The Effects of Learning and Eating Behaviours among Medical Students during the COVID-19 Pandemic

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Article

The Effects of Learning and Eating Behaviours among Medical Students during the COVID-19 Pandemic

Sayeeda Rahman [1,*], Rita Kirton [1], Brenda Roach [1], Maria Teresa Villagomez Montero [1], Alexey Podcheko [1], Nader Nouraee [1], Sadia Ahsan [1], Joshua Noel Nisar [1] and Ahbab Mohammad Fazle Rabbi [2]

[1] School of Medicine; American University of Integrated Sciences School of Medicine, Barbados.
[2] Department of Population Sciences, University of Dhaka, Dhaka, Bangladesh.
* Correspondence: srahman@auis.edu

Abstract: Background: The effect of the COVID-19 pandemic has transformed medical education and is likely to have long-lasting effects on student learning, mental well-being, and eating behaviour. This study aimed to examine the learning behaviors of medical students at the American University of Integrative Sciences (AUIS), Barbados, during the COVID-19 pandemic. **Methods:** A cross-sectional web-based online survey was administered to medical students at AUIS from July until November 2021. The data collecting instrument recorded students' demographic and learning behaviour information (Meo et al. 2020), and eating disorders (SCOFF questionnaire). **Results:** The overall response rate was 55% (n=120). In relation to learning behaviour, students agreed with the following statements: 'deterioration in work performance and studying' (48.4%), 'remember subject's contents appropriately' (40.4%), 'concentration on the studies' (40.3%), 'difficulty in performing two tasks simultaneously' (38.7%), 'difficulty in performing mental calculations' (33.9%), 'difficulty in recalling recent information' (32.3%), and 'difficulty in recalling old information' (38.7%). Among the 8 dimensions of learning behaviors, deterioration in work performance or studying, and difficulties in recalling recent information were found to be significantly associated with the gender of the students. For SCOFF questionnaire, approximately 24.2% screened positive for eating disorders. Screening with the SCOFF test demonstrated that female, older (>25 years), overweight + obese, Clinical Sciences + PreMed, and non-USA-based students were at more risk of eating disorders. **Conclusions:** The results indicate that during the COVID-19 pandemic AUIS students have developed learning difficulties, and are likely to have eating disorders. University policymakers should take appropriate measures to support a healthy learning environment and improve students' mental well-being and eating behaviours.

Keywords: learning behaviours; eating disorders; SCOFF questionnaire; medical students; COVID-19 pandemic; barbados

Introduction

The COVID-19 pandemic caused many countries worldwide to implement lockdown/quarantine policies, with most universities announcing a teaching pause to protect staff and student health and safety to minimize the spread of this highly contagious disease.[1-3] Implementation of social distancing, suspension of face-to-face teaching, and travel limitations caused a disruption within the education sector with infection control policies mandating the closure of schools and universities.[4] Pandemic-imposed measures may result in major psychological consequences such as post-traumatic stress symptoms, negative effects, and anger, posing a threat to health, and affecting life in general.[5] As reported recently, the pandemic is likely to affect problematic eating behaviours amongst young adults and students through multiple pathways,[5] the emotional impact of the restrictions being the foremost, loneliness and social isolation, boredom, and decreased physical and social activities.[6]

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Furthermore, the lack of physical presence of peers can lead to negative learning experiences for some students, compounded by increased anxiety and depression with constant news updates and the dynamic circumstances of the pandemic.[6] Medical and allied health professional students are also more susceptible to stress due to the sudden shift to online learning and lack of social and peer interactions.[4,7-9] Such uncertainties and stressful situations create barriers to learning, as well as loneliness due to social distancing contribute to a further increase in stress, anxiety, and problematic eating behaviors. While some students found remote learning beneficial as it created flexibility and comfort;[10] others found it quite challenging. These challenges included decreased supervision by educators, difficulty learning within the home setting, and the notion of self-learning.[11] Identifying how these obstacles have impacted students learning behavior is both valuable and critical. Studies have demonstrated that the overarching use of technology provided emotional support for students in the form of direct professor-student interactions and the stimulation of real-time feedback allowed education to be focused on the student.[12,13] Educational models that emphasize such factors will likely improve online learning behavior.

The COVID-19 pandemic and related limitations have negatively impacted the food habits of the majority of the world's population.[14] Due to a decrease in food availability, food acquisition, and food quality, several South American, African, and Asian nations have experienced food insecurity.[15-17] Changes in dietary habits have occurred in North America and Europe, yet food insecurity has not increased proportionally.[18] The confinement has also caused an increase in psychological discomfort, which has led to an increase in emotional eating, weight gain, a drop in physical activity, and an overall rise in sedentary living.[19,20]

According to Coakley et al.,[21] University students with symptoms of moderate to severe anxiety reported higher degrees of maladaptive appetitive traits: hunger, food, and satiety responsiveness, and emotional over-eating, with a decrease in enjoyment of food (3). Although women were more likely to consume fresh foods, many experienced more psychological distresses with higher levels of emotional eating that led to weight gain.[18,22] Among student populations, there hasn't been much change in dietary and lifestyle habits, but different student populations have experienced food insecurity based on their sociodemographic location, and availability of food in their country.[20,23,24] Depending on the change in living situations some students increased their consumption of healthy foods and physical activity while others continued to order take-out and increased their overall consumption of food. Most student populations had a reduction in the consumption of fresh foods with an overall increase in alcohol consumption and smoking.

The American University of Integrative Sciences (AUIS), Barbados has a mixed population of students from many parts of the world. Although most students are from the US, many come from India, Nigeria, Canada, the Caribbean Islands, and Europe. Depending on their country of origin, different students have experienced different changes in their dietary habits with some improving and others decreasing their nutrition during the COVID-19 pandemic.

This study aims to examine the learning and eating behaviour among medical students of the American University of Integrative Sciences (AUIS) in Barbados during the COVID-19 pandemic.

Methodology

Study Design, Sampling, and Data Collection

Study type: A Cross-sectional study was conducted at AUIS from July until November 2021.

Study Participants and procedures: All AUIS PreMed and medical students were invited to participate in this study. A validated online learning questionnaire was published using the online Google Form link, with those students willing to participate completing an informed consent form. The consent form explained the purpose of the study to the participants. Participation was voluntary, with participants given the option to withdraw at any time during data collection. The questionnaire was anonymous with no identifying information being collected.

Inclusion criteria: All AUIS PreMed and medical students.

Exclusion criteria: Students who declined to participate in the survey.

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Study instrument: The data was collected using the following study tools:

1. Students' demographic information
2. Learning behaviour information: A validated online learning questionnaire on Learning Behaviour information was utilized.[3] The questionnaire assessed the impact of quarantine on students' learning behaviors with a Five Point Likert Scale (strongly disagree to strongly agree) used to collect the information. The survey questionnaire consisted of 8 items.
3. Screening for eating disorders (SCOFF): The SCOFF questionnaire is a five-item screening questionnaire for eating disorders developed by Morgan et al.[25] The Questionnaire is designed to examine whether an eating disorder is present rather than to make a diagnosis and investigate the key aspects of eating disorders i.e. vomiting, concerns about losing control over how much one eats, weight loss, feeling fat, and whether food dominates life. These questions can be answered by 'yes' or 'no'. Scores of 2 or greater indicate that the participant could have a high possibility of having anorexia nervosa or bulimia nervosa.

Ethical Approval

Ethical approval was obtained from the research committee of the American University of Integrative Sciences (AUIS-RC/2020/R#02-SR). The study was conducted by the guidelines of the 1975 Declaration of Helsinki.

Statistical analysis:

All statistical analysis was performed by using (SPSS) software version 22.0 for Microsoft windows. The numbers and percentages were calculated. A p-value <0.05 was considered to be significant. Reporting descriptive statistics about student knowledge/perceptions of COVID-19 and vaccine acceptance [means and percentage]. Informing descriptive statistics for items measuring students' perceived stress and learning behaviour of students [means and percentage].

Result

The response rate was 52% (n=62). The majority of the respondents were females (59.7%) (Table 1). Most of the respondents (56.5%) were residing in the USA during the survey. The mean age of the participants was 31.84 years (SD = 8.68). The percentage of participants within the normal range of BMI was 50%. The percentage of those who were underweight was 4.8%, and 25.8% of the participants were classified as overweight by the BMI classification of the WHO. More than three fourth of the respondents (87%) received the COVID-19 vaccine and only 13% tested COVID-19 positive during the survey period.

Regarding learning behaviour, students agreed with the following statements: 'deterioration in work performance and studying' (48.4%), 'remember subject's contents appropriately' (40.4%), 'concentration on the studies' (40.3%), 'difficulty in performing two tasks simultaneously' (38.7%), 'difficulty in performing mental calculations' (33.9%), 'difficulty in recalling recent information' (32.3%), and 'difficulty in recalling old information' (38.7%) (Table 2).

The associations between sex and the pandemic's effect on students' learning behaviors at AUIS are summarized in Table 2. Responses for the outcomes related to learning behaviors are summarized into three categories: disagree (containing strongly disagree and disagree), neutral, and agree (containing both agreed and strongly agreed respondents). Among the 8 dimensions of learning behaviors, only noticing a deterioration in work performance or studying and difficulties in recalling recent information were found to be significantly associated with the sex of the students. As per the structure of the sample, female frequencies were higher for all three categories of learning behaviors; however, exceptionally higher percentages were observed for female students who significantly noticed a deterioration in work performance or studying (37.1%).

The relationship between student's study levels and learning behaviors at AUIS was also examined, which is summarized in Table 3. None of the dimensions of learning behaviors showed a significant association with the student's study levels.

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Regarding the SCOFF questionnaire, 24.2% of the participants reported two or more yes-responses (SCOFF test positive). Among 62 participants 24 (38.7%) answered 'yes' to the SCOFF question 'Do you worry you have lost control over how much you eat?', while only 3 (4.8%) participants answered, 'yes' to the question 'Do you ever make yourself sick (vomit) because you feel uncomfortably full?' (Table 4). Screening with the SCOFF test demonstrated that females, older (>25 years), overweight + obese, Clinical Sciences + PreMed, and non-USA-based students were at more risk of eating disorders (Table 5).

Table 1. Medical students' Socio-demographic Characteristics (n=62).

Socio-demographic Characteristics	**Responses (%)**
Gender	
Male	25 (40.3%)
Female	37 (59.7%)
Age (Year±SD)	
Male	32.64 ± 8.72
Female	31.3 ± 8.73
Total	31.84 ± 8.68
Body Mass Index	
Underweight	3 (4.8%)
Normal	31 (50%)
Overweight	16 (25.8%)
Obesity	12 (19.4%)
Level of study	
Clinical Sciences Yr 1	11 (17.7%)
Clinical Sciences Yr 2	17 (27.4%)
PreMed 1	2 (3.2%)
PreMed 2	3 (4.8%)
MD 1	3 (4.8%)
MD 2	4 (6.5%)
MD 3	3 (4.8%)
MD 4	4 (6.5%)
MD5	15 (24.2%)
Location of respondent	
USA	35 (56.5%)
Canada	14 (22.6%)
India	4 (6.5%)
Barbados	4 (6.5%)
Others (Japan, Jamaica, Trinidad etc.)	5 (8.1%)

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Table 2. Effect of COVID-19 pandemic on learning behaviours among medical students of AUIS (n=62) vs gender of respondents.

		Strongly Disagree + Disagree		Neutral		Agree + Strongly agree		P-value
		Male	Female	Male	Female	Male	Female	
1.	Have you noticed deterioration in your work performance/studying?	11 (17.7%)	10 (16.1%)	7 (11.3%)	4 (6.5%)	7 (11.3%)	23 (37.1%)	0.025**
2.	Do you remember your subject's contents appropriately?	5 (8.1%)	9 (14.5%)	8 (12.9%)	15 (24.2%)	12 (19.4%)	13 (21%)	0.598
3.	Are you appropriately concentrating on your studies?	7 (11.3%)	14 (22.6%)	5 (8.1%)	11 (17.7%)	13 (21%)	12 (19.4%)	0.303
4.	Are you having a difficulty in performing two tasks simultaneously	9 (14.5%)	15 (24.2%)	7 (11.3%)	7 (11.3%)	9 (14.5%)	15 (24.2%)	0.703
5.	Are you having difficulty in performing mental calculations?	14 (22.6%)	15 (24.2%)	4 (6.5%)	8 (12.9%)	7 (11.3%)	14 (22.6%)	0.489
6.	Are you having difficulty in recalling recent information?	14 (22.6%)	10 (16.1%)	5 (8.1%)	13 (21%)	6 (9.7%)	14 (22.6%)	0.071*
7.	Are you having difficulty in recalling old information?	13 (21%)	15 (24.2%)	2 (3.2%)	8 (12.9%)	10 (16.1%)	14 (22.6%)	0.338
8.	Are the hours of study increased or decreased?	5 (8.1%)	6 (9.7%)	14 (22.6%)	14 (22.6%)	6 (9.7%)	17 (27.4%)	0.207

Note: Significance: ***p<0.01, **p<0.05, *p<0.1.

Table 3. Effect of COVID-19 pandemic on learning behaviours among medical students of AUIS (n=62) vs study level of respondents (medical/premed).

