



Effects of Sleep Deprivation on the Students of Saveetha Dental College and Hospitals, Chennai

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Adequate sleep plays a vital role in optimizing, stabilizing, and enhancing memory, cognition, attention, and attention to things, instances, situations that a person may come across on a day-to-day basis. Consequently, a lack of proper sleep can lead to the absence of the information qualities of an individual.

Aim: To study the effects of Sleep Deprivation among the students of Saveetha Dental College, Chennai.

Materials and Methods: The study was conducted using a questionnaire-based survey, which was activated among the students ranging from the first year to the fourth year of dentistry. The survey contains questions concerning the sleep timing of individuals and accessory methods that may or may not be used to battle insomnia in students.

Results: The results from the survey shows a majority of the people did not have any previously diagnosed medical ailments (60%), and did not use any pharmacological aids to combat sleep-related issues (36%). A p-value of 0.03 showed statistical significance.

Conclusion: The results concluded that sleep deprivation did hamper the overall quality of life and academic performance of individuals. It can be said that sleep is an essential factor to determine the quality of overall life an individual leads.

Keywords: *Sleep; deprivation; impaired; cognition; insomnia; memory; innovation; novel.*

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1. INTRODUCTION

Sleep deprivation refers to a state in which an individual has not gotten adequate sleep. The quality and quantity of sleep necessary for an individual to feel fresh and relaxed refer to his/her baby's sleep limit and any amount of sleep less than the daily sleep limit can cause the individual to be sleep deprived. Typically, the daily average sleep time of an individual should be around 6 to 8 hours, however, that can vary from individual to individual [1-4].

Optimum quality of sleep is an absolute necessity for optimizing memory processes. Previous literature has also shown a strong correlation between scores, average educational habits of students, and adequate availability of sleep [5-8]. A sleep-deprived person may become more prone to stress and mental illnesses as compared to an individual who meets his/her daily sleep limit. Sleep, in general, can be described as a resting state in which the responsiveness, metabolism, motor activity, psychological activity, and overall awareness of an individual gets reduced [9-11]. Among the groups which are at the highest risk of falling prey to sleep deprivation, the ones that stand out the most are students and individuals pursuing academics. Previous literature has established multiple correlations between sleep deprivation and lack of attentiveness among students [12-15]. Sleep deprivation has also been known to completely disrupt the circadian rhythm which is mainly associated with the maintenance of the daily basic biological processes, and include cycle changes in an individual's metabolic rate and efficiency and his/her sleep wake-cycle[16][10,17]. Within University or college students, the major cause of sleep deprivation is increased academic load and the inability of the student to cope up with it, in addition to that, easier access to technological sources of recreation and entertainment have also been found to play an important role in pushing students into a state of severe sleep deprivation [12,18][15,19][15,19,20]. Adverse effects of sleep deprivation on the physical well-being of an individual have been previously documented and are shown to have a very strong correlation. Sleep deprivation has shown a noticeable drop in the individual's ability to remember new information and a substantial increase in the reaction time and reflexes [12,18,21]. Our team has extensive knowledge and research experience that has translate into high quality publications [22–26].

This research aims to assess the quality and quantity of sleep needed for college students in adverse effects caused due to the lack of it.

2. MATERIALS AND METHODS

A cross-sectional survey was conducted among the adolescent population with a sample size of 100 A self-administered structured questionnaire was prepared based on the effects of Sleep deprivation 12 questions. It was circulated to participants through an online platform (google form). The statistics were done using SPSS software, a chi-square test was used to check the association, and a P-value of 0.05 was said to be statistically significant. The pros of the survey are that the adolescents of different lifestyles and cultures were surveyed. Children and adults were excluded from the survey. The simple random sampling method was the sampling method used to minimize the sampling bias.

