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Online learning during the COVID pandemic lockdown: A cross sectional study among medical students

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Abstract

Introduction: We aimed to find out how medical students coped with online learning at home during the COVID 19 pandemic 'lockdown'.

Methods: A cross-sectional study was carried out from July to December 2020, using an online SurveyMonkey Questionnaire®, with four sections: biodata; learning environment; study habits; open comments; sent to 1359 students of the International Medical University, Malaysia. Responses of strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree and strongly agree for the closed-ended questions on the learning environment and study habits, were scored on a 5-point Likert scale. Percentages of responses were obtained for the closed ended questions.

Results: There were 323 (23.8%) responses. This included 207 (64%) students from the preclinical semesters 1 – 5 and 116 (36%) students from clinical semesters 6 – 10. Of the respondents, more than 90% had the necessary equipment, 75% had their own personal rooms to study, and 60% had satisfactory internet connections. Several demotivating factors (especially, monotony in studying) and factors that disturbed their studies (especially, tendency to watch television) were also reported.

Conclusion: Although more than 90% of those who responded had the necessary equipment for online learning, about 40% had inadequate facilities for online learning at home and only 75% had personal rooms to study. In addition, there were factors that disturbed and demotivated their online studies.

Keywords: *Online Learning, Self-directed Learning, Self-regulated Learning, Learning Environment, Malaysian Medical Students*

I. INTRODUCTION

In response to the COVID 19 pandemic, the government of Malaysia imposed a movement control order which is referred to as a lockdown, on 18, March 2020. The International Medical University (IMU), which is a private medical university in Malaysia has been relatively resourceful with respect to e-learning even before the occurrence of the lockdown as it had Moodle®, an online Learning Management System (LMS) platform, in its e-learning portal. Like most educational institutions, the IMU, within a short period of time, had to shift the teaching and learning process from a face-to-face mode to an online mode using

Microsoft Teams® most of the time during the lockdown.

The objectives of our study were: to describe the learning environment and the study habits of undergraduate medical students while attending online learning sessions during the lockdown; to determine whether undergraduate medical students used the online resources to practice clinical skills (such as communication skills, physical examination skills) and to develop clinical reasoning.

II. METHODS

A literature search was done in PubMed and Google Scholar using search words: online learning, self-directed learning, self-regulated learning, and learning environment. Study setting and sample selection: Our study population was undergraduate medical students of the IMU. Sample size was calculated to be 293, using the formula provided by Fluid Surveys (2020), for a population size of 1359, with a confidence level of 95% and a margin of error of 5%. A cross-sectional study was carried out using an online SurveyMonkey Questionnaire®, from July to December 2020. As online surveys are well known to have high non-response rates, the questionnaire was sent to all the undergraduate medical students in the IMU, during the lockdown. Data collection and analysis: Informed written consent was obtained from all participants. The questionnaire had four sections: biodata; learning environment; study habits and open comments. There was a total of 12 questions with questions 4, 10 and 11 being closed-ended and having 4, 5 and 14 subsidiary questions, respectively within them. Responses to the closed-ended questions were scored on a 5-point Likert scale: strongly disagree; somewhat disagree; neither agree nor disagree; somewhat agree; strongly agree. Percentages of responses were calculated for the closed-ended questions. Data were analysed using software SPSS version 26.0 (IBM Corporation), and summarised, and descriptive statistics are presented.

III. RESULTS

Data that support the study are openly available in Figshare at <http://doi.org/10.6084/m9.figshare.16909384> (Ariyananda et al., 2021). 323 students (23.7%) responded. This included 207 (64%) students from the preclinical semesters 1 – 5 and 116 (36%) students from clinical semesters 6 – 10. 75% were in their homes and the remainder were in rented accommodation close to the university. Data mentioned below are summarised in Table 1. More than 98% had either a laptop or a tablet and a smart phone. 93% had Internet

and WiFi connections, but the internet connection was stable only for 59.4% and only 64.7% had uninterrupted power supply. The locations of their study areas were as follows: personal room 75%; common ‘living room’ 15.8%; twin shared room 6.5%; varying locations 2.7%. The following demotivating factors were reported: monotony in studying (70.6%); lack of access to real patients (56.3%); lack of support from peers and mentors (50.5%); inadequacy of e-learning resources (25.7%). In addition, 85.7% reported a variety of other causes as demotivating factors. Factors that distracted were watching television (83.6%); sleeping (55.4%); distractions from other members of the family (40.2%) and house chores (40.2%). For demotivating factors and distractions students were invited to offer one or more responses. Ability to obtain feedback, learn clinical skills, learn clinical reasoning and to prepare for assessments were rated as insufficient (scored as strongly disagree, somewhat disagree or neither agree or disagree) as 55.1, 80.5, 57.2 and 56.6 percent, respectively. Those who strongly agreed or somewhat agreed or neither agreed or disagreed that following issues impair their study performances were: inability to access educational resources physically (62.8%) and deterioration of self-discipline (74.3%).