		Strongly Disagree + Disagree		Neutral		Agree + Strongly agree		P-value
		Pre-med	Medical	Pre-med	Medical	Pre-med	Medical	
1.	Have you noticed deterioration in your work performance/studying?	11 (17.7%)	10 (16.1%)	7 (11.3%)	4 (6.5%)	15 (24.2%)	15 (24.2%)	0.826
2.	Do you remember your subject's contents appropriately?	8 (12.9%)	6 (9.7%)	10 (16.1%)	13 (21%)	15 (24.2%)	10 (16.1%)	0.490
3.	Are you appropriately concentrating on your studies?	11 (17.7%)	10 (16.1%)	7 (11.3%)	9 (14.5%)	15 (24.2%)	10 (16.1%)	0.593
4.	Are you having a difficulty in performing two tasks simultaneously	9 (14.5%)	15 (24.2%)	10 (16.1%)	4 (6.5%)	14 (22.6%)	10 (16.1%)	0.105
5.	Are you having difficulty in performing mental calculations?	16 (25.8%)	13 (21%)	5 (8.1%)	7 (11.3%)	12 (19.4%)	9 (14.5%)	0.664

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6.	Are you having difficulty in recalling recent information?	12 (19.4%)	12 (19.4%)	9 (14.5%)	9 (14.5%)	12 (19.4%)	8 (12.9%)	0.762
7.	Are you having difficulty in recalling old information?	15 (24.2%)	13 (21%)	5 (8.1%)	5 (8.1%)	13 (21%)	11 (17.7%)	0.974
8.	Are the hours of study increased or decreased?	7 (11.3%)	4 (6.5%)	16 (25.8%)	12 (19.4%)	10 (16.1%)	13 (21%)	0.466

Note: Significance: ***p<0.01, **p<0.05, *p<0.1.

Table 4. SCOFF questionnaire - Analysis of the findings.

Item no. of the SCOFF	Number of 'Yes" responses (n=62)	Percentage
1. Do you ever make yourself sick (vomit) because you feel uncomfortably full?	3	4.8%
2. Do you worry you have lost control over how much you eat?	24	38.7%
3. Have you recently lost more than one stone (approx. 6 Kg) in three months period?	6	9.7%
4. Do you believe yourself to be fat when others say you are too thin?	11	17.7%
5. Would you say that food dominates your life?	9	14.5%
SCOFF score		
0-yes-response	31	50.0%
1-yes-response	16	25.8%
2-yes-responses	10	16.1%
3-yes-responses	4	6.5%
4-yes-responses	0	0%
5-yes-responses	1	1.6%

Table 5. SCOFF results in relation to gender, age, BMI, level of study, and location.

Variables	SCOFF test positive- scored more than 2 and above **Responses (%)**	SCOFF test negative
Gender		
Male	4 (6.5%)	21 (33.9%)
Female	11 (17.7%)	26 (41.9%)
Age (Year±SD)		
≤25 years	5 (8.1%)	10 (16.1%)
>25 years	10 (16.1%)	37 (59.7%)
Body Mass Index (BMI)		
Underweight	0	3 (5.2%)
Normal	5 (8.6%)	24 (41.4%)
Overweight	5 (8.6%)	11 (19%)
Obese	4 (6.9%)	6 (10.3%)

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Level of study		
Clinical Sciences + PreMed	9 (14.5%)	24 (38.7%)
MD1–MD5	6 (9.7%)	23 (37.1%)
Location of respondent		
USA-based	5 (8.1%)	30 (48.4%)
Non-USA based	10 (16.1%)	17 (16.1%)

Discussion

This study attempted to identify the impact of COVID-19 on undergraduate medical students at AUIS. The findings demonstrated that AUIS students experienced problems in their learning behaviour as well as had eating disorders during the COVID-19 pandemic.

Experiencing quarantine conditions has strained many individuals, including medical students, with the COVID-19 pandemic having a worldwide impact on the general public and mental health.[1-3,8] The academic and professional performance of medical students has dropped due to the epidemic.[3] In our study, one-third to less than half of AUIS students reported a decline in their ability to study and have difficulty memorizing topic material, focusing on their studies, performing mental calculations, and recalling old and recent information. Students struggled to adapt to home-based instruction.[1,2,4] Prolonged screen exposure during online education, may create brain changes that affect the focus, language intelligence, and processing speed, which may have a substantial impact on learning processes.[26] Consequently, online learning during the COVID-19 pandemic, which mostly relies on computer-based platforms and necessitates more screen time, may have comparable effects on students' learning patterns.[27]