3. RESULTS

The survey conducted got results from 57% of Females and 43% males females within the age group of 18 to 28 the chi-square test showed the statistical significance of P is equal to 0.003(Fig. 1). 40% of the study population was previously diagnosed with some medical ailments, while 60% had no previous medical history (Fig. 2). 49% of the study population had interrupted and erratic sleep patterns, while 51% had uninterrupted and normal sleep patterns (Fig. 3). 58% of the study population sometimes used pharmaceutical aids to fall asleep, 6% always used pharmaceutical aids and 36% never used pharmaceutical aids to combat sleep disruptions (Fig. 4). 17% of the study population said that poor sleep always affected their daily work, 61% were sometimes affected, 18% were rarely affected and 4% were never affected by poor sleep during working hours (Fig. 5). In the study population, it was found that 24% of the females had been previously diagnosed with medical ailments but only 16% of the males had been diagnosed with medical ailments previously (Fig. 6). Within the female population, it was found that 35% of them got 6 to 8 hours of sleep, 16% got less than 5 hours of sleep and 6% got more than 8 hours of sleep .Within the male population, 27% of males got 6 to 8 hours of sleep, 12% got less than 5 hours of sleep and 4% of them got more than eight hours of sleep (Fig. 7). In this study it was also found that in

terms of drug usage for better sleep, 38% of females sometimes used drugs, 1% always used drugs, and 18% never used drugs. As for the male population, it was found that 20%

sometimes use drugs, 5% always use drugs, and 18% of males never use drugs to fall asleep (Fig. 8).

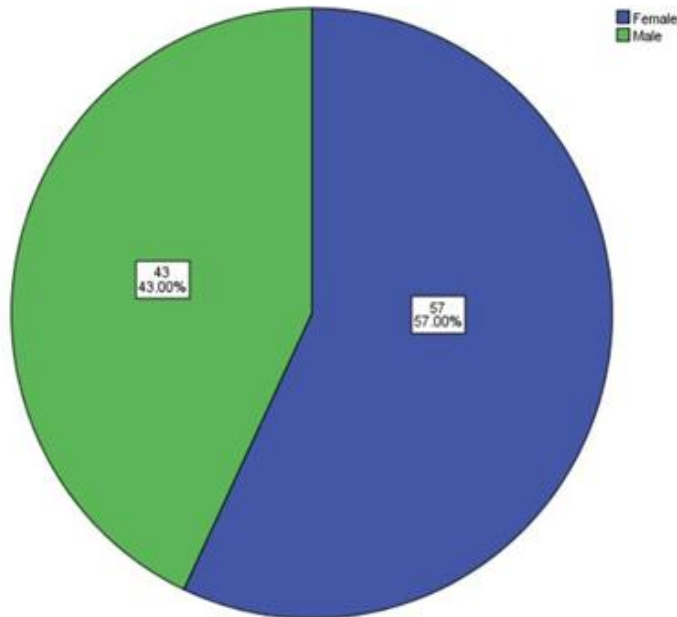


Fig. 1. Pie Chart showing the percentage distribution of gender who answered the survey; Where Green represents Male (43%) and Blue represents female (57%); the percentage of females were more in the study than males

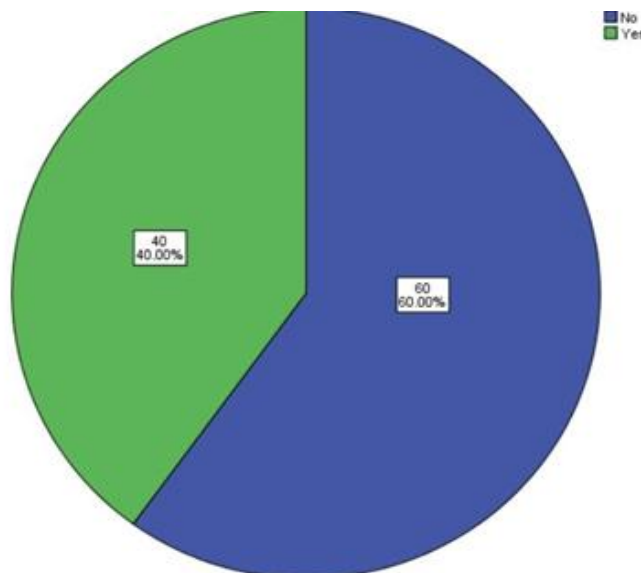


Fig. 2. Pie chart showing the percentage distribution of people who had previously diagnosed medical ailments; Where Green represents yes (40%) and Blue represents No (60%); The percentage of people who did not have previously diagnosed medical conditions was more

