Educational Loss of Health Science Students during Online Learning in COVID-19 Pandemic

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ABSTRACT:

Introduction: The COVID-19 pandemic has brought about notable turmoil to the normal functioning, of on-campus face-to-face educational delivery, in higher education institution worldwide. Health science colleges began offering online teaching and learning as an alternative to traditional classroom teaching and learning. This survey explores and provides information on how does online lectures/online learning (OL) causes educational loss of health science students (Pharmacy and Physiotherapy) in COVID-19 pandemic.

Objectives: The COVID-19 pandemic has given rise to worldwide awareness, that the present way to lifestyle does not work, it has caused an unmatched disturbance in medical education and health science system across the globe. There are many areas that require revolutionary changes and one among them is educational sector. Emergency lockdown does have a preventive objective which overpowers the life of students, parents and teachers. To combat this inevitable crisis educational sector started conducting online classes. But this technique has some major drawbacks which collectively leads to educational loss of health science students. This abrupt changeover in teaching and learning methods has raised new challenges and opportunities. From this survey we would come to know the educational difficulties and limitation faced by Health Science students and deprivation in their learning procedure.

Method: This survey-based investigation was carried out to analyze the efficacy of OL method and educational loss faced by Health Science students. A questionnaire was manually prepared and students were asked to fill the form. We took this survey onhealth science students (Pharmacy and Physiotherapy) with random sampling. Student's responses were collected and were analyzed by dividing them into group1(G1) and group2 (G2) according to the course to keep the data confidential, so we are not disclosing which group indicates which course. Further Authors have discussed students' point of view and their perception on this OL and teaching process during COVID-19 pandemic.

Result: The survey results illustrate that the students of both groups (G1 & G2) accept the fact that they do face educational loss during OL in COVID-19 pandemic. The statistics of randomly selected candidates indicate that there were similar responses from both courses and fulfilled the null hypothesis. All the participants agreed the hypothesis of this survey.

Conclusion: To sum up and to conclude from the collected data and result it proves that there are many aspects that affect students' education and it appears that they struggle to manage their lives and studies during OL, thus require more support and direct instruction. Therefore, our aim was to prove the significance of the topic was successful by the acquired data and statistics.

Keywords: COVID-19, health science, pharmacy, physiotherapy, educational loss, online learning (OL).

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INTRODUCTION:

Considering the upsurge of the novel coronavirus in late 2019, each day has brought breaking news about the disease and its variants updated increasing case numbers, and strict announcements. It has affected people regardless of nationality, level of education, income etc[1,2]. But the same has not been true for its consequences, which have hit the hardest. And due to this pandemic situation OL has provided boon for the students[3]. According to UNESCO in most recent reports many countries have closed their institutions and suspended physical classes. Therefore, all the educational institutions rely on different teachings and methodologies[4].

OL can be defined as contemporary or noncontemporary task that takes place in an online environment, mediated by the use of internet in teaching and learning for students. Today's digital learning has come up as necessary resource for students and schools all over the world[5,6]. OL is not just to learn academics but also to conduct extracurricular activities for students.

We conducted this survey, to examine some of the difficulties faced by the health science students.It would be a great policy of interest to know whether the students are able to have their educational needs fulfilled under the recent circumstances[7]. There could be many key challenges of OL which can be a cause for the educational loss of students such as internet connectivity, some may experience difficulties to focus on screen for longer period of time[4,8,9,10]. Many other problems were faced by students and their families like physiological effect, mental health issue, difficulty to adapt OL approach, students lack of enthusiasm and interest[11,12,13].

Students from prerogative background have the required support system and framework by which they are able to learn using many facilities. They could find their way overstep to closed college doors to backup and alternative learning windows[14,15,16]. Other than this, students from middle class or underprivileged backgrounds are often obviate to have good education when their college get shut down. In this COVID pandemic many families have come down to zero, financially.In additional to there was economic burden with high demand for electronic devices and provision of internet[11,17,18].

Considering all these aspects and conveying our issues which is causing educational loss we are conducting this research of our health science students. Further, the outcome will help us to know exactly the perception of the students regarding OL. Moreover, institute will get insights about the area of improvement to give the best education to the students.

I.   METHODS:

1. Rationale:

The authors accentuate that this survey study was conducted for health science students who have experienced online mode of education for their respective streams. During this analysis the survey was structured to assess students view on their educational loss in OL during COVID-19 pandemic. The decision to examine students' opinion and difficulties can seem contextual. It is vital to study their experiences under this pandemic, which are shared by students around the Group 1 (G1) and Group 2 (G2) of health science students and explore if there are any differences. Therefore, to get genuine and fair result the investigator has divided survey participants into two groups according to their streams.

2. Study Design:

This survey provides more information about online education and learning in perception of students, more focused on educational loss and limitation. The study design was conducted by random selection of health science students 10 from each section/course. They were asked to fill up the consent form which stated that they understood the purpose of this survey and voluntarily agree to participate in this survey, and were inform about the conditions of this project. The participation was completely voluntary and unpaid we are not evaluating any participants for their performance in any way. And we had kept their identity hidden throughout the study. The data was collected by manual survey and form filling was assessed and statistical analysis was carried out by the team.

3. Sampling and Setting:

In the campus, there are two streams belonging to health-sciences that are Pharmacy and Physiotherapy, 200 students from one stream and 142 students from another stream. Here, a sample group of 10 ($n1=10$ from one stream, $n2=10$ from another stream) for each stream, total 20 participants (N=20) were selected for the survey with random sampling technique irrespective of gender, age and year of study. Sampling error was calculated for n1 and n2 at 95% confidence interval and the calculated values were 1.71 and 2.68 respectively. Through the survey, students shared their perceptions, understanding and their loss during OL. The collected data from this survey was studied statistically.

4. Questionnaire Design and Data Collection

The questionnaire was framed from the collective suggestion and recommendation by the authors after conducting brainstorming sessions in view of online education system during the lockdown period. The objectives of these questions were to understand the efficacy of current online teaching-learning in comparison to traditional/in-class face-to-face teaching process[19,20]. They covered a wide range of aspects related to the learning experiences of health science students during the lockdown period and what impact that experience might have had on their health science course learning. Authors thoroughly checked these questions for accuracy and validity. Altogether 21 questions were presented to the students based on Likert scale. The statements/questions were asked in the questionnaire in a random order of mixture of positive and negative

questions regarding the topic to avoid a bias. Each answer was given a score. And lastly one question was a descriptive which was optional and was based on participants view on our topic.

As this survey was conducted for Health Science students; more precisely of two groups of students from the same campus, data collection was done using a questionnaire form. It was attached with the consent form and survey details sheet. Data collection was done during the unlock 20.0 in Maharashtra, India.

5. Data Analysis

Data was exported and analyzed using excel sheet. Descriptive statistics were presented as counts and percentage to summarize the collected data. To assess the perception of health science students on the educational Loss during OL in COVID-19, 3-Point Likert Scale was used[21]. Answers were converted into numeric values by assigning them points as follows (greater loss = 3 points; moderate loss= 2 points, no loss = 1 point) for further statistical evaluation. Participants were asked to answer questions which were framed to evaluate the educational loss during pandemic in all aