Original Article

BEHAVIORAL CHANGES LINKED WITH ELECTRONIC ASSESSMENT ON UNDERGRADUATE STUDENTS AT THE UNIVERSITY COLLEGE OF MEDICINE AND DENTISTRY

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ABSTRACT

Background: Global lockdown occurred after the emergence of the COVID-19 health crisis. Courses and exams that used to be taken on campus are now being taken entirely online. The purpose of this research was to investigate how students feel about taking exams online from afar.

Material and Method: It was a descriptive cross-sectional study. To collect data from undergraduate medical and dental students, a pre-validated survey was distributed to the student body. It included questions about students' demographics as well as their experiences with stress and adjustments in coping strategies in the context of online exams. SPSS version 23 was used to analyze the data.

Results: Students' intake of high-energy drinks (57%) and soda drinks (60%) increased more in remote e-assessment compared to on-campus assessment, and the majority of students report that their caffeine consumption increased in remote e-exam compared to on-campus assessment. During the remote e-assessment, students reported a rise in their consumption of fast food and a decrease in their consumption of healthy foods. Half of the students surveyed said that they slept less and did less exercise when taking exams online. Seventy percent of students said they spent less time with their families because of exams taken at home. An increase in the use of analgesics (51%) and anti-stress medications (41%) was also observed during remote e-examination.

Conclusion: The results of the study showed that students rated taking exams remotely as more stressful than taking the same exams on campus. Students' eating habits, sleep schedules, and exercise routines suffered as a result of the distant e-exams.

Key Words: COVID-19, Smoking, Social media, Analgesics

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INTRODUCTION

Coronaviruses can result in an array of acute respiratory, hepatic, and neurological diseases ranging in severity.[1]

COVID-19 resulted in a health emergency across the world and resulted in a lockdown at the global level. Health services in the most affected countries were overwhelmed due to a massive increase in COVID-19 cases. To flatten the COVID-19 epidemiological curve most governments across the globe initiated a series of non-pharmaceutical interventions (NPI).[2] This global spread of the virus resulted in affecting the education sector badly. The institutions had to shift to remote education where possible. Few countries were

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able to shift to remote online education by using the latest technological tools. Data suggests that 99% of the formally enrolled students have been affected because of this shift and at the same time they are a part of this global experiment of online education in which various modalities have been deployed to continue their education.[3]

According to a survey conducted by the International Association of Universities across the world, more than 90% of educational institutes have shifted to remote teaching to continue educational activities during a pandemic.[4]

The most important challenge in this online transition was to organize assessments so that the students can progress through their studies.[5]

E- assessments were introduced to provide immediate feedback, which is a constant challenge for the teaching faculty.[6] E-assessments are considered to be an important component in distance education.[7] COVID-19 led to the development and adaptation of online technologies thus opening promising opportunities for e-assessments.[5] But even with exceptional information technology setup the chance of technical glitches during remote assessments is still a threat.[8] Initially, the e-assessments adopted by educational institutes were conducted in-campus[9] in which the students experienced similar exam settings, IT support as well as exam invigilation as in on-campus paper-based assessments.[5] But, remote E-exams mean that the student will appear in an E-assessment at home which comes with a lot of other challenges. More or less these challenges are similar to the routine E-exam but might be more challenging in remote settings.[5]

Technical hitches that are a threat to the exam validity and possible dishonest behavior among the students are possible challenges.[10] Moreover, it is difficult to assess practical knowledge and skills through remote exams, which in turn impacts achieving the purpose of learning.[11] UCMD adapted remote online e-exams as a mode of assessment to assess students' academic performance during online education during the COVID-19 pandemic. This study was conducted to explore the experiences of students during remote online exams. The study explores stress and associated factors along with its impact on students' dietary habits and lifestyles. The results of this study will help in reducing the stress-causing factors associated with remote online exams. The objective was to determine stress-related factors in remote and on-campus e-exams and to identify the behavioral changes associated with remote e-exams.

MATERIAL AND METHODS

The study was conducted in the University College of Medicine & Dentistry- The University of Lahore. The ethical review board of UCMD approved the study. A pre-validated questionnaire was distributed among the students. It was a descriptive cross-sectional study and a total of 950 students participated in the study. Only students of the University College of Medicine & Dentistry were included in the study. The data was collected using Google forms. The survey included 29 questions that aimed to assess the students' remote e-exam perceptions.