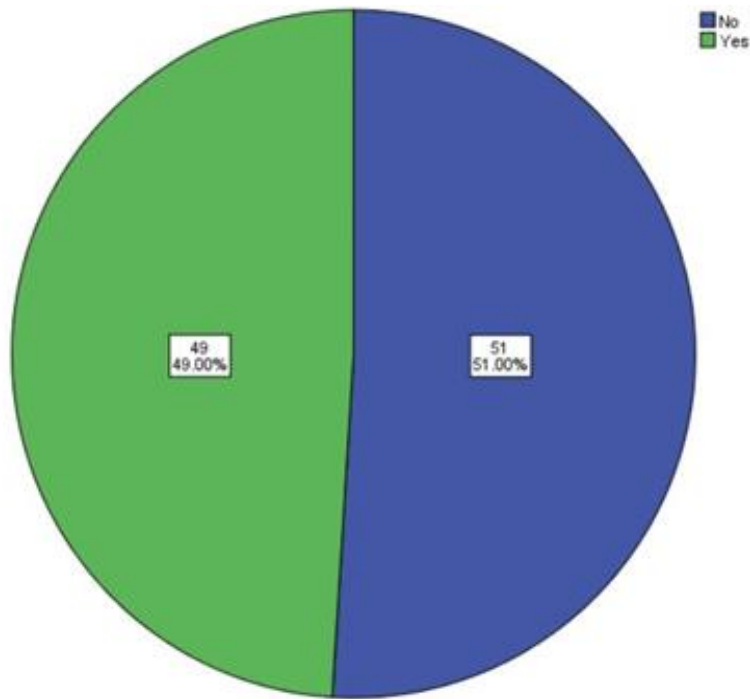


Fig. 3. Pie Chart showing the percentage distribution of people Who had interrupted sleep. Where Green represents Yes (49%) and Blue represents No (51%). The percentage of people who had interrupted sleep was less in comparison to the people who had interrupted sleep