To determine which online resources were statistically significant with respect to their perception of adequacy to learn and practice clinical skills, an independent sample t test was used to compare the mean score on perception of adequacy of different online resources for 63 (19.5%) students who answered ‘yes’ (strongly agree & somewhat agree) against 260 (80.5%) who answered ‘no’ (strongly disagree, somewhat disagree & neither agree nor disagree). A similar statistical comparison was done regarding learning clinical reasoning during online learning to 138 (42.7%) students who answered ‘yes’, with 185 (57.3%) who answered ‘no’ with respect to perception regarding adequacy of resources. Both comparisons yielded highly significant p values.

Statement	Strongly Disagree n (%)	Somewhat Disagree n (%)	Neither Agree nor Disagree n (%)	Somewhat Agree n (%)	Strongly Agree n (%)
There was adequate lighting for me to study	5 (1.5)	15 (4.6)	9 (2.8)	81 (25.1)	213 (65.9)
I had adequate workspace study	8 (2.5)	22 (6.8)	10 (3.1)	86 (26.6)	197 (61)
There were no external distractions around my study	48 (14.9)	95 (29.4)	53 (16.4)	66 (20.4)	61 (18.9)
Comfort factor (prepared meals and clean laundry) helped to make a more productive studying environment	22 (6.8)	19 (5.9)	37 (11.5)	77 (23.8)	168 (52)

The inability to access resources (textbooks, quiet study environment etc.) from a physical library affected the quality of my studies.	59 (18.3)	61 (18.9)	70 (21.7)	88 (27.2)	45 (13.9)
I required supervision from lecturers to effectively study.	84 (26)	86 (26.6)	77 (23.8)	49 (15.2)	27 (8.4%)
I struggled with self-discipline to concentrate fully on my studies while at home.	33 (10.2)	50 (15.5)	39 (12.1)	97 (30)	104 (32.2)
I prefer studying in groups rather than in isolation.	68 (21.1)	81 (25.1)	75 (23.2)	49 (15.2)	50 (15.5)
I was able to manage my time better during the lockdown for my studies.	54 (16.7)	64 (19.8)	75 (23.2)	93 (28.8)	37 (11.5)
I am confident to use online resources for my studies.	0 (0.0%)	19 (5.9%)	51 (15.8%)	133 (40.9%)	120 (37.2%)
IMU e-learning resources were adequate to facilitate my studies.	17 (5.3)	37 (11.5)	88 (27.2)	131 (40.6)	50 (15.5)
I was able to navigate my way through IMU e-learning to get the materials required for my studies.	6 (1.9)	29 (9)	60 (18.6)	143 (44.3)	85 (26.3)
I found online teaching sessions helpful to me to achieve the learning outcomes.	20 (6.2)	44 (13.7)	89 (27.6)	109 (33.7)	61 (18.6)
Scheduled online sessions helped me organize my time for my studies.	27 (8.4)	43 (13.3)	67 (20.7)	108 (33.7)	78 (23.8)
Scheduled online sessions helped me motivate myself to do my own self-study.	32 (9.9)	48 (14.9)	75 (23.2)	99 (30.7)	69 (21.4)
I was able to participate in online discussions with ease.	19 (5.9)	43 (13.3)	76 (23.5)	123 (38.1)	62 (19.2)
I was able to receive relevant feedback from my mentors on my performance through online sessions.	25 (7.7)	63 (19.5)	90 (27.9)	84 (26)	61 (18.9)
I was able to learn clinical skills (previously through CSSC sessions / Clinical Postings) through online sessions.	122 (37.8)	93 (28.8)	45 (13.9)	48 (14.9)	15 (4.6)
I was able to apply clinical reasoning in cases discussed through online sessions.	32 (9.9)	58 (17.6)	94 (29.7)	110 (34.1)	29 (8.7)
I was able to prepare well for assessments through online sessions.	31 (9.6)	66 (20.4)	86 (26.6)	101 (31.3)	39 (12.1)
I had stable Internet connection for online sessions.	30 (9.3)	44 (13.6)	57 (17.6)	108 (33.4)	84 (26)
I did not experience any power outages which interrupted online sessions.	19 (5.9)	61 (18.9)	34 (10.5)	81 (25.1)	128 (39.6)

Table 1. Information about the online resources and learning environments.