During the Covid-19 pandemic, the learning behavior of medical students has been influenced by elements including remote learning, reduced social engagement, and heightened stress.[3,27] Numerous students have had to acclimate to online classes, which can be tough owing to technological issues, lack of desire, and home distractions. Moreover, the lack of face-to-face connection with peers and instructors has made it more difficult for certain students to remain motivated and focused.[28] In addition, elevated levels of stress brought on by the pandemic and its effects on their life can have a negative impact on their learning behavior. During the COVID-19 epidemic, Curelaru et al.[27] found learning process issues among undergraduate and postgraduate university students in Romania, which included misunderstandings, a lack of feedback, increased academic obligations, a lack of challenge, and disengagement. In addition, Almendingen et al.[28] found a general sense of decreased motivation and effort across students' perceptions of online learning during the COVID-19 epidemic. A survey conducted in Pakistan demonstrated that 77% of medical students viewed online learning negatively in light of the present epidemic.[29] Similarly, more than one quarter (26.8%) of the medical students in Jordan expressed overall satisfaction with online learning.[30]

However, some students have adapted well to the new learning environment and discovered strategies to remain interested and involved. The COVID-19 pandemic has also had a substantial impact on the clinical training and learning environment of students, making it more challenging for them to get practical experience and practice clinical skills.[31,32] The lack of in-person clinical rotations has also restricted their exposure to patients and the medical profession. A study in Libya revealed that 54.1% of students believed that online learning could facilitate interactive learning; however, only 21% felt that clinical learning could be successfully achieved through the use of technological methods.[33] In addition, medical students have had to adapt to changes in curriculum and assessment methods, since some schools have used online tests and remote proctoring.[34] The additional stress and anxiety induced by the epidemic may further impact their learning behavior.[12] However, medical students have demonstrated resilience and adaptability, with many finding inventive ways to complement their education, including virtual patient simulations and telemedicine encounters.[9,35]

The COVID-19 pandemic has had substantial effects on students, including increased stress and changes in lifestyle and dietary habits.[36,37] These changes may lead to the onset or worsening of eating disorders such as anorexia, bulimia, and binge eating disorder.[38] Furthermore, the epidemic has impeded access to mental health care and support. Students who are struggling with stress or disordered eating should emphasize self-care, seek support, and seek assistance.[39] In this survey, 45.2% of students were determined to be fat or overweight.[40] Previous research has demonstrated a comparable prevalence of obesity during pandemics. Approximately one-quarter of the AUIS student population had SCOFF test positive i.e., those students are at more risk of developing eating disorders.[41] It is very concerning that more than 38% of participants responded affirmatively to the second SCOFF question (Do you worry that you have lost control over how much you eat?). During the COVID-19 pandemic lockdown, Flaudias et al.[5] also found that 38.3% students were SCOFF positive i.e., they were more likely to engage in hazardous eating behaviors during COVID-19 pandemic lockdown. Female students in our study were more susceptible to eating disorders which were supported by studies conducted during the COVID-19 pandemic by Tavolacci et al.[42] and Mahar et al.[43]

Stress and anxiety produced by the COVID-19 pandemic have a negative effect on mental health, and it appears to contribute to eating patterns.[44,45] Chan & Chiu[46] found that participants with suspected eating disorders reported significantly greater levels of depression and anxiety symptoms, as well as lower levels of three categories of psychological well-being (environmental mastery, purpose in life, and self-acceptance). These findings indicated that eating disorders require increased clinical attention during the COVID-19 pandemic.

Limitations

This study had a number of limitations. One of the important limitations of the present study was the small sample size. Secondly, the cross-sectional nature of the data limits the extent to which causal inferences may be made. Thirdly, physical activity during lockdown was not assessed. However, it is the first study of this kind in the Caribbean region in understanding the perceived stress, learning behavior, and eating disorder among medical students during the COVID-19 pandemic.

Conclusion

The effect of COVID-19 pandemic has transformed medical education and is likely to have long-lasting effects on student learning, mental well-being, and eating behaviour. The findings demonstrated that a substantial number of students had learning behavoiur problems and a very high possibility of having eating disorder symptoms. The policymakers of the academic institutions should take appropriate strategies to support learning and improve the mental well-being and eating bahaviour of the students.

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Institutional Review Board Statement: Ethical approval was obtained from the research committee of the American University of Integrative Sciences (AUIS-RC/2020/R#02-SR). The study was conducted by the guidelines of the 1975 Declaration of Helsinki.

Informed Consent Statement: Participants were fully informed about the nature of the study. The consent form explained the purpose of the study to the participants. Participation was voluntary, with participants given the option to withdraw at any time during data collection. The questionnaire was anonymous with no identifying information being collected.

Data Availability Statement: Data and copies of the questionnaire are available upon reasonable request to the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

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