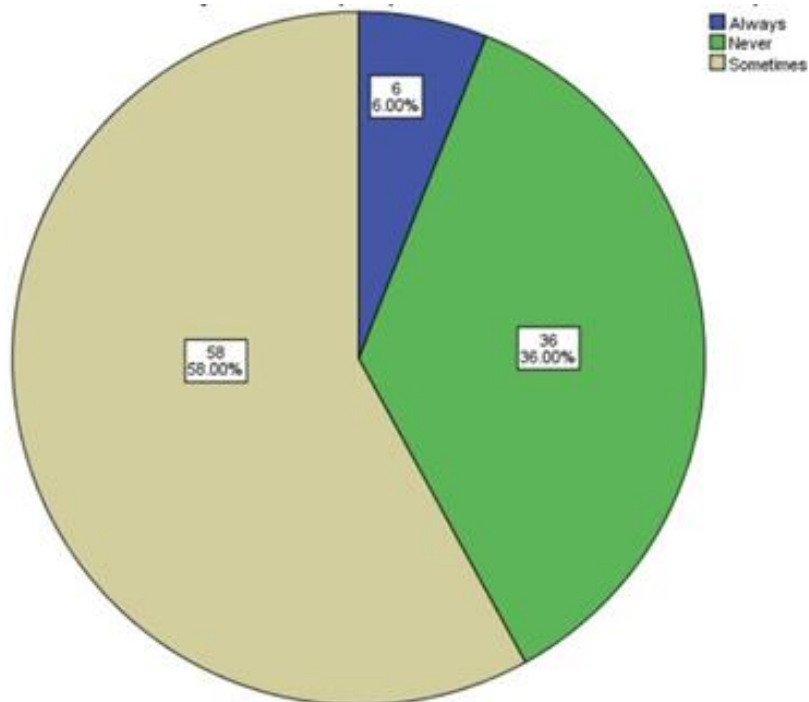


Fig. 4. Pie Chart showing the percentage distribution of people who took Pharmaceutical aids to fall asleep. Where Beige represents sometimes (58%), Green represents Never (36%) and Blue represents Always (6%). A larger percentage of people sometimes used pharmaceutical aids to combat insomnia

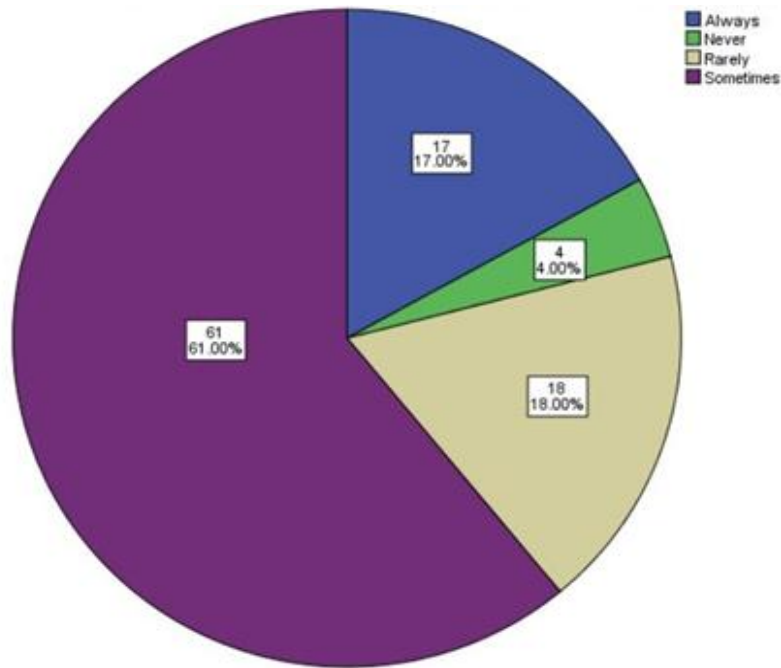


Fig. 5. Pie Chart showing the percentage distribution of people who responded to the question, Has Sleep affected your activities during work. Where Purple represents sometimes (61%), Beige represents Rarely (18%), Blue represents Always (17%), and Green represents Never (4%). A larger group of people said that lack of sleep sometimes affected their daily work

