%)	18 (18.2%)	**99 (31.8%)**	0.374
BAMS II professional	3 (2.9%)	83 (82.2%)	15 (14.9%)	**101 (32.5%)**	
BAMS III professional	3 (4.3%)	58 (84.1%)	08 (11.6%)	**69 (22.2%)**	
BAMS IV professional	3 (7.14%)	36 (85.7%)	03 (7.1%)	**42 (13.5%)**	

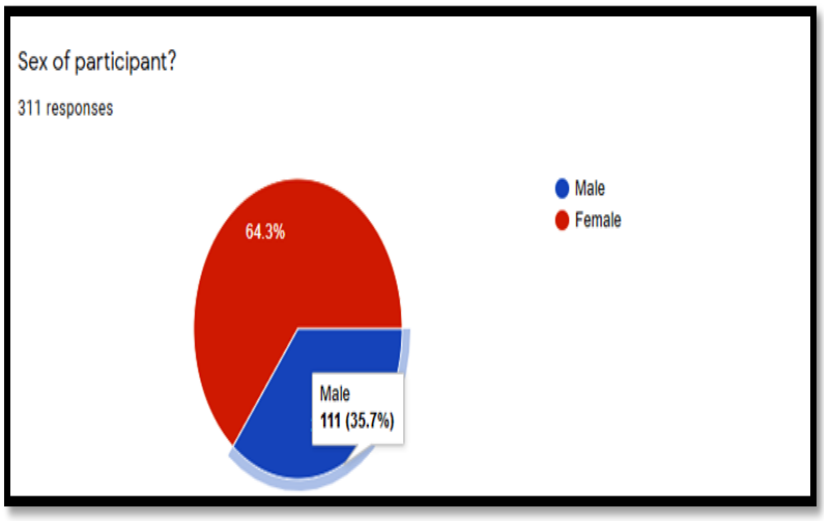

Figure 2: Pie chart representing sex (Gender) of participant.

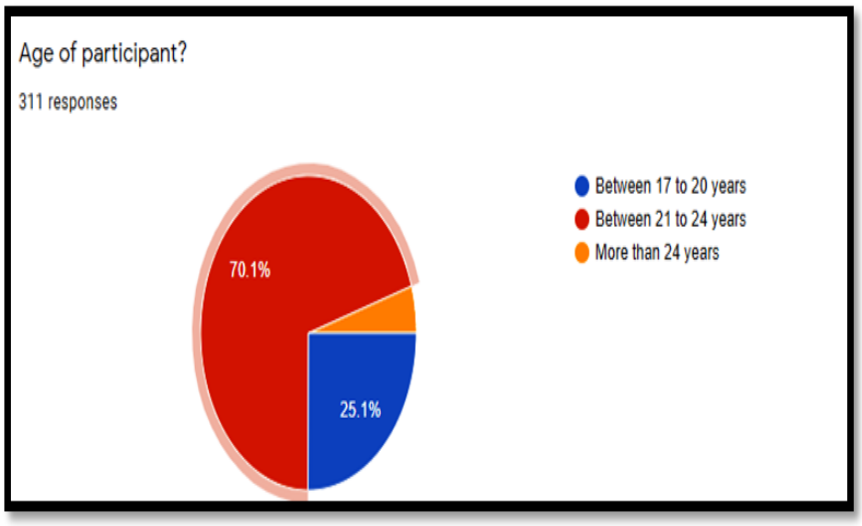

Figure 3: Pie chart representing age of participant.

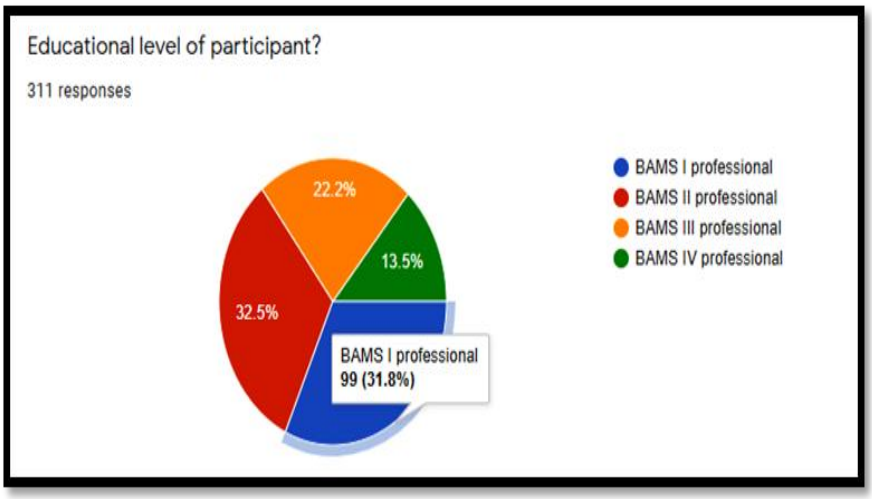

Figure 4: Pie chart representing educational level of participant.

3.2 Perceived stress scale level: In the second section of this survey, level of stress in students during COVID-19 lockdown was assessed by perceived stress scale (PSS).

Table 2: Responses of students to the perceived stress scale (N =311).

Perceived stress scale (PSS)	Never	Almost never	Sometimes	Fairly often	Very often	Mean	SD
In the last month, how often have you been upset because of something that happened unexpectedly?	17 (5.5%)	20 (6.4%)	144 (46.3%)	67 (21.5%)	63 (20.3%)	2.45	1.05
In the last month, how often have you felt that you were unable to control the important things in your life?	24 (7.7%)	19 (6.1%)	133 (42.8%)	63 (20.3%)	72 (23.2%)	2.46	1.13
In the last month, how often have you felt nervous and stressed?	26 (8.4%)	19 (6.1%)	119 (38.3%)	73 (23.5%)	74 (23.8%)	2.48	1.16
In the last month, how often have you felt confident about your ability to handle your personal problems?	13 (4.2%)	22 (7.1%)	142 (45.7%)	78 (25.1%)	56 (18.1%)	2.45	1.00
In the last month, how often have you felt that things were going your way?	44 (14.1%)	67 (21.5%)	141 (45.3%)	38 (12.2%)	21 (6.8%)	1.76	1.05
In the last month, how often have you found that you could not cope with all the things that you had to do?	26 (8.4%)	42 (13.5%)	163 (52.4%)	53 (17.0%)	27 (8.7%)	2.04	0.99
In the last month, how often have you been able to control irritations	23 (7.4%)	45 (14.5%)	136 (43.7%)	61 (19.6%)	46 (14.8%)	2.19	1.09

in your life?							
In the last month, how often have you felt that you were on top of things?	49 (15.8%)	71 (22.8%)	140 (45%)	16 (5.1%)	35 (11.3%)	1.66	1.03
In the last month, how often have you been angered because of things that happened that were outside of your control?	18 (5.8%)	36 (11.6%)	118 (37.9%)	83 (26.7%)	56 (18.0%)	2.39	1.08
In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	30 (9.6%)	42 (13.5%)	153 (49.2%)	56 (18.0%)	30 (9.6%)	2.05	1.05

Participants never felt that they were on the top of the things (1.66±1.03) and things were going your way (1.76±1.05). Table 2 displays the responses of 10 items of the PSS provided by the students. Survey was proceeding during lockdown period of COVID-19 second wave and following trends were observed: 46.3% of the students felt sometimes upset that happened unexpected; 42.8% were felt sometimes unable to control the important things in life; 38.3% of the students felt sometimes nervous and stressed during lockdown. In last month during lockdown 45.7% of the students felt sometimes confident to handle personal problem; 45.3% of the students felt sometimes they could not cope with all the things that had to do; 43.7% of the students felt sometimes able to control irritations in life; 45% of the students felt sometimes that they were on top of things; 37.9 % of the students felt sometimes that they angered because of things that happened were outside of their control and 49.2 % of the students felt sometimes difficulties were piling up so high that they could not overcome them.

Table 3: Total scores of the perceived stress scale (n=311).

Perceived stress scale	Frequency (%)
Low stress (0 to 13)	13 (4.2%)
Moderate stress (14 to 26)	254 (81.7%)
High stress (27 to 40)	44(14.1%)

In general, 81.7 % of the students had moderate stress, 14.1% had high stress and 4.2 % had low stress (Table 3). Moderate stress is more in male than females (84.7% versus 80%) and severe stress is more in female than male (16.5% versus 9.9%). In 17 to 20 years age group, incidence of moderate stress was 70.5% and severe stress 23.1%. In 21 to 24 years age group, incidence of moderate stress was 85.3% and severe stress 11%. Maximum participants were from BAMS II (32.5%) & BAMS I professional (32.5%). High stress was more common in BAMS I professional student.

3.3 Academic difficulty and Coping Strategies of participants: In the third section of this survey Academic difficulties and Coping Strategies were assessed by questionnaire.

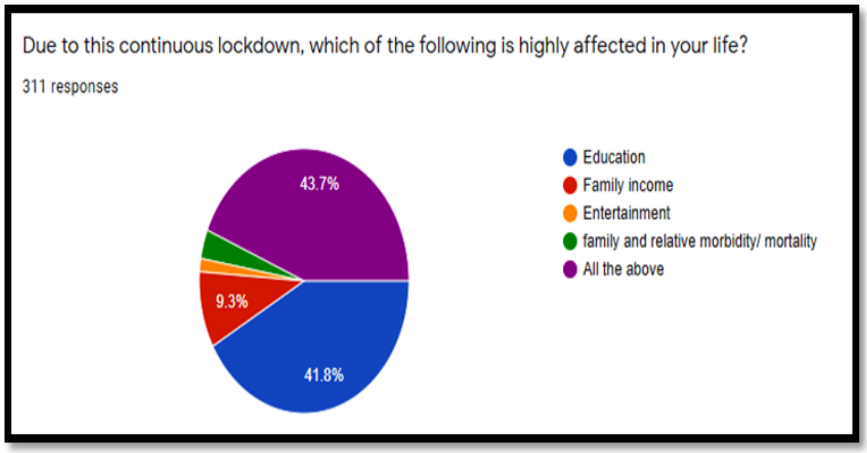

Figure 5: Pie chart representing highly affected part of life due to lockdown.

Figure 5 has revealed that during lockdown maximum students experience that all the factors (education, family income, entertainment & morbidity/mortality in family and friends) affected their life.

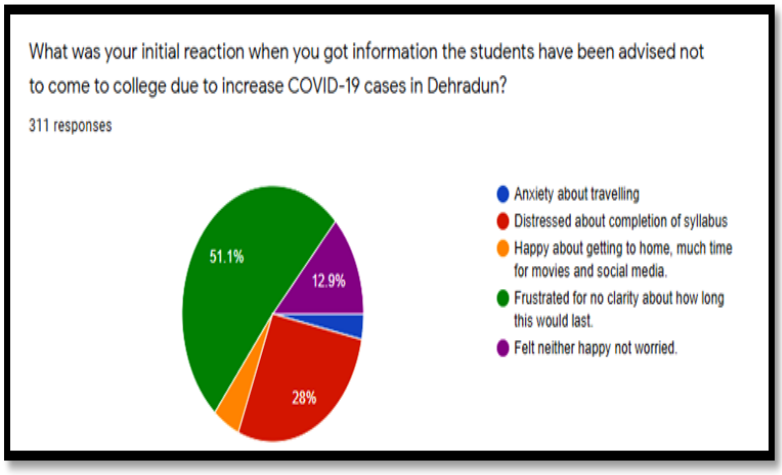

Figure 6: Pie chart representing initial reaction of students when lockdown declared.

Figure 6 has shown that when the students were asked not to come to college, 51.1% reported as being frustrated for no clarity about how long this would last and 12.9% were neither happy nor worried.

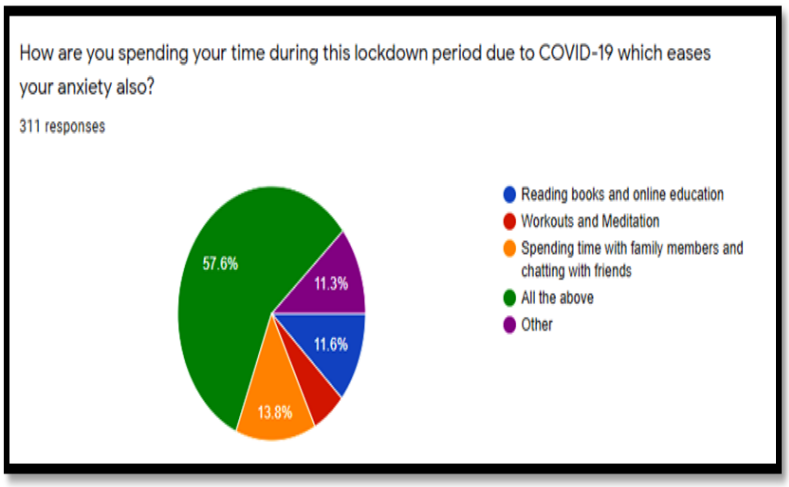

Figure 7: Pie chart representing how time was spent during lockdown.

Figure 7 has revealed that during lockdown 57.6% students have spent their time by reading books, online education, workouts, meditation and chatting with family members / friends.

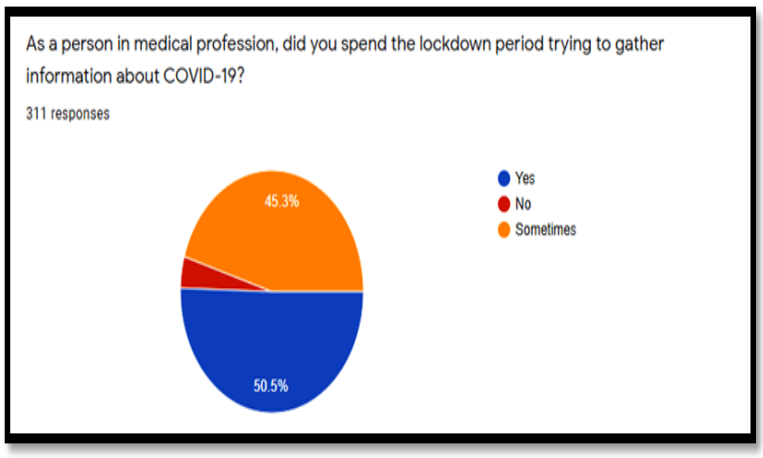

Figure 8: Pie chart representing participant who gather information about COVID-19.

Figure 8 has shown that during lockdown 50.5% students spent their time to gather information about COVID-19 and 45.3% spent their time to do this sometimes.

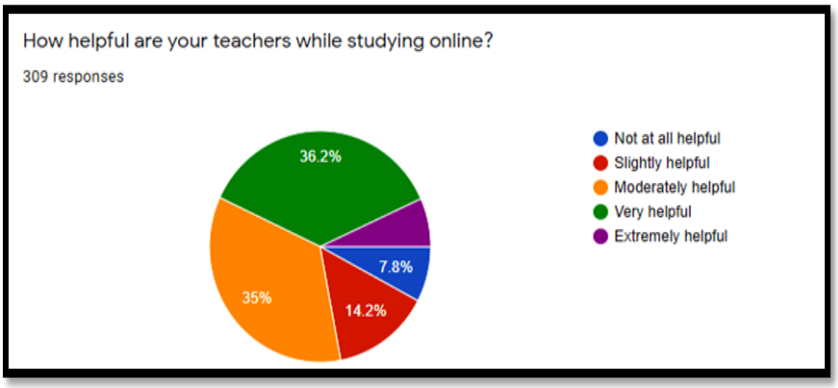

Figure 9: Pie chart representing role of teacher while studying online.

Figure 9 has revealed that online teaching during lockdown, 36.2% students felt that role of teacher was very helpful and 35% felt that moderately helpful.

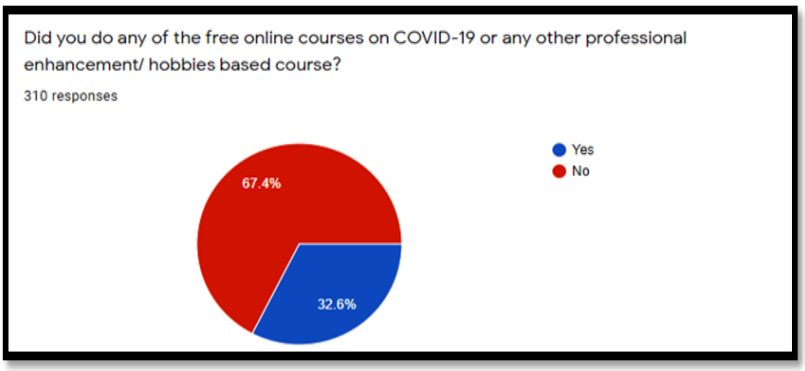

Figure 10: Pie chart representing free online course by participants during lockdown.

Figure 10 has shown that during lockdown 32.6% students participated for free online courses on COVID-19 or any other professional enhancement/ hobbies based course and rest 67.4% have not participated in any online courses.

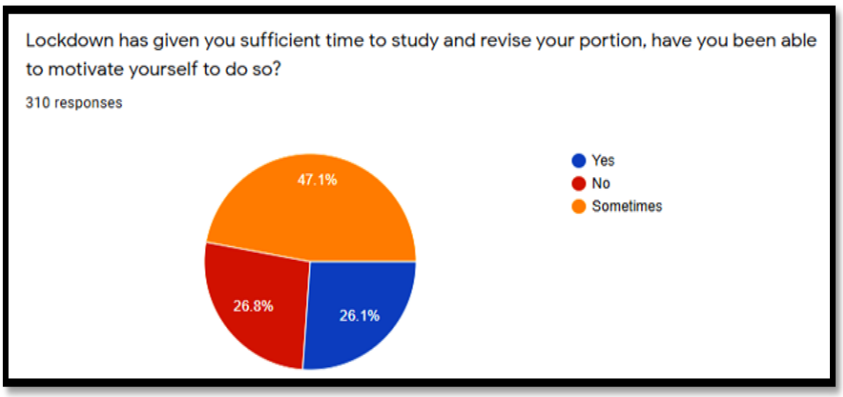

Figure 11: Pie chart representing use of time for study and revise syllabus during lockdown.

Figure 11 has revealed that during lockdown 47.1% students were sometimes motivated to revise the syllabus and 26.1% students were always motivated to revise the syllabus.

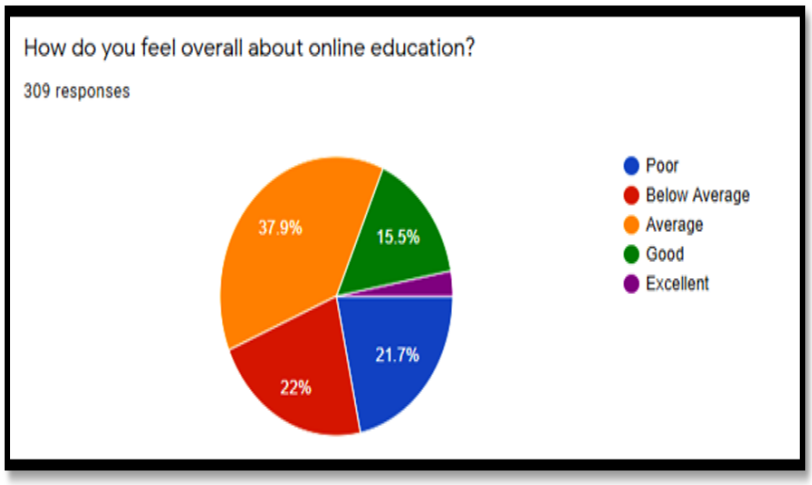

Figure 12: Pie chart representing overall opinion about online education.

Figure 12 has indicated that 47.1% students felt overall average response for online education and 22% felt below average response.

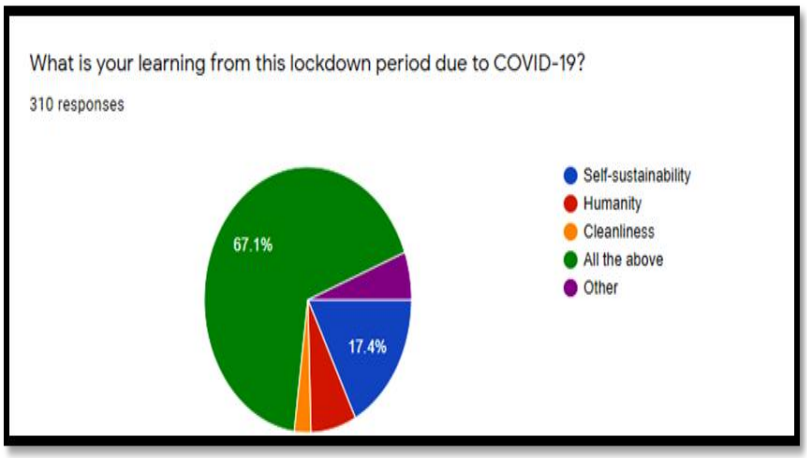

Figure 13: Pie chart representing overall opinion about learning from this Lockdown.

Figure 13 has indicated that during lockdown 67.1% students learnt about Self-sustainability, Humanity and Cleanliness. 17.4% students learnt about Self-sustainability only.

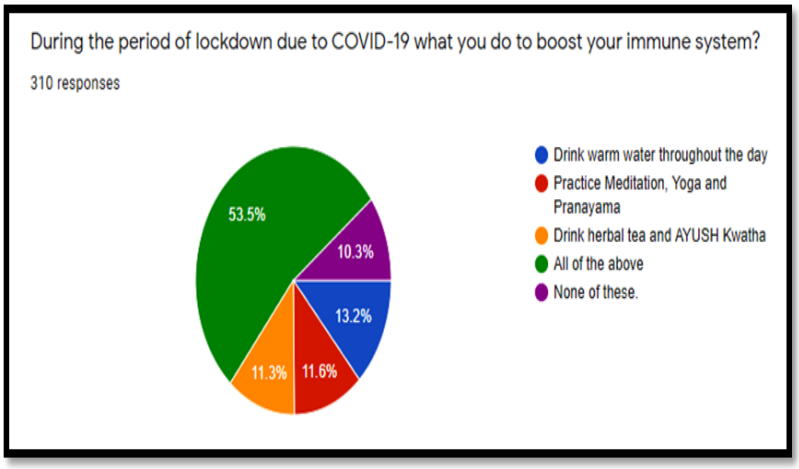

Figure 14: Pie chart representing opinion about what to do for boosting immunity during Lockdown.

Figure 14 has shown that during lockdown 53.5% students boosted their immune system by drinking warm water throughout the day, practicing Meditation, Yoga and Pranayama, by drink herbal tea and AYUSH Kwatha. 13.2% students boosted their immune system by only drinking warm water throughout the day.

Table 4: Association of Gender with PSS score.

	Sex	N	Mean	Std. Deviation	P-value (Independent Sample t-test)
PSS	Male	111	21.79	4.37	0.703
	Female	200	21.99	4.36	

Stress level did not differ statistically significant between male and female students. Both gender felt moderate level stress (P-value = 0.703) (Table: 4).

Table 5: Association of participants age groups with PSS score.

Age	N	Mean	95% Confidence Interval		P-value (One-Way Anova)
			Lower Bound	Upper Bound	
17 to 20 years	78	21.17	20.09	22.26	**0.053**
21 to 24 years	218	22.29	21.73	22.84	
> 24 years	15	20.33	18.04	22.62	

Stress level did not differ statistically significant among different age group (P-value = 0.053). All aged students felt moderate level stress (Table: 5).

