Study protocol to assess sleep quality and quantity of dental students belonging to the University of Concepcion in e-learning classes during the current pandemic.

Protocolo de estudio para evaluar la calidad y cantidad de sueño de estudiantes de Odontología UdeC en clases e-learning en pandemia.

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INTRODUCTION.

In mid-March 2020, the World Health Organization (WHO) declared a pandemic due to COVID-19, an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), having a universal psychosocial impact. This current situation has led to drastic changes such as social distancing and modifications of daily practices, including those happening in the educational area. It implied the end of traditional teaching in classrooms, and teachers opting for electronic resources and online strategies.

This has also meant that the teaching process in Chilean universities had to be rearranged, implementing the use of virtual platforms such as Canvas and Microsoft Teams to teach contents to students both synchronously and asynchronously, defining this new teaching modality as *"e-learning"*. Studies assure that learning through videos and online conferences is useful, however, when consulting the opinion of students, only a few prefer to use this learning methodology. Most of them lean towards a combination of traditional teaching and online learning.[1] Despite the opinion of university students, some programs belonging to the health area have reported that the way to obtain the best achievements in teaching is based on how efficiently teachers use technological resources synchronously and asynchronously, in order to facilitate this type of teaching.[2,3] The implementation of online classes (e-learning) demands a high use of electronic devices and screens, forcing a new pace of study that experts have warned could cause academic overload.[3]

Portable electronic devices and computers emit a type of short-wavelength light, the so-called "blue light", which generates alterations in circadian physiology, levels of alertness and in cognitive performance. which generates alterations in circadian physiology, in levels of alertness and in cognitive performance.[4]

This is due to the effect that this type of light has on melanopsin (a photopigment present in the retina) which is very photosensitive to this kind of light, causing a delay in the secretion of melatonin as a result to exposure[5] Melatonin is a hormone that serves the immune, cardiovascular and nervous systems, contributing to sleep/wakefulness, and a delay in its secretion could cause[6] a reduction in the number of hours of sleep, delay in REM sleep time and decreased alertness in the mornings,[4,5] which is directly associated with poor sleep quality.[4]

The objective of this research project will be to learn the way in which the participation in face-to-face classes and *"e-learning"* influences the quality and quantity of sleep in dental students at the University of Concepción (UdeC), and also to identify the presence of normal sleep patterns and/or sleep disorders.

MATERIALS AND METHODS.

A cross-sectional descriptive observational research will be carried out. To accomplish this, a questionnaire will be applied, which will be prepared based on the *"self-report of sleep disorders"*,[7] and based on the percentiles proposed by the researcher, will help to identify the presence of normal sleep patterns or sleep disorders in dental students.

The formulation of six extra questions to obtain information regarding the participation of students in face-to-face classes and the *"e-learning"* modality during the current year will be added.

For this study we will consider all undergraduate dental students from second to fifth year at University of Concepción Faculty of Denistry. The entire population (approximately 350 students) will be invited to participate, and considering a 70% acceptance rate, a final sample of 250 students is estimated, to whom inclusion and exclusion criteria will be applied. We estimate the entire answering process to last about 15 minutes.

The inclusion criteria will include students, women and men, with an age range between 18 and 27 years old, and who are part of the courses held in the second to fifth year of the dentistry program at the Universidad de Concepción during the year 2020.

Regarding the exclusion criteria, those dental students from the University of Concepción who did not have face-to-face classes in March 2020 or who did not have non-face-to-face classes with an e-learning modality will not be considered in this study.

This considers students who are in their first year and those who are in the semester corresponding to the internship process. The independent variables of this study will be the sociodemographic situation and the class modality (face-to-face or *"e-learning"*), and the dependent variables will be sleep duration and sleep quality. If any alteration or variation happens and/or a change in the class modality occurs, this will be analyzed.

The recollection of the data will be done through a questionnaire applied on Google Forms, and will be sent to all students in second to fifth year via their institutional email (Webmail UdeC). The data will be analyzed on Google Forms, complemented by Infostat to obtain summary measures (central tendency and dispersion) and a correlation analysis. Within the limitations, it can be mentioned that participants might not check their email inbox during the period of survey application, so they would not know of its existence.

Another limitation would be the need for a stable Internet connection in order to answer the survey. It is certain that all students will receive the link to the survey on their institutional emails, which they will be able to answer if they have the conditions and elements to do so. The motivation to complete the survey must also be considered, as well as the quality of answers to the survey, which may vary from student to student.

Regarding the survey itself, participants may not remember their exact sleep patters at the beginning of the school year, giving answers with a certain lack of precision. This might also be related to the impossibility of carrying out periodic controls that allow tracking sleep patterns during the entire year, being imposible to determine if sleep patters are similar during online clases or if variations occurred over the passing months.

Therefore, the month of March will be taken and reference for the face-to-face classes, which is quite a limited period of time to represent sleep patterns and a whole academic year.

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2

No funding will be requested since the questionnaire that will be used for this research is a free online tool provided by Google, and no payment of any kind will be given to participants.

EXPECTED OUTCOMES.