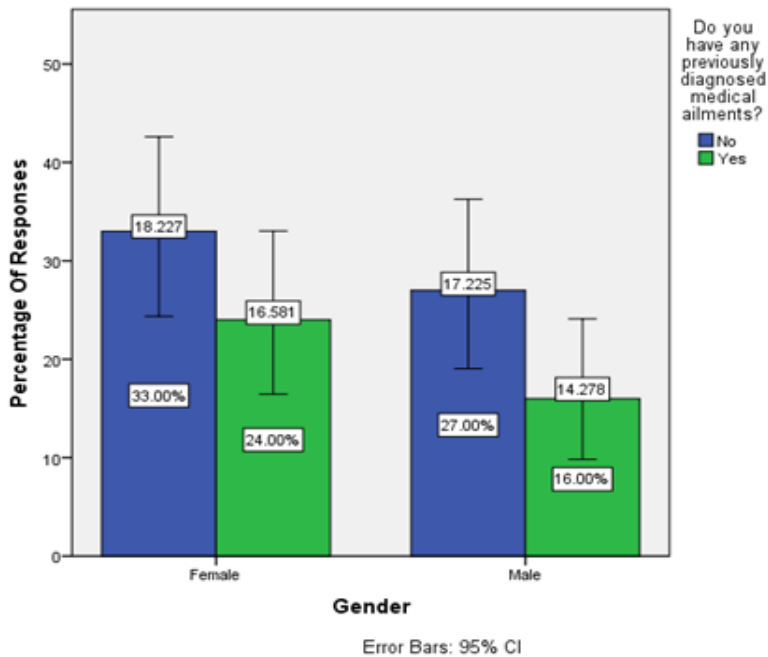


Fig. 6. Bar Graph depicts the association between Gender and the number of people who had previously been diagnosed with medical ailments. The Y-axis represents the number of responses and the X-axis represents gender. Blue represents No, and Green represents yes; A majority of people said that they did not have any previously diagnosed medical ailments. This difference is statistically insignificant (Chi-square test p-value- 0.974)

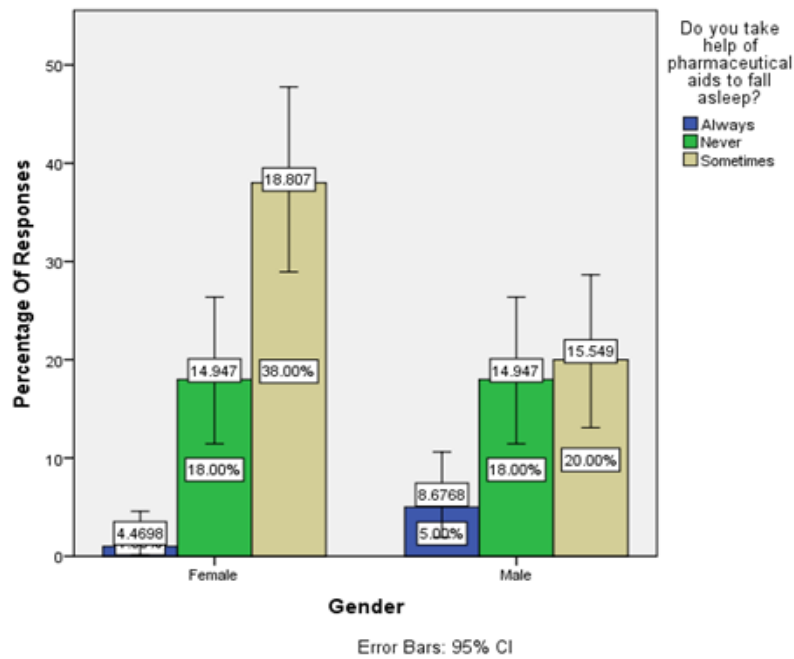


Fig. 7. Bar Graph depicts the association between Gender and the number of people who take help of pharmaceutical aids to fall asleep. The Y-axis represents the number of responses and the X-axis represents Gender. Blue denotes Always, Green denotes Never, Beige denotes Sometimes. Majority of the people sometimes took help of pharmacological aids to fall asleep. This difference is statistically insignificant (Chi-Square test p-value- 0.631)

