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Social media for students' sleep health promotion – a health intervention report during COVID -19



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ABSTRACT

The COVID-19 pandemic has affected sleep health. Students' sleep health is essential for the performance of neuro-cognitive processes, as well as mental and physical balance. We assume the COVID19 pandemic has modified some sleep habits by prompting environmental and social interaction changes. In this study we surveyed a sample of 300 Brazilian students, with internet access, resident in the Federal District. They completed a questionnaire over two weeks in March 2020, i.e. the second and third week of the social isolation policy enacted in the Federal District due to COVID19. Valid responses from students aged 18–24 years were analyzed. The sample was mostly female; 76,3% reported somnolence during the day, 70,2% anxiety and 87,8% worse sleep associated with stress and/or anxiety, which indicated the variables for an educational health intervention design in this context. Further, 53.2% made no effort to avoid screens before sleeping; 73.9% to avoid using the bed for work or watching television and 83.1% to avoid consuming heavy foods before sleeping. We then created an Instagram profile, @comodormimos, which focused on the main sleep issues revealed by participants in the survey. Posts on the profile were based on sleep-related subjects: sleep processes, sleep hygiene practices for students; sleep stages, function and regulation; and sleep-wake circadian rhythms. The profile gained 307 followers, mostly women (61,7%), 18–24 years old. We concluded that the Covid-10 pandemic period increased harmful sleep behavior in students. Further studies are needed to understand the impact of the COVID-19 pandemic on student sleep health.

Introduction

Students' sleep health is essential for the performance of neurocognitive processes [1–3], as well as the mental and physical balance [2]. Undergraduate students, therefore, should avoid habits that lead to sleep deprivation as this can cause health and learning difficulties in a short time, due to problems with cognitive skills and emotional state [3,4]. The school start time effects on adolescent learning and academic performance, emotional health and behavior is part of the clinical implications of sleep hygiene [5]. The practice of sleep education programs can be followed by a knowledge-to-action perspective regarding barriers, proposed solutions, and future directions in terms of early to bed [6], looking for an exploration of adolescent sleep hygiene practices [7–9]. Probably the sleep behaviors since childhood may affect traditional-age college students. These age-sleep patterns on youth can be predictor factors of sleep across life span.

Numerous studies demonstrate that the COVID-19 pandemic has affected sleep health [10,11]. The influence of sleep before COVID-19 seems to be age dependent, where an epidemiological study had showed that the sleep time were longer in young adults (<25 years) compared to another age group of adults (45–54 years) [11]. There are implications of association between portable screen-based media device and sleep outcomes, and these disruption factors of sleep have been describing in pandemic period [12]. The bed time together with sleep hygiene have been growing as diagnosis and treatment skills on sleep medicine [13], particularly during COVID-19 in sleep interventions around the world.

In view of the fundamental importance of sleep and its regulation by the circadian cycle, sleep hygiene habits are characterized by a set of practices that help to obtain the maximum benefit from hours of sleep by improving environmental factors and reducing bad habits that cause harm. It will also help to avoid or minimize sleep disorders [3]. Thus, sleep hygiene is essential at all ages [14] in order to organize the amount and timing of sleep and sleeping rituals including adjusting environmental factors such as light and temperature, not eating high-calorie foods,

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practicing physical activity every day, maintaining consistent times for going to bed and getting up, and not using electronic devices close to bedtime [15,16]. However the young adults usually complain about insomnia and cognitive problems during undergraduation [17].

The present study focuses on the Sleep and Sleep Hygiene part of the Preventive and Educational Projects (PEP) in Sleep Health [18–20]. Since sleep and sleep hygiene habits are essential for a good cognitive performance [13], we considered that a study of undergraduated students' perception of the value of sleep and the need for sleep hygiene, sleep education since adolescence to adult age would yield valuable insight and inform interventions to improve sleep health in this population, particularly during the pandemic period. The aim of this study was to promote sleep health education based on social media in undergraduate students using Instagram. We hypothesize that the COVID19 pandemic in undergraduate students had modified some sleep habits by triggering changes in environmental and social interaction.

