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Did digital learning during the lockdown impact emotional distress?

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ABSTRACT

Digital learning might have been one helpful strategy for occupational therapy students during the coronavirus pandemic in 2019. This study aimed to assess, before and after the lockdowns, whether digital learning caused any changes or had any impact in terms of the sleep quality, sleep hygiene, and emotional distress experienced by the 1st – 3rd year students during two semesters between 2020 and 2021. The Thai version of the Pittsburgh Sleep Quality Index, Sleep Hygiene Index, and Depression Anxiety Stress Scales were assessed in purposive sampling of 42 students. It was found that sleep hygiene and quality were not significantly different, while depression, anxiety, and stress scores increased significantly in 2021. Even though all students were able to maintain grade point averages, they perceived poor sleep quality and moderate sleep hygiene after the 9-month lockdown. This study suggests that coping strategies with resiliency, mental health well-being, and sleep health management might be an integrated topic for digital learning. In conclusion, the lockdown situation has cultivated a significant uptrend in emotional distress without differences in academic success among the participants.

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Introduction

University lecturers adopted online teaching during the coronavirus pandemic or COVID-19. Hours of planning, preparation, and reflection in breakout rooms were required for occupational therapy students (OTS). New learning skills were developed such as telehealth, simulated clients as well as experiencing different sessions with exhaustion throughout the day[1]. Some occupational therapy educators are enthusiastic facilitators in terms of delivering quality instruction with encouragement for sharing professional experiences[2]. However, online teaching requires time-consuming course preparation. It is challenging to use video simulations of clients that allow the OTS to make essential decisions similar to the real demands for professional health education[1,2]. Currently, online teaching mixed with various types of digital learning (e.g., flipped, blended, hybrid, e-learning) has been reported to be equivalent to or more effective than traditional face-to-face (F2F) classroom instruction among the OTS[3].

The new everyday phenomena of smartphones and internet users have also developed the need for multipurpose digital learning[4]. However, the 1st – 4th year OTS (n = 110) in India who had internet addiction (57.28%) perceived poor quality of sleep (75%) in moderate correlation with high levels of stress (14.54%)[5]. This is similar to the first-to-fourth-year OTS in South Africa (n = 117), who were found to be highly affected by academic stress-related health science and clinical education[6]. OTS might have been coping with overloaded online schedules, especially for some dependent and unorganized students[2] or those with poor coping strategies for resilience (e.g., disorganized adaptability and psychological insecurity)[7,8].

Moreover, the first-to-fourth-year OTS in a university in Thailand (n = 52) perceived poor quality of sleep to be moderately correlated with emotional distress during COVID-19[9]. The unwell sleep OTS (n = 30) gained higher comorbidities of smartphone, internet addiction, and emotional states than those well sleep OTS (n = 22) in the academic year 2020. Sharma, Tyszka[10] found that American OTS (n = 332) perceived emotional distress, i.e. depression (52.4%), anxiety (62.6%), and stress (87.7%) during COVID-19 in the academic year 2021. Also, they reported that the lockdown situation decreased social participation and reduced physical leisure activities, leading to intense, pervasive negative feelings of sadness and depression[10].

A further determination is required for the OTS on whether there was a change before and after the 9-month lockdown, in other words, a transition between the academic years of 2020 and 2021. Therefore, this study was interested in comparing the sleep and emotional distress parameters among the first-to-third-year OTS at a university in Thailand during the 9-month lockdown and digital learning due to COVID-19.

Materials and methods

Participants and procedure

This study was a causality with the before-and-after (twice data collection) lockdown situation and digital learning between two academic years (9 months) during the COVID-19 pandemic. Purposive sampling was used by inviting the OTS, 1st to 3rd years at one university during the academic year 2021, who had engaged in a previous study (n = 42)[9] to receive follow-up over a period of 9 months.

Sample size and subject selection

Data from a previous study by the authors in the 1st to 4th OTS for academic year 2020 (n = 52)[9] and the results of the American OTS[10] the Depression Anxiety Stress Scale (DASS-21) averaged scores of depression and its cut-off scores provided in the DASS manual[11] were used to calculate by G*Power software (version 3.1.9.4) with 2.02 of critical t-test. The data indicated that this study required at least 40 samples, at the 80% power of effect size. To minimize the risk of miscalculation, a replacement participant could be accepted in the event of a withdrawal by a participant.

To prevent biopsychosocial confounding factors, the inclusion criteria for subject selection included having no history of physical or neuropsychiatric disorders. To ensure the absence of a pertinent history concerning any disorders, all participants were asked to answer two yes/no questions in the online survey concerning medical diagnoses and use of medications in the past to the present, including physical activity routines during the COVID-19 pandemic.

Instruments for data collection

The online survey consisted of five sections comprising the following standardized instruments: the Thai version of the Pittsburgh Sleep Quality Index (T-PSQI), the Sleep Hygiene Index: Thai version (SHI: Thai version), and the DASS-21: Thai version. Demographic information was also collected, including birthdate, gender, and grade point average (GPA).

The T-PSQ[12] was used to assess overall sleep quality over one month and consisted of 19 self-rated items. Each item was scored from 0 (no difficulty) to 3 (severe difficulty). An overall score of less than or equal to 5 indicated good sleep quality. Its psychometric properties were previously reported to possess acceptable internal consistency and reliability (α = 0.73) as well as a sensitivity tool of 89.6% for sleep quality assessment[12]. This study considered a cut-off score above 5 to indicate poor sleep quality[12].

The Thai version of the SHI has previously been addressed as having acceptable internal consistency and reliability (α = 0.73)[13]. It consists of 14 questions for sleep hygiene behaviors; scores ranged from "5", indicating the most practiced behavior, to "1", indicating the least practiced behavior. A low level of practice in terms of sleep hygiene behaviors scored 1.00-2.33, while a moderate level scored 2.34-3.66, and a high level scored 3.67-5.00[13]. This study considered a cut-off score below 3.67 to indicate poor sleep hygiene[13].

The Thai version of the DASS-21 consists of 21 questions on emotional states with a previous report for acceptable to good internal consistency and reliability[14]. The scoring criterion for each item was between 0 and 3, which needed to be multiplied by 2 to gain the final score for each level[11,14]. This study considered cut-off scores below 10, 8, and 15 for normal levels of emotional states or without depression, anxiety, and stress, respectively[11]. Raw data per participant of score interpretation was counted of 5 levels for each emotional state (depression, anxiety, and stress) i.e., normal, mild, moderate, severe, and extremely severe. and then all counted scores were calculated as percentages for all participants.

Statistical analysis

All obtained data were analyzed using the IBM Statistical Package for the Social Sciences (IBM SPSS) version 2. Descriptive statistics were used to explain the data. Also, paired-samples t-tests were calculated at a *p*-value threshold of 0.05.

Results

Sample characteristics

During the nine-month data collection, a total of 42 OTS were recruited; most of them were females (n = 35). In the raw data, there were only 7.14% vs. 14.29% of OTS who received GPAs less than 3.00 in the year 2020 vs. 2021, respectively. Interestingly, the OTS were able to improve their GPA by around 40.48% during a period of nine months (no change 38.09%; decrease 21.43%). A paired-samples t-test showed no significant difference in ages as converted from birthdates and GPA (Table 1).

Sleep quality and hygiene

A paired-samples t-test found no significant difference between the post- versus pre-scores of the T-PSQI and the SHI. The raw data of OTS were 59.52% poor quality of sleep and 73.81% moderate sleep hygiene in the year 2021, whereas 54.76%

poor quality of sleep and 76.19% moderate sleep hygiene were shown in 2020. During a period of nine months, there was continuing moderate sleep hygiene (positively changed by 2.38%), but the OTS had negatively changed sleep quality by around 4.76%.

Table 1 Personal data and outcomes of the study

Variables	Year 2020 (n = 42)	Year 2021 (n = 42)	*p*-value*
Age (years)	19.33 ± 0.85	19.38 + 0.79	1.60
GPA	3.29 + 0.39	3.40 + 0.38	0.25
T-PSQI	6.12 ± 2.28	6.45 ± 3.10	0.59
SHI	3.51 ± 0.36	3.51 ± 0.33	0.99
DASS-21			
Depression	4.52 ± 3.00	12.90 ± 7.10	< 0.001
Anxiety	4.38 ± 3.13	9.48 ± 6.03	< 0.001
Stress	3.33 ± 2.24	11.24 ± 8.04	< 0.001

Note: The data were reported using mean ± standard deviation. *The data were compared using the paired-samples t-test.

Abbreviations: GPA, grade point average; T-PSQI, Thai version of the Pittsburgh Sleep Quality Index; SHI, Sleep Hygiene Index-Thai version; DASS-21, Depression Anxiety Stress Scale-Thai version.

Emotional states

There was a significantly higher score for depression compared to the previous year's scores. The OTS did have significantly higher anxiety compared to the last year's score for anxiety. The raw data for OTS revealed 64.29% (1 extremely severe, 4 severe, 16 moderates, and 6 mild depression) in the year 2021, whereas there were only 11.90% (5 mild depression)—in 2020. Later, there were 30.95% (1 extremely severe, 2 severe, 5 moderate and 5 mild of anxiety) in the year 2021 whereas there were 26.19% (6 moderate and 5 mild anxiety) in 2020. None of the former OTS were found to be stressed, but the later OTS were found to include 30.95% (1 extremely severe, 2 severe, 5 moderate and 5 mild stress). Only 11.90% of the OTS had positively changed depression levels in both years (no change 9.52% and negative change 78.58%).

Discussion

This study found no significant differences in age, GPA, sleep quality or hygiene for the OTS in both years. As seen in the scoring interpretation, the OTS remained having poor sleep quality and moderate sleep hygiene for a period of nine months. All three types of emotional distress were significantly shown to have higher scores in the year 2021, with mild to extreme levels of depression, anxiety, and stress. In contrast to the year 2020, the OTS gained mild depression and anxiety, whereas normal stress was addressed.

Interestingly, the OTS perceived an interesting benefit of digital learning that the emotional distress accompanied with the trend of improved GPA of those participants (40.48%). As seen in table 1, their means have changed from 3.29 to 3.40 with the similar range of SD. Using digital learning might be a good life experience due to personal and social adaptability during

the period of the 9-month lockdown, similar to the study of Brown et al[7], who mentioned that OTS could have perceived stress as being associated with self-control and a positive outlook. Our educators have supported the OTS for developing their competencies[1] (e.g., self-regulation skills for time management) and protective factors[6] (e.g., social supportive circumstances and resilience behavior). Importantly, most OTS were able to achieve academic improvement during the lockdown, meaning they could utilize the effective design of digital learning, similar to a previous study[3]. However, the current study found mild to extreme stress in 2021 indicating that academic stress might be one confounding factor for individual levels of listening skills in the context of online classrooms[7] (e.g., data downloading, active listening, and empathetic listening toward proactive instructors).

It has been accepted[7,9] that poor sleep OTS (poor sleep quality and moderate sleep hygiene) were not spending long hours of digital learning, but they perceived mild smartphone and internet addiction for family/peer contacts at nighttime in correlation with mild emotional distress. The current study found non-significant differences in sleep parameters which may imply their poor sleep behavior prior to the lockdown period, and it was remained as usual behavior throughout the period of data collection. Consequently, the poor sleep OTS could not avoid emotional distress and have delayed internet access at home[1] during COVID-19 because a turning point of accumulative stress episodes might increase in symptoms of depression and anxiety in 2021. Those participants may have been feeling of sadness (reduced social participation) and loneliness (low motivation toward increased social isolation) as described in the previous studies under an unsafe/unhealthy context[9,10]. This statement indicates that personal coping strategies of resilience might be a medium to decrease the risk of health behavior as seen from a minor improvement in sleep hygiene in 2021.

Study limitations and recommendations for future studies

This study could not identify a cause or effect of the lockdown situation separately from digital learning. Further studies should consider the use of a controlled study mixed with a qualitative study on any confounding and protective factors related to mental health well-being and academic success.

Conclusion

This study highlights a significant uptrend in terms of depression, anxiety, and stress after nine months of lockdown and digital learning experienced by OTS at a university in Thailand.

Clinical implications

- There was no impact on GPA, sleep quality, and sleep hygiene during the period of nine-month lockdown and digital learning although the OTS perceived emotional distress.
- Poor sleep quality and moderate sleep hygiene might be personal variation due to emotional distress under unsafe circumstances.
- The significant worsening of emotional state of the OTS might be a warning sign to support and monitor before two academic years of lockdown situation.

Conflicts of interest

The authors declare no conflicts of interest in the completion of this work.

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