Table 6: Association of BAMS professional groups with PSS score.

Education	N	Mean	Std. Deviation	95% Confidence Interval for Mean		P-value
				Lower Bound	Upper Bound	
BAMS I professional	99	22.15	4.91	21.17	23.13	0.887
BAMS II professional	101	21.97	3.97	21.18	22.75	
BAMS III professional	69	21.71	4.18	20.70	22.71	
BAMS IV professional	42	21.59	4.22	20.28	22.91	

Stress level did not differ statistically significant among different education level (P-value = 0.887). All education level students felt moderate level stress (Table: 6).

4. DISCUSSION

The second wave of COVID-19 was began around 11 February 2021 and hit India very hard with the daily cases reaching nearly triple the first peak value as on April 19, 2021.During this critical time in the history of human, many people have suffered from psychological distress. Undergraduate students who are among the most energetic groups were also suffering with profound psychological stress due to state of uncertainty about the future.[25] Different studies have emphasized high levels of anxiety and stress in university students during COVID-19 lockdown period due to academic delays and influence of the epidemic on daily life, disturbance in students' daily routine and social relationships.[26-27] Our study focused on the level of perceived stress and Academic difficulties in BAMS students during lockdown due to COVID-19 pandemic. In this study, 81.7 % of the students had moderate stress, 14.1% had high stress. These scores are comparable to other national and international studies that were conducted in India[28-29] and Malaysia.[30] Mostly students who participated in this study were female (64.3%) (Figure-2), belong to age group of 21 to 24 years. High levels of stress among females have been attributed to various factors, including hormonal changes, expression of emotions and opinions regarding their social situation.[31-32] Other studies also revealed that women aged between 16 and 24 years exhibited a great risk of developing psychological distress.[33] Students were stressed due to education (syllabus completion and exams during the lockdown) problems, family income, entertainment & morbidity which have been reported in other studies as well.[34] Anxiety and stress are some of the psychological effects of public health emergencies on college students due to academic difficulty.[35] Our survey found similar manifestations in these two Ayurvedic colleges of

Uttarakhand during COVID-19 lockdown. Our study indicated that overall opinion about online education only 47.1% students felt average response and 22% felt below average response. Other study related to online education was also found to be associated with below average response, which is due to academic, financial, and social difficulties.[36] Managing the online mode education might become a challenge for students. It may be due to students' capability to deal with technology, enough home resources assisting online learning, or stable internet connection.[37] Most of the students responded that they learned self-sustainability, humanity and cleanliness from this pandemic situation and also most of the students spent their time in reading, writing, workouts, meditation, and chatting with their family members and friends in this pandemic situation.[38] 53.5% students boosted their immune system by drinking warm water throughout the day, performing Meditation, Yoga and Pranayama, drinking herbal tea and AYUSH Kwatha. Other study also revealed these lifestyle modifications; dietary management and prophylactic interventions enhance immune system.[39]

CONCLUSION

This is an observational survey study to assess the level of mental stress and academic difficulties in Ayurvedic college students in Uttarakhand during COVID-19 lockdown. This study showed high to moderate levels of stress among students in Ayurvedic college of Dehradun during theCOVID-19 lockdown. Most important stress provoking factors during COVID-19 lockdown is education and academic difficulties. The integration of online counseling and stress management programs would be helpful to mitigate the stress of students and prevention of psychiatric disorders, such as depression and anxiety during pandemic. We believe that stress management programs may reduce the overall stress; improve academic performance and technical skills in students. Stress is more common in female students during COVID-19 lockdown. Less than 50% students indicated average response about online education. Self-sustainability, humanity and cleanliness are most important learning point during this COVID-19 pandemic. Maximum students have used warm water for drinking throughout the day, performed Meditation, Yoga, Pranayama, drunk herbal tea and AYUSH Kwatha to improve their immune system.

Conflict of interest: The authors declare no conflict of interest.

Funding sources: No funding has been received from any organization to conduct this survey.

Acknowledgements: We would like to thanks to Mr. Amolak from Social balooni public school (SBPS), Dehradun who has made the Google form survey sheet, Dr. Gayatri Vishvkarma (Indian Spinal Injuries Centre, Vasant Kunj, New Delhi for statistical work and all the students who have participated whole heartedly in this survey and have devoted their valuable time for participation in this study. Authors also acknowledge the support and resources provided by the Himalayiya University (HU), Uttarakhand Ayurveda University (UAU), Banaras Hindu University (BHU).