Methods

Procedure

The PEP is developed in the Discipline of Collective Health Practices (PSC) and offered in the third semester of the medicine course at the Catholic University of Brasília, in the first semester of 2020. The study followed 510/2016 resolution of Brazilian Health Ministry. This resolution authorizes studies developed in undergraduation disciplines. The PSC applies the paradigms of situational strategic planning to health through: the analysis of the population's epidemiological profile, and the design of educational health interventions anchored to the work of the seven health education themes proposed by Briceño-León [20]. The themes are explained as follows: I - Education does not occur only in educational programs, but in every health action; II - Ignorance is not a void to be filled, but a content to be transformed; III - There is not one who knows and another who does not know, but two who have different knowledge; IV - Education must be dialogued and participatory; V - Education must reinforce people's confidence in themselves; VI - Health education should seek to value the effort / reward knowledge model; VII - Education must foster individual responsibility and collective cooperation.

Based on these themes, the following steps were used to carry out the current study: a) by the first the opinion poll was collected, b) survey of educational materials available in the literature and c) creating the social media by analysis of the main health needs for the development of the profile.

Measurement

a) Opinion poll

In March 2020, a semi-structured questionnaire was designed. All questions were presented on the GOOGLE FORMS platform that could be available through a link published on social network by the snowball strategy that was used as a method of dissemination. The sample were based on the concept of convenient sample by invitation from the participants comprised family and friends of the class of students enrolled in the PSC discipline. The study recruited 300 undergraduate students, mostly medical students between 18 and 24 years of age with internet access, resident in the Federal District, answered the questionnaire between the third and fourth week of March 2020. This coincided with the start of COVID-19 pandemic control in Brazilian polices. Also, at this time we had a Brazilian policy that the local institutes should have a strategic action "O Brasil Conta Comigo", which aimed at students in health courses, to cope with the coronavirus pandemic (COVID-19) [21].

B) Survey of educational materials already available

To outline the profile on Instagram, a survey and evaluation of educational and health promotion materials was carried out on the theme

of sleep hygiene and psychoeducation of sleep. The Educational Content Validation Instrument in Health proposed by Leite et al. (20), was used to evaluate the materials according to domains using 15 items in the instrument comprises, which assess objectives, structure/presentation and relevance of educational materials in health. The final educational materials addressed the need for good quality of sleep, as well as sleep hygiene and life habits that should be adopted, especially by medical students. In this sense, the content elaborated in the present work has embedded in strategies towards changes in lifestyle and health maintenance in times of COVID-19.

C) Analysis of the main health needs for preparing the Instagram profile

Following the above steps, a descriptive analysis of the population's socio-demographic and health profile was carried out. Using the results of the google forms analysis, the key points for the development of health promotion actions published through Instagram were included.

The study was developed to have a format to call young followers as a tool to increase the number of followers and the interaction of readers with the @comodormimos profile. The content was permanently posted on the profile, as well as a "question box" publication. With the presentation and baseline explanations completed, the posting of content related to the theme Sleep and Hygiene of Sleep began, seeking to create a logical sequence of posts and to use accessible language.

Statistical analysis

Simple yet powerful the data-analysis visualization was made easy by an advanced Summary add-on that gave the ability to create interactive dashboards in a snap. It further allowed to quickly analyze collected data that's actively linked to Google Forms (with automatic updates). These google forms offered a quick overview of the collected data via the responses section where it displays summarized graphs and answer items. We created a customized analytics dashboard with specify various chart-types and apply different filters so you can further drill down and analyze subsets of the form responses [22]. Descriptive statistics are presented in this article. Also the instagram was able to give the summary of the data in a customized analytis format.

Results

Sample demographics

We analysed 307 undergraduate students, the sample that could be included were 300 students, comprised an eminently young population, mostly female ($n = 185$), respectively 61,7% female and 38,3% male, and mostly aged between 18 and 22 years (median=20), respectively 87,3% of the sample. None of the undergraduate students was part time worker.

A) Online Google survey during COVID-19

In general, respondents slept for less than 8 h a day. Overall 7 students were excluded because of a clinical condition that could bias their answers, and we included 8 students that had children. The complaint of sleepiness was reported in 76.3% and of anxiety in 70.2% of the sample. Also the association between stress and anxiety worsening their sleep were collected in 87,8% of the sample. (See table 1)

C) Sleep and sleep hygiene variables

Variables associated with sleep. 76.3% of 295 respondents experienced drowsiness during the day, 70.2% experienced anxiety and 87.8% reported worsening of sleep in the presence of stress and anxiety.

C) Data collected via Instagram

The Instagram profile had 315 followers, 74% of whom were women and 26% men, mainly in the 18–24 age group, but its reach extended to 504 people, which fulfilled its goal of increasing interaction with the

Table 1.
Demographic characteristics of the sample answer Google survey.

| | N = 307 | Percentage (n = 300) |
|-------------------|---------|----------------------|
| Older > 18 years | 300 | 100% |
| Female | 189 | 61.7% |
| Have children | 8 | 2.7% |
| No Working | 161 | 53.7% |
| Stressful routine | 125 | 41.7% |

Table 2.
Sleep items.

| | N = 300 | % answering Yes |
|--------------------------------------------------------------|---------|-----------------|
| Sleepiness | 224 | 76.3% |
| Anxiety | 211 | 70.2% |
| Poor sleep ascribed to stress and anxiety | 263 | 87.8% |
| On average 8 h of sleep each day | 89 | 29.7% |
| Experience somnolence during the day | 70 | 76.7% |
| Anxiety (from graph) | 212 | 70.7% |
| Poor sleep ascribed to stress and anxiety from graph | 264 | 88% |
| Sleeping pills | 57 | 19% |
| Does it take long to fall asleep | 148 | 49.3% |
| Do you wake up during the night (e.g. to go to the restroom) | 56 | 18.7% |
| Do you snore? | 74 | 24.7% |

public. The live post reached 285 people, and was highly praised in the comments. The last section of the questionnaire by Google forms to evaluate the life habits that constituted to a good sleep hygiene routine on a scale from little [1] to very [5]. The questions (in the order shown on the graph, from top to bottom) were: See below the questions about sleep and life habits:

- 1 Do you have a fixed time to wake up during the week?
- 2 Do you have a fixed bedtime during the week?
- 3 Do you sleep after lunch? (no more than 45 min)
- 4 Do you practice regular physical exercise? (Avoiding exercising close to bedtime)
- 5 Do you avoid the consumption of alcoholic beverages and/or cigarettes for at least 2 h before going to bed?
- 6 Do you avoid caffeine before bed?
- 7 Do you create a quiet, low-light environment and a comfortable temperature close to bedtime?
- 8 Do you stay away from screens before bedtime?
- 9 Do you avoid using the bed for work and /or watching television?
- 10 Do you try to avoid heavy foods before bed?

See Graph 1 and table 2 with the answers.

A&B profile of sleep health developed

In line with the theme of Sleep and Sleep Hygiene, art was used that links the sensorial idea of sleeping or sleep through the use of the colors blue, yellow, and their variations, and shapes of stars, moons, clouds and sheep. We used highlights in the profile to clarify, subdivide and emphasize information.

The first highlight was intended to present the members and intentions of PEP. The second highlight, "INSTAGRAM" aimed to clarify and organize the draw of their attention to @comodormimos for future readers, who would later interact with the Instagram profile. The presentation posts included explanations about the objective of the PSC Discipline and about the choice of the theme Sleep and Sleep Hygiene. Briefly, the importance of the subject was explained and some habits listed that can be introduced in their routines. We used some techniques such as

connecting to popular culture to relate to the student population. For example the lyrics of Gonzaguinha's song "Never stop dreaming" were published as an encouraging message for the pandemic era.

Discussion

We found data showing that the occurrence of the sleep habits in undergrated students, and it was associated with anxiety and media use before to go to sleep. The interaction between social media and presentive action were well succeed in our protocol during COVID-19 pandemic period. The creation of the @comodormimos profile on Instagram was based on the need for a subject understanding by the researched public, and the result was many interactions through likes, comments, and messages, due to the characteristics of the platform itself, that provides an environment for creating communities interested, with tools for interaction and engagement. The health intervention involved the creation of an Instagram profile can be described as a tool that increased sleep education on undergraduated students. COVID-19 pandemic affected students' sleep health, and it was modified in some sleep habits by eliciting environmental and social interaction changes.

The strengths of the study were the opportunity to deliver necessary and tailored content to the community on a theme common to all. The chosen platform allowed connection with the public, even in the midst of a period of physical isolation, through the dissemination of content and exchange of knowledge between professionals, students and the wider population. Thus, learning has become easier and more widely accessible through the use of social media. The development of the PEP via Instagram allowed us to understand and, therefore, learn about the need for good virtual communication to attract the public and share easily assimilated information on the theme of Sleep and Sleep Hygiene. To resolve the negative points, ways of attracting the male audience should be considered. These could include an active search for profiles and improvement of the language, making it more integrative, as well as expanding the use of tools that encourage the participation of readers, such as Polls and Question Boxes. The PEP dialogues with health care policies related to "Sleep and hygiene for the quality of life of students" through posts and exchange of experiences on sleep health based on studies on the influence of lifestyle. The exchange of knowledge takes place at different "levels" and in different spheres, and between all participants.

We found an increase in the use of the internet before going to sleep among the undergraduate medical students, and this worsened during the COVID-19 period. The media abuse in young adults is probably connected with hedonist circuit that is increased in the modern Society by the bad habits including the intentional delay sleep phase called as social jet lag [23–25]. The stress is a useful phenomenon that is natural and biological determined, affected by psychosocial and environmental factors, that is usually seen in undergrated students. It can imply in a state of hyperarousal follow by bad sleep hygiene.

There is an increase in internet use around the world [26] and the majority of internet users are teenagers. Some young people have been diagnosed with Internet addiction (IA) [27]. There is thus a need to understand the potential risks associated with the internet as users display pathological internet use behavior, similar to compulsive gambling, excessive pornography consumption, compulsive shopping, or excessive gaming [28,29]. The excessive internet use have been associated to other addiction such as pathological gambling, and it gets worse during night time.

Moreover we can see some behavior disorders associated with psychiatric disorders; impulsivity, depression, anxiety, psychosis, obsessive-compulsive symptoms, and social anxiety were reported in a metaanalysis published in 2019 by Alimoradi et al. [30]. These authors also hypothesized that children, teenagers, and young adults are most susceptible to IA; a highly vulnerable segment of the population, most of them are still in their developing years.

Our results showed that the majority of medical students had bad sleep hygiene. In their childhood, they probably were children and ado-

lescentes with sleep problems that were not well accessed by the parents, and now they are medical students with low knowledge in healthy quality. Poor sleep hygiene can have a very negative effect on sleep in adolescents and young adults with IA and there is clear association between internet addiction (and its equivalents), sleep problems, and curtailed sleep duration. Therefore, assisting young people in developing good sleep hygiene (e.g., not using the internet or smartphones before bedtime or while in bed) is relevant in all clinical practice. We found longer sleep duration pattern in undergraduated students. Young adults has an extend sleep duration during weekends as a recovery of sleep restriction during weekday [31]. More data about the connection between sleep hygiene is need. There is a growing in use of portable screen for sleep outcomes [32]. The use of media may increase the sleep psychoeducation.

The data made available by Instagram about the profile of the readers, the total likes and shares and the potential for disseminating the posts. Even with the creation of an attractive visual identity and the use of simple language, there is no establishment of contact with the public interested in the subject, as would normally happen in the face-to-face application of the PEP, which minimizes social interaction with the project. In addition, it is clear that the majority of followers and, therefore, the public most interested in the content, is female. The male audience seeks information and participates less, which makes it difficult to fully understand the reality of the situation and develop an appropriate intervention. The highest limitation of this study that we weren't apply the sleep questionnaire to obtain data about sleep duration, time to fall asleep, awakenings, and Dreams or nightmares. The students participated by answering an online questionnaire. The Snowball strategy was the dissemination method, a non-probabilistic sampling technique in which the participants invited new participants from their network of acquaintances. The questions were prepared by the medical students and they could increase their knowledge in sleep medicine. It should be made using sleep questionnaires that have a high efficiency and accuracy to detect behavior and sleep disorders.

Finally, self-responsibility is a very important point, since sleep hygiene and nocturnal and daytime habits, which directly influence sleep quality, are purely individual actions. The analysis of sleep in undergraduate students can stimulate more creative thinking, resilience social connectedness, well-being, physical health and longevity to them and their partner, and their patients in the medical undergraduate students. The collective cooperation is relevant since family actions, for example, are a model for sleep hygiene behaviors. Still, the neighborhood and anyone can inform, give tips, and exchange knowledge about sleep hygiene, in order to improve health, a collective good. Worries were that Coronavirus' pandemic increased the harmful sleep behavior of students. Further studies should be done to understand the impact of COVID-19 pandemic in the undergraduate student sleep health.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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