IV. DISCUSSION

Although more than 90% of those who responded had the necessary equipment, about 40 % had inadequate facilities for online learning at home and only 75% had personal rooms to study. This is a substantial minority of students who are not equipped to carry out online learning effectively and it is a matter of concern. Areas that need urgent attention to improve online learning which would cater to 40% that lack facilities are: providing reliable power supply and fortification of web-based infrastructure and services (expansion of internet bandwidth and expansion of WiFi facilities, subsidized access to internet) and subsidizing hardware. It is known

that use of the internet by medical students has not translated into improved online learning behaviour (Venkatesh et al., 2017). Previous studies suggest that self-study can be both efficient and inefficient depending on how the learners behave (Evans et al., 2020).

Majority of students strongly agreed and somewhat agreed with regards to adequacy of environmental factors/comforts such as illumination (91%), workspace (96.6%); and prepared meals and clean laundry (75.8%). Studies have shown that temperature, lighting, and noise have significant direct effects on university students'

academic performance (Realyvásquez-Vargas et al., 2020).

Furthermore, there were factors that disturbed and demotivated their online studies such as monotony in studying; lack of access to real patients; lack of support from peers and mentors and inadequacy of e-learning resources. Monotony when studying alone may be overcome by getting students to interact through peer online discussion groups and by providing gamified/interactive learning material online. Gaps due to lack of access to real patients may be reduced by use of photos (especially in dermatology and ophthalmology), images (such as radiographs, CT and MRI scans), video clips (in neurology to demonstrate involuntary movements and seizures), audio clips (to listen to abnormal heart sounds and murmurs) and by studying case scenarios. Examining parents and siblings at home may help to practice clinical examination techniques of different body systems. Role play by teachers and peers on predetermined scripts will help to develop clinical reasoning and communication skills. As non-verbal cues contribute to a great extent in data gathering during history taking, there is a high chance of students missing this aspect, as online learning is two-dimensional compared to three-dimensional experience they would get in real life. Our observations with regards to perceptions on learning clinical reasoning online is better than for learning clinical skills, as many as 42.7% perceive those resources at their disposal as adequate to learn clinical reasoning. This finding may be supported by the understanding that clinical reasoning can be learned without actual physical contact with patients.

However, these methods will not be able to substitute the kinaesthetic experiences of palpating abdominal lumps and uterus (at different stages of foetal development) as well as vaginal examination in normal and diseased states as done in clinical settings. As for learning clinical procedures, although theoretical aspects can be learned remotely, procedural skills cannot be properly acquired without performing in clinical settings. Simulations closely matching clinical settings using artificial intelligence, AR and VR technologies are available and would be further developed in the future.

Limitations: The main limitation of this study is the low response rate of 23.7% despite an email reminder and persuasion by the leader of each cohort. Although the sample exceeded the minimum sample size of 293, the findings may not be generalizable to the rest of the students at the IMU. The study does not address findings specific to different cohorts as subgroup analysis has not been done as sample sizes of cohorts were too small to arrive at valid conclusions. Since majority (64%) of

students who responded are from the pre-clinical phase (whose clinical training is much less compared to clinical phase), pooled data regarding ability to learn clinical skills and clinical reasoning online would not be generalizable across all semesters.

V. CONCLUSION

It is concerning to find that 40% did not have stable internet and one-fourth did not have personal study rooms despite 90% possessing hardware. Furthermore, there were factors that disturbed and demotivated online studies. These should be remedied by providing reliable power supply and fortification of web-based infrastructure and services and by providing subsidised hardware.

Although acquisition of clinical reasoning and clinical skills were perceived to be possible, through online teaching/learning sessions, by one in five and two in five students respectively; every possible effort should be made to remedy shortcomings of the remaining students.

As the pandemic is likely to prevail for some time, we recommend further studies, especially to obtain perceptions of medical students studying in other medical schools in Malaysia and in poorly resourced countries and in the subset of clinical students.

Notes on Contributors

Pilane Liyanage Ariyananda contributed to the conception, design of the study, interpretation of data, and preparation of the paper. Chin Jia Hui, Reyhan Karthikeyan Raman, Aishath Lyn Athif, Tan Yuan Yong, Muhammad Hafiz contributed to conception, acquisition and analysis of data.

Ethical Approval

Permission was obtained from the Institutional Review Board (Project ID No.: IMU: CSc/Sem6 (34) 2020) of the IMU to collect and analyse the data.

Data Availability

A copy of the informed consent form, survey questionnaire and anonymized database are available at <https://doi.org/10.6084/m9.figshare.16909384%20> under CC0 license.

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Declaration of Interest

The authors have no competing interests.

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