It is expected to obtain a difference in sleep quality and sleep quantity in dental students at University of Concepción, prior to and during the pandemic. The results of this study will allow us to understand the impact this new lifestyle has had on dentistry students.

All those who request it will receive feedback on the results of the survey, allowing them to know about their own situation and learn about sleep habits of dentistry students. In addition to this, all survey participants will be sent infographic material with tips and useful data to promote their sleep hygiene and/or how to improve it. Taking into account the possibility that in the near future a blended teaching modality could be implemented, that is, incorporating face-to-face classes added to an e-learning modality, we consider that the results obtained can be useful.

Class schedules can be modified in such a way that their distribution is optimal and considers sleep patterns of the students, since sleep is a complex process that consists of different neurophysiological stages, which, when affected by bad practices or habits, such as the lack of sleep, can lead to disorders that involve an imbalance in health and performance, both mentally, physically, and psychologically.[8-10]

We also believe that this study could be an invitation to include other programs in health sciences, to deepen the results or create comparisons that could help improve sleep patters of university students, promoting their best performance during this relevant period in their lives.

A factor that can influence learning abilities and academic performance is sleep, both its quality and duration, having repercussions such as daytime sleepiness and an increase in physical and psychological health problems.[11,12] In addition, lack of sleep affects not only university students, but also children, adolescents, and adults, resulting in a public health problem.[7,13]

REFERENCES.

1. Asiry MA. Dental students' perceptions of an online learning. Saudi Dent J. 2017 Oct;29(4):167-170. doi: 10.1016/j.sdentj.2017.03.005. PMID: 29033527; PMCID: PMC5634796.

2. Richter S, Idleman L. Online Teaching Efficacy: A Product of Professional Development and Ongoing Support. Int J Nurs Educ Scholarsh. 2017 Aug 22;14(1):/j/ijnes.2017.14.issue-1/ijnes-2016-0033/ijnes-2016-0033.xml. doi: 10.1515/ijnes-2016-0033. PMID: 28902621

3. Platt CA, Raile ANW, Yu N. Virtually the Same? Student Perceptions of the Equivalence of Online Classes to Face-to-Face Classes. MERLOT J Online Learn Teach. 2014;10(3):489-503.

4. Von gaevernitz D, Garabeli A, Rachid L, Okarenski G. Quality of Sleep and Use of Computers and Cell-Phones Among University Students. Rev Assoc Med Bras. 2020; 65(12):1454-8.

5. Asencio-Guerra AJ, Romero Santo-Tomás O, Jurado-Luque MJ, Segarra-Isern FJ, Canet-Sanz T, Giménez-Rodríguez P, Terán-Santos J, Alonso-Álvarez ML, García-Borreguero D, Barriuso-Esteban B. Sueño saludable: evidencias y guías de actuación. Documento oficial de la Sociedad Española de Sueño. Rev Neurol. 2016; 63(Supl.2): S1-S27.

6. Sroykham W, Wongsawat Y. Effects of LED-backlit computer screen and emotional selfregulation on human melatonin production. Annu Int Conf IEEE Eng Med Biol Soc. 2013; 2013:1704-7.

7. Gómez Camposa R, Lazari E, de Arrudab M, Pacheco Carrillo, Urra-Albornozd C, y Cossio-Bolañose M. Evaluación de los trastornos del sueño y propuesta de percentiles para los adolescentes. Arch Argent Pediatr. 2019;117(2):73-80

8. Rasch B, Born J. About sleep's role in memory. Physiol Rev. 2013 Apr;93(2):681-766. doi: 10.1152/physrev.00032.2012. PMID: 23589831; PMCID: PMC3768102.

9. Bathory E, Tomopoulos S. Sleep Regulation, Physiology and Development, Sleep Duration and Patterns, and Sleep Hygiene in Infants, Toddlers, and Preschool-Age Children. Curr Probl Pediatr Adolesc Health Care. 2017 Feb;47(2):29-42. doi: 10.1016/j.cppeds.2016.12.001.

10. Troynikov O, Watson CG, Nawaz N. Sleep environments and sleep physiology: A review. J Therm Biol. 2018 Dec;78:192-203. doi: 10.1016/j.jtherbio.2018.09.012. PMID: 30509635.

11. Hershner SD, Chervin RD. Causes and consequences of sleepiness among college students. Nat Sci Sleep. 2014 Jun 23;6:73-84. doi: 10.2147/NSS.S62907. PMID: 25018659; PMCID: PMC4075951.

12. Ahrberg K, Dresler M, Niedermaier S, Steiger A, Genzel L. The interaction between sleep quality and academic performance. J Psychiatr Res. 2012 Dec;46(12):1618-22. doi: 10.1016/j.jpsychires.2012.09.008. PMID: 23040161.

13. Rebolledo JP, Fasce E, Narváez CG, Vega JA. Tipos y Niveles de Motivación Académica, Estrategias de Aprendizaje y Rendimiento Académico en estudiantes de plan común de carreras de salud de una Universidad Privada. Rev Educ Cienc Salud.2020; 17(1): 18-25.

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4