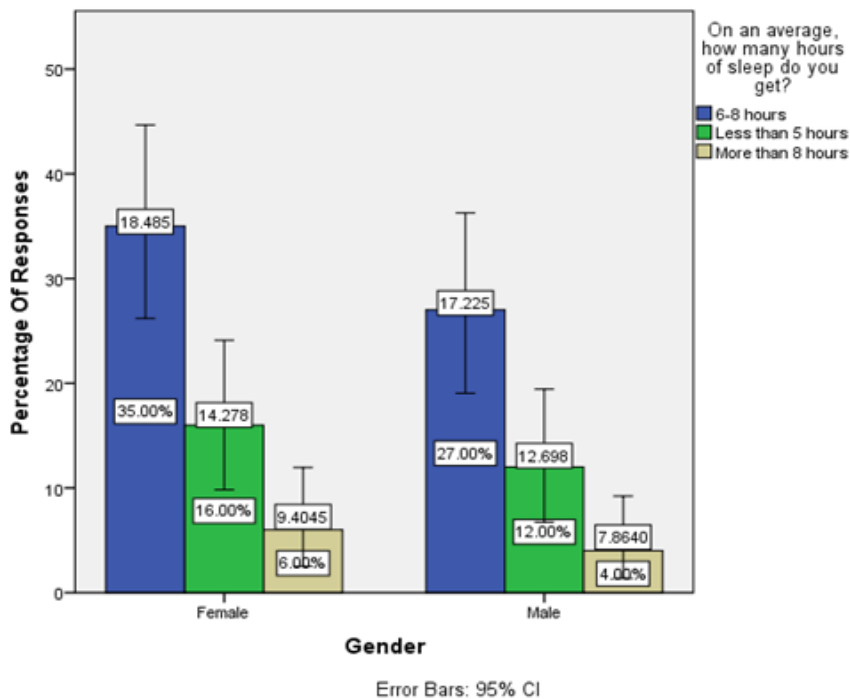


Fig. 8. Bar Graph depicts the association between Gender and the average amount of sleep that they get. The Y-axis represents the number of responses and the X-axis represents Gender. Blue represents 6-8 hours, Green represents less than 5 hours, Beige represents more than 8 hours. This difference is statistically significant (Chi-Square test p-value- 0.04)

4. DISCUSSIONS

Our present study found that 24% of the Females and 16% of the Males of the study population had a history of medical ailments, which directly or indirectly led to sleep-related issues. In a previous research conducted by Nyer et al [27-29], they found that 37% of the college students had a history of medical issues. Which was similar to the findings of our study. College years are a time of critical transition from adolescence to adulthood. This transition is involved with inadequate sleep. Student's inadequate sleep hygiene is common, as students often use technology and substances that compromise sleep quality and quantity. This chronic sleep deprivation may impair academic performance, mood regulation, and driving safety. Investigation of new approaches to promote good sleep should be prioritized [30]. This survey has created an awareness on the importance of sleep among college students. The present study found that 49% of the total individuals had interrupted sleep patterns and were regularly sleep deprived. In a previous study by VanHelder and Radomski [30-32], they found that 53% of their study population was under severe sleep deprivation. The present study concluded that 38% of Females and 20% of Males of the study population had the habit of taking help of pharmacological aids to combat insomnia. The study conducted by Skidmore, Kaufman, and Crowell [33-35] found that 45% of their study population used pharmaceutical aids to combat sleep deprivation. The results obtained from this survey are not generalizable to working classes or other groups of people. Additionally, the sample size was very small and the margin for bias also increased. Sample size can be increased and thus, the results can be more generalized.

5. CONCLUSION

From the conducted survey, we can conclude that sleep is very essential for overall normal well-being and functioning of the body, and lack of it will have detrimental effects, and the students of Saveetha Dental College were moderately sleep-deprived.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline participant consent and ethical approval has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Abrams RM. Sleep Deprivation. *Obstet Gynecol Clin North Am.* 2015;42:493–506.
2. Solai Prakash AK, Devaraj E. Cytotoxic potentials of *S. cumini* methanolic seed kernel extract in human hepatoma HepG2 cells. *Environ Toxicol.* 2019;34:1313–9.
3. Rajakumari R, Volova T, Oluwafemi OS, Rajesh Kumar S, Thomas S, Kalarikkal N. Grape seed extract-soluplus dispersion and its antioxidant activity. *Drug Dev Ind Pharm.* 2020;46:1219–29.
4. R H, Hannah R, Ramani P, Ramanathan A, Jancy MR, Gheena S, et al. CYP2 C9 polymorphism among patients with oral squamous cell carcinoma and its role in altering the metabolism of benzo[a]pyrene. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology.* 2020;130 :306–12. Available: <https://doi.org/10.1016/j.oooo.2020.06.021>.
5. Chen W-L, Chen J-H. Consequences of inadequate sleep during the college years: Sleep deprivation, grade point average, and college graduation. *Prev Med.* 2019; 124:23–8.
6. Barabadi H, Mojab F, Vahidi H, Marashi B, Talank N, Hosseini O, et al. Green synthesis, characterization, antibacterial and biofilm inhibitory activity of silver nanoparticles compared to commercial silver nanoparticles. *Inorganic Chemistry Communications* 2021;129:108647. Available: <https://doi.org/10.1016/j.inoche.2021.108647>.
7. Santhakumar P, Roy A, Mohanraj KG, Jayaraman S, Durairaj R. Ethanolic Extract of Capparis decidua Fruit Ameliorates Methotrexate-Induced Hepatotoxicity by Activating Nrf2/HO-1 and PPAR γ Mediated Pathways. *Indian Journal of Pharmaceutical Education and Research.* 2021;55:s265–74.

- Available:<https://doi.org/10.5530/ijper.55.1s.59>.
8. Wahab PUA, Madhulaxmi M, Senthilnathan P, Muthusekhar MR, Vohra Y, Abhinav RP. Scalpel Versus Diathermy in Wound Healing After Mucosal Incisions: A Split-Mouth Study. *J Oral Maxillofac Surg.* 2018;76:1160–4.
 9. Lo JC, Chong PLH, Ganesan S, Leong RLF, Chee MWL. Sleep deprivation increases formation of false memory. *J Sleep Res.* 2016;25:673–82.
 10. Clarizia G, Bernardo P. Diverse Applications of Organic-Inorganic Nanocomposites: Emerging Research and Opportunities. IGI Global; 2019.
 11. Peer Review #2 of “Impact of COVID-19 outbreak on the mental health status of undergraduate medical students in a COVID-19 treating medical college: A prospective longitudinal study (v0.2)” 2020. Available:<https://doi.org/10.7287/peerj.10164v0.2/reviews/2>.
 12. Maheshwari G, Shaukat F. Impact of Poor Sleep Quality on the Academic Performance of Medical Students. *Cureus.* 2019;11:e4357.
 13. Bharath B, Perinbam K, Devanesan S, AlSalhi MS, Saravanan M. Evaluation of the anticancer potential of Hexadecanoic acid from brown algae *Turbinaria ornata* on HT–29 colon cancer cells. *Journal of Molecular Structure.* 2021;1235:130229. Available:<https://doi.org/10.1016/j.molstruc.2021.130229>.
 14. Sridharan G, Ramani P, Patankar S, Vijayaraghavan R. Evaluation of salivary metabolomics in oral leukoplakia and oral squamous cell carcinoma. *J Oral Pathol Med.* 2019;48:299–306.
 15. Tahmasebi S, Qasim MT, Krivenkova MV, Zekiy AO, Thangavelu L, Aravindhana S, et al. The effects of oxygen-ozone therapy on regulatory T-cell responses in multiple sclerosis patients. *Cell Biol Int.* 2021;45:1498–509.
 16. Davies SK, Ang JE, Revell VL, Holmes B, Mann A, Robertson FP, et al. Effect of sleep deprivation on the human metabolome. *Proc Natl Acad Sci U S A.* 2014;111:10761–6.
 17. Singh MR, Singh D, Kanwar J, Chauhan NS. *Advances and Avenues in the Development of Novel Carriers for Bioactives and Biological Agents.* Academic Press; 2020.
 18. Siegel JM. The neurobiology of sleep. *Semin Neurol.* 2009;29:277–96.
 19. Vivekanandhan K, Shanmugam P, Barabadi H, Arumugam V, Daniel Raj Daniel Paul Raj D, Sivasubramanian M, et al. Emerging Therapeutic Approaches to Combat COVID-19: Present Status and Future Perspectives. *Front Mol Biosci.* 2021;8:604447.
 20. Wadhwa R, Paudel KR, Chin LH, Hon CM, Madheswaran T, Gupta G, et al. Anti-inflammatory and anticancer activities of Naringenin-loaded liquid crystalline nanoparticles *In vitro.* *J Food Biochem.* 2021;45:e13572.
 21. Fullagar HHK, Skorski S, Duffield R, Hammes D, Coutts AJ, Meyer T. Sleep and athletic performance: the effects of sleep loss on exercise performance, and physiological and cognitive responses to exercise. *Sports Med.* 2015;45:161–86.
 22. PradeepKumar AR, Shemesh H, Jothilatha S, Vijayabharathi R, Jayalakshmi S, Kishen A. Diagnosis of Vertical Root Fractures in Restored Endodontically Treated Teeth: A Time-dependent Retrospective Cohort Study. *J Endod.* 2016;42:1175–80.
 23. Dhinesh B, Isaac JoshuaRamesh Lalvani J, Parthasarathy M, Annamalai K. An assessment on performance, emission and combustion characteristics of single cylinder diesel engine powered by *Cymbopogon flexuosus* biofuel. *Energy Convers Manage.* 2016;117:466–74.
 24. Lekha L, Kanmani Raja K, Rajagopal G, Easwaramoorthy D. Schiff base complexes of rare earth metal ions: Synthesis, characterization and catalytic activity for the oxidation of aniline and substituted anilines. *J Organomet Chem.* 2014;753:72–80.
 25. Soh CL, Narayanan V. Quality of life assessment in patients with dentofacial deformity undergoing orthognathic surgery—A systematic review. *Int J Oral Maxillofac Surg.* 2013;42:974–80.
 26. Krishnan V, Lakshmi T. Bioglass: A novel biocompatible innovation. *J Adv Pharm Technol Res.* 2013;4:78–83.
 27. Nyer M, Farabaugh A, Fehling K, Soskin D, Holt D, Papakostas GI, et al. Relationship between sleep disturbance and depression, anxiety, and functioning in college students. *Depress Anxiety.* 2013;30:873–80.

28. Ezhilarasan D. Critical role of estrogen in the progression of chronic liver diseases. *Hepatobiliary Pancreat Dis Int.* 2020;19 :429–34.
29. Gowhari Shabgah A, Ezzatifar F, Aravindhan S, Olegovna Zekiy A, Ahmadi M, Gheibihayat SM, et al. Shedding more light on the role of Midkine in hepatocellular carcinoma: New perspectives on diagnosis and therapy. *IUBMB Life.* 2021;73:659–69.
30. VanHelder T, Radomski MW. Sleep deprivation and the effect on exercise performance. *Sports Med.* 1989;7:235–47.
31. J PC, Marimuthu T, C K, Devadoss P, Kumar SM. Prevalence and measurement of anterior loop of the mandibular canal using CBCT: A cross sectional study. *Clin Implant Dent Relat Res.* 2018;20:531–4.
32. Zorzi AR, de Miranda JB. *Cartilage Repair and Regeneration.* BoD – Books on Demand; 2018.
33. Skidmore CR, Kaufman EA, Crowell SE. Substance Use Among College Students. *Child Adolesc Psychiatr Clin N Am.* 2016;25:735–53.
34. Mudigonda SK, Murugan S, Velavan K, Thulasiraman S, Krishna Kumar Raja VB. Non-suturing microvascular anastomosis in maxillofacial reconstruction- a comparative study. *J Craniomaxillofac Surg.* 2020;48 :599–606.
35. Nambi G, Kamal W, Es S, Joshi S, Trivedi P. Spinal manipulation plus laser therapy versus laser therapy alone in the treatment of chronic non-specific low back pain: a randomized controlled study. *Eur J Phys Rehabil Med.* 2018;54:880–9.

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