REFERENCES

1. Civljak R, Markoti A, Kuzman I. The third coronavirus epidemic in the third millennium: what's next? Croatian Medical Journal, 2020; 61(1): 1–4. doi: 10.3325/cmj.2020.61.1
2. Saha J, Chouhan P. Indoor air pollution (IAP) and pre-existing morbidities among under-5 children in India: are risk factors of coronavirus disease (COVID-19)?. Environ Pollut, 2020; 266: 115250, doi: http://dx.doi.org/10.1016/j.envpol.2020.115250
3. H. Cai, B. Tu, J. Ma, L. Chen, L. Fu, Y. Jiang. Psychological impacts and coping strategies of front-line medical staff during COVID-19 outbreak in Hunan, China Med Sci Mon Int Med J Exp Clin Res, 2020; 26: 1-17. doi: 10.12659/MSM.924171
4. Andrews M A, Areekal B, Rajesh K R, Krishnan J, Suryakala R, Krishnan B, Muraly C P, Santhosh P V. First confirmed case of COVID-19 infection in India: A case report. Indian J Med Res, 2020; 151: 490-2. doi: 10.4103/ijmr.IJMR_2131_20
5. World Health Organization. Statement on the second meeting of the International Health Regulations, 2005. Emergency Committee Regarding the Outbreak of Novel Coronavirus (2019-nCoV*)* [accessed on May 20, 2020]
6. Wilder-Smith, A., & Osman, S. Public health emergencies of international concern: a historic overview. Journal of travel medicine, 2020; *27*(8). https://doi.org/10.1093/jtm/taaa227
7. Srivastava Niraj, Saxena Varsha. A review on scope of immune-modulatory drugs in Ayurveda for prevention and treatment of COVID-19. Plant Science Today, 2020; 7(3): 417–423. doi: https://doi.org/10.14719/pst.2020.7.3.831
8. Meenakshi Sreeram* and Mona A. Mundada: Survey to Assess Perceived Causes of Stress, Its Manifestations and Coping Strategies among Dental College Students in Maharashtra during COVID-19 lockdown; Biomedical & Pharmacology Journal, March, 2021; 14(1): 53-60. https://dx.doi.org/10.13005/bpj/2098

9. Sheena Johnson, Cooper C., Cartwright S., Ian Donald Paul Taylor., Millet C. The experience of work-related stress across occupations, Journal of Managerial Psychology, 2005; 20(2): 178-187. https://doi.org/10.1108/02683940510579803
10. Bruce Mc Ewen, Robert Sapolsky. Stress and your health. The Journal of Clinical Endocrinology & Metabolism, 2006; 91(2)1: E2. https://doi.org/10.1210/jcem.91.2.9994
11. Kadapatti, M.G., &Vijayalaxmi, A.H.M. Stressors of Academic Stress- A Study on Pre-University Students. Indian Journal of Scientific Research, 2012; 3(1): 171-175. doi: https://dx.doi.org/10.13005/bpj/1404
12. K. Jayasankara Reddy*, MS.Karishmarajanmenon and Anjanathattil: Academic Stress and its sources among University Students; Biomedical & Pharmacology Journal, 2018; 11(1): 531-537. doi: https://dx.doi.org/10.13005/bpj/1404
13. Deb, S., Strodl, E., & Sun, J. Academic stress, parental pressure, anxiety and mental health among Indian high school students. International Journal of Psychology and Behavioral Sciences, 2015; 5(1): 26-34. doi:10.5923/j.ijpbs.20150501.04
14. Al-Dwaikat TN, Aldalaykeh M, Ta'an W, Rababa M. The relationship between social networking sites usage and psychological distress among undergraduate students during COVID-19 lockdown. Heliyon, 2020; 9, 6(12). doi: 10.1016/j.heliyon.2020.e05695
15. Ministry of Home Affairs. Guidelines on the measure to be taken by Ministers/ Departments of Government of India, State/Union Territory Governments and State/Union Territory Authorities for Containment of COVID-19 epidemic in the country, 2020. https://www.mha.gov.in/sites/default/files/MHAOrder_29042021.pdf
16. Xu S, Li Y Beware of the second wave of covid-19. The Lancet, 2020; 395(10233): 1321–1322. doi: 10.1016/S0140-6736(20)30845-X
17. Rajesh Ranjan, Aryan Sharma, Mahendra K. Verma. Characterization of the Second Wave of COVID-19 in India, medRxiv 2021.04.17.21255665; doi: https://doi.org/10.1101/2021.04.17.21255665
18. W. Cao, Z. Fang, G. Hou, M. Han, X. Xu, J. Dong, et al., The psychological impact of the COVID-19 epidemic on college students in China, Psychiatric. Res, 2020; 287: 112934. doi: 10.1016/j.psychres.2020.112934
19. Peng EY, Lee M, Tsai S, Yang C, Morisky DE, Tsai L. Population-based post-crisis psychological distress: an example from the SARS outbreak in Taiwan. J Formos Med Assoc [Internet], 2010; 109(7): 524e532. doi: 10.1016/S0929-6646(10)60087-3
20. Al-rabiaah A, Temsah M, Al-eyadhy AA, Gamal MH, AlZamila F, Al-Subaiea S. Middle east respiratory syndrome-corona virus (MERS-CoV) associated stress among medical

students at a university teaching hospital in Saudi Arabia. J Infect Public Health [Internet], 2020; 1e5. doi: 10.3855/jidc.6925

21. AlAteeq DA, Aljhani S, AlEesa D. Perceived stress among students in virtual classrooms during the COVID-19 outbreak in KSA. J Taibah Univ Med Sci, 2020; 15(5): 398-403. doi: 10.1016/j.jtumed.2020.07.004
22. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav, 1983; 24(4): 385-96. PMID: 6668417.
23. Cohen, S., & Williamson, G. Perceived Stress in a Probability Sample of the United States. In S. Spacapan, & S. Oskamp (Eds.), The Social Psychology of Health: Claremont Symposium on Applied Social Psychology, 1988; 31-67. Newbury Park, CA: Sage.
24. Taylor JM. Psychometric analysis of the ten-item perceived stress scale. Psychol Assess, 2015; 27(1): 90e101. doi: 10.1037/a0038100
25. Wang, J., Geng, L. Effects of Socioeconomic Status on Physical and Psychological Health: Lifestyle as a Mediator. Int J Environ Res Public Health, 2019; 20, 16(2): 281. doi: 10.3390/ijerph16020281
26. Cao W., Fang Z., Hou G., Han M., Xu X., Dong J. The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Res.*, 2020; 287: 112934. doi: 10.1016/j.psychres.2020.112934
27. Lee S. A. Coronavirus Anxiety Scale: a brief mental health screener for COVID-19 related anxiety. *Death Stud*, 2020a; 44: 393–401.doi: 10.1080/07481187.2020.1748481
28. George S, Joseph BB. Level of stress and its causes among 1st year dental students - a cross-sectional study. Natl J Physiol Pharm Pharmacol, 2018; 8(11): 1518-1521. doi:10.5455/NJPPP.2018.8.0825017082018
29. Ahmed M, Prashantha B. Perceived stress and source of stress among undergraduate medical students of Government Medical College, Mysore. Int J Community Med Public Health, 2018; 5(8): 3513e3518. doi:10.18203/2394-6040.ijcmph20183090
30. Al-Dubai S, Ganasegeran K, Barua A, Rizal A, Rampal K. Evaluation of psychometric properties of the Malay version perceived stress scale in two occupational settings in Malaysia. Ann Med Health Sci Res, 2014; 4(2): S104-7. doi: 10.4103/2141-9248.138023
31. Rosen S, Mouzon D. In: Aneshensel CS, Phelan JC, Bierman A, editors. Handbook of the sociology of mental health. Dordrecht: Springer, 2013; 277e296.
32. Goldstein JM, Jerram M, Poldrack R, Ahern T, Kennedy DN, Seidman LJ. Hormonal cycle modulates arousal circuitry in women using functional magnetic resonance imaging. J Neurosci, 2005; 25(40): 9309e9316. doi: 10.1523/JNEUROSCI.2239-05.2005

33. Taylor, M.R., Agho, K.E., Stevens, G.J. *et al.* Factors influencing psychological distress during a disease epidemic: Data from Australia's first outbreak of equine influenza. *BMC Public Health*, 2008; 8: 347. https://doi.org/10.1186/1471-2458-8-347
34. Meenakshi Sreeram* and Mona A. Mundada: Survey to Assess Perceived Causes of Stress, Its Manifestations and Coping Strategies among Dental College Students in Maharashtra during COVID-19 lockdown; Biomedical & Pharmacology Journal, March, 2021; 14(1): 53-60. https://dx.doi.org/10.13005/bpj/2098
35. Cao W, Fang Z, Hou G, et al. The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Res*, 2020; 287: 112934. doi: 10.1016/j.psychres.2020.112934
36. Kwaah CY, Essilfie G. Stress and coping strategies among distance education students at the University of Cape Coast, Ghana. Turk Online J DistEduc, 2017; 18(3): 120e134. doi:10.17718/TOJDE.328942
37. Sahu P. Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact on Education and Mental Health of Students and Academic Staff. Cureus, 2020; 4, 12(4): e7541. doi: 10.7759/cureus.7541
38. M. Abisha Meji, Milon Selvam Dennison; Survey on general awareness, mental state and academic difficulties among students due to COVID-19 outbreak in the western regions of Uganda, Heliyon, 2020; 6: e05454. doi: 10.1016/j.heliyon.2020.e05454
39. Srivastava Niraj, Saxena Varsha, Gehlot Sangeeta, & Singh B M. (2020). Outbreak of Coronavirus Disease (Covid-19) in India and Consideration of Preventive Aspects by Ayurveda. International Journal of Research in Pharmaceutical Sciences, 2019; *11*(SPL1): 739-747. https://doi.org/10.26452/ijrps.v11iSPL1.3076