Exam-related stress factors included E-exam interface issues and connectivity issues) structure of the exam paper and preparedness. Teaching methods or courses not being covered properly and personal factors. The questions that explored the behavioral changes were dietary routine, sleeping pattern, smoking, and use of medications. The data was analyzed using SPSS version 21. Demographics were described using descriptive statistics. The association between remote e-exam stress and stress-related factors and behavioral changes was determined using Chi-square.

RESULTS

A total of 950 students participated in the study 73% were medical and 27% were dental students (Table-1). In the current study, 91% of students reported exam-related stress while only 7.47% expressed that they don't feel stress during examinations. Out of 91% almost one-third found remote E-Exam stressful, 19% of the data suggests in campus exams are more stressful whereas, 42% of students were of the view that both systems of exams are stressful (Figure-1).

Table-1: Discipline of participants

Discipline	Frequency(%)
MBBs	698(73.5%)
BDS	252(26.5%)

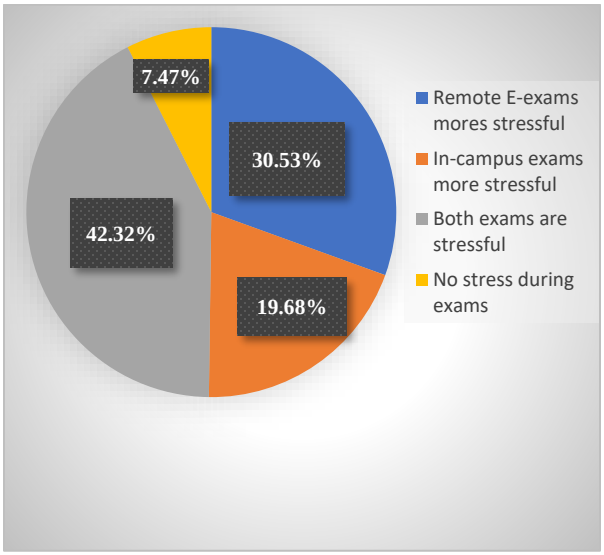

Figure-1: Students' experience of self-reported exam-related stress.

The study explored eleven different factors that may be responsible for stress during exams. There was a significant association between students' experience of stress during exams and all the studied factors.

78% (remote assessment) and 30% (in campus assessments) of the students reported Internet connection problems as major causative agents of stress.

Other causative stress factors in remote E-assessments were the exam question difficulty, freedom to navigate among the questions, teaching methods, form of exam, exam duration, and use of unfair means by other students. 59.2% (in-campus) and 41% (remote exams) students reported the exam question difficulty as one of the major factors. 70.6% (remote exams) and 29.4 % (in-campus) students considered the option to navigate between the exam questions as a factor for stress. Individual factors including students' grades were reported as the second and third most common factor that contributes to both remote & in-campus E-exams. Fellow students' dishonesty (61.3%) and exam setting (54.1%) were among the significant factors contributing to stress in remote E-exams.

Students reported a negative effect on their dietary patterns in remote assessments. 70% of the students reported that their caffeine intake rises in the remote e-exam in comparison with the campus assessment, Students' reported an increase in consumption of energy and soda drinks at 57% and 60% respectively in the remote e-assessment as compared to on-campus assessment. Students stated that their healthy food intake decreased by 43%. in the remote e-assessment and they increased fast food intake (65%) and high sugar content food (59.8%) during the remote-e exam. Half students labeled that their sleep duration was decreased during remote e-exams and they also conveyed that during remote- exams their physical activities were decreased (52.9%). 70% of students highlighted that the students spent lesser time with their family during remote- exams. The consumption of analgesics and anti-stress tablets was 51% & 41% and 57.1% of students thought that insomnia was also augmented during remote e-exam.

Table-2: Bivariate analysis of exam related stress

		Remote E-exams are more stressful	In-campus exams are more stressful	Both exams are stressful	No stress during exams	p-value
The technical problem associated with the e-assessment platform.	48.82%					<0.001
	Yes	67.3%	50.6%	59.6%	17.8%	
	No	32.7%	49.4%	40.4%	82.2%	
Internet connection problems associated with	44.92%					0.002
	Yes	78.6%	30.7%	47.3%	23.1%	
	No	21.4%	69.3%	52.7%	76.9%	
Exam duration (Time limit) associated with	47.65%					<0.001
	Yes	64.7%	52.5%	51.6%	21.8%	
	No	35.3%	47.5%	48.4%	78.2%	
Questions difficulty in	54.1%					0.005
	Yes	71.3%	59.2%	63.5%	22.4%	
	No	28.7%	40.8%	36.5%	77.6%	
Not studying the whole exam material in	48.82%					0.007
	Yes	60.9%	52.1%	58.4%	23.9%	
	No	39.1%	47.9%	47.6%	76.1%	
Mode of question navigation (open or close) in	50.5%					
	Yes	70.6%	53.2%	55.1%	23.1%	0.00
	No	29.4%	46.8%	44.9%	76.9%	
Whether the exam is more than one form (Includes MCQs & SEQs)	49.97%					0.0004
	Yes	63.4%	51.6%	59.6%	25.3%	
	No	36.6%	48.4%	40.4%	74.7%	
Teaching methods have not properly covered the course material	47.62%					<0.001
	Yes	67.2%	46.3%	55.3%	21.7%	
	No	32.8%	53.7%	44.7%	78.3%	
The grade is not what the student expects in	51.42%					0.001
	Yes	73.2%	52.8%	57.7%	22.0%	
	No	26.8%	47.1%	42.3%	78.0%	
use of unfair means by other students (cheating) in	41.4%					0.0008
	Yes	61.3%	35.7%	47.2%	21.4%	
	No	38.7%	64.3%	52.8%	78.6%	
Exam environment at home in	45.65%					0.0003
	Yes	54.1%	51.7%	52.0%	24.8%	
	No	45.9%	48.3%	48%	75.2%	

Table-3: Bivariate analysis of behavioral changes associated with e-exams

	Remote E-exams are more stressful	In-campus exams are more stressful	Both exams are stressful	No stress during exams	P value
Caffeine Consumption					<0.001
Increased	44.1%	46.1%	47.2%	25.4%	
Decreased	8.2%	9.9%	8.6%	25.4%	
No Change	22.6%	25.3%	24.0%	30.3%	
Not applicable	25.1%	18.7%	20%	35.9%	
High Energy Drinks					0.002
Increased	37.7%	35.1%	35.8%	20.7%	
Decreased	10.9%	14.4%	9.4%	11.1%	
No Change	23.4%	23.5%	24.9%	30.0%	
Not applicable	28.0%	27.1%	29.9%	38.1%	
Soda Drinks					0.004
Increased	32.2%	29.8%	26.8%	15.5%	
Decreased	15.7%	18.7%	15.2%	17.8%	
No Change	28.6%	28.0%	31.7%	31.1%	
Not applicable	23.5%	23.4%	26.3%	35.7%	
Eating healthy food					0.00
Increased	41.5%	23.4%	22.8%	20.5%	
Decreased	29.7%	46.1%	32.7%	22.7%	
No Change	22.9%	24.8%	31.7%	33.5%	
Not applicable	3.9%	5.7%	12.7%	23.3%	
Eating fast food					0.00
Increased	40.3%	50.3%	38.4%	23.8%	
Decreased	25.4%	18.6%	14.5%	18.3%	
No Change	24.3%	22.8%	30.6%	31.1%	
Not applicable	10%	8.2%	16.4%	26.8%	
Eating high sugar food					0.001
Increased	49.8%	47.3%	43.5%	26.6%	
Decreased	14.4%	18.6%	10.3%	14.4%	
No Change	24.6%	24.4%	30.4%	31.5%	
Not applicable	11.1%	9.7%	15.8%	27.5%	
Sleeping Hours					0.0006
Increased	33.9%	16.6%	13.4%	16.8%	
Decreased	48.4%	66.6%	59.5%	35.8%	
No Change	13.1%	12.2%	16.1%	18.8%	
Not applicable	4.6%	4.5%	11.1%	28.5%	
Exercise/sports					0.0009
Increased	24.0%	18.6%	10.2%	10.4%	
Decreased	52.9%	55.7%	51.5%	36.2%	
No Change	13.3%	14.7%	22.0%	24.3%	
Not applicable	9.8%	10.9%	16.7%	29.1%	

Smoking habits					0.0012
Increased	17.9%	13.6%	16.0%	11.9%	
Decreased	9.1%	11.8%	6.3%	8.2%	
No Change	8.1%	9.5%	11.9%	10.4%	
Not applicable	64.9%	65.2%	65.8%	69.5%	
Communications using social media					0.0004
Increased	40.9%	20.4%	22.5%	14.3%	
Decreased	32.4%	51.4%	37.7%	32.3%	
No Change	12.7%	16.0%	21.3%	20.9%	
Not applicable	13.9%	12.2%	18.5%	32.4%	
Time spent by this family					0.00
Increased	31.7%	10.8%	8.8%	8.9%	
Decreased	50%	69.3%	60.9%	42.9%	
No Change	9.9%	12.0%	16.5%	18.3%	
Not applicable	8.4%	7.9%	13.7%	29.8%	
Analgesics use					0.0005
Increased	31,6%	29.5%	26.6%	20.1%	
Decreased	14.0%	15.4%	13.1%	14.1%	
No Change	15.6%	15.3%	18.4%	16.4%	
Not applicable	38.8%	39.9%	41.9%	49.4%	
Have used medications to relieve stress					0.003
Increased	33.8%	32.6%	28.4%	19.4%	
Decreased	10.3%	10.1%	11.3%	12.7%	
No Change	13.7%	14.8%	16.5%	17.4%	
Not applicable	42.2%	42.4%	43.8%	50.5%	
Have used medications to relieve insomnia					0.0002
Increased	27.1%	23.5%	20.2%	14.9%	
Decreased	12.1%	12.9%	14.0%	12.5%	
No Change	11.7%	11.8%	12.7%	12.8%	
Not applicable	49.2%	51.8%	53.1%	59.7%	

DISCUSSION

Assessment is an essential element in education to evaluate the attainment of desired learning outcomes. Valid and reliable assessment is the backbone of a successful academic program.[12] E- Assessment has been adopted by many organizations across the globe. E-assessment has occupied a vital part in this digital revolution of the education system.[13] With the widespread of COVID-19, educationists have been required to adopt drastic actions to adapt the digital delivery of courses to aid students' teaching and learning.[14] This study intended to explore the association of stress with E-exam (remote and campus) and associated stress during remote & campus e-exams.

Almost one-third of the data reported remote E-Exam more stressful and 19% of the students considered campus exams to be more stressful. Previous research work has also highlighted stress related to e-Exams[15] especially Remote E-Exam when compared with campus E-exam[16] On exploration students' perceptions revealed internet connection problems as a major factor related to Remote E-Exam students' when compared to campus Exams.[17] It may be due to lack of good internet services across the country.[18]

Question difficulty was stated as the chief reason for exam-related stress in the majority (59.2%) of the students (in campus exam) as compared to 71.3% (remote E.exams).[17] The navigation mode was also described as one of the stress factors in 70.6% of students in remote E-exams as linked with 53.2% of students in campus exams. According to another study, Contrary to this students' performance is not affected by test time and elimination of navigation.[19] It has been reported in research that effective teaching, of course, can reduce stress in students.[20] Individual factors including individual grades were described as second and third most vital factor causing stress in remote E-and in-campus assessment respectively. Fellow students' dishonesty (61.3%) and exam setting (54.1%) have been reported as the significant factors increasing stress during remote E-exams. Examination cheating poses threats to the integrity and quality of higher education.[21] According to the study, the influence on dietary behaviors was negative. Students reported that their consumption of high-energy drinks (57%) and soda drinks (60%) increases in remote e-assessment, while students conveyed that their caffeine intake increased in remote e-exam in comparison to on-campus assessment (70 percent of the students conveyed this), and students reported that their consumption of remote e-exam. According to the findings of another piece of research, the most popular explanation for why people consume caffeine is "studying for exams."[22] In the context of a remote electronic assessment, the students thought that their preference for healthy food intake (43%) diminishes and that they prefer foods with a high sugar content (59.8%), namely fast food (65%). Another study has shed light on how variations in food behavior can be attributed to academic pressure.[23] The majority of the students said that the length of their sleep and the amount of time they spent being physically active reduced when they were taking remote e-exams. Changes in sleep habits may result from participation in remote learning.[24] The work-family balance was disrupted by remote online learning, and students spent 70 percent less time with their families during remote exams than they did during on-campus examinations. During the remote E.exam, participants reported the ingestion of analgesics (51%), as well as the intake of stress reduction (41%). The use of self-medication among medical students has been highlighted in a previous study and the present study highlights a rise in the use of self-medication during remote E.exams.[25]

CONCLUSION

According to the findings of the study, pupils were subjected to greater levels of anxiety and their conduct was negatively impacted as a result. This stress and behavioral alterations can be reduced by organizing earlier simulated training of remote e-assessment to offer an atmosphere that is free of tension associated with remote e-exams. A program designed to promote students' health and well-being should be made available in educational institutions. Such a program would help students better cope with the psychological and behavioral effects of stress.

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AUTHOR'S CONTRIBUTION

TA: Conceived the idea, introduction, methodology, and final review
MN: Data collection and results analysis
SM: Final review, discussion, writing and formatting
STF: Data analysis and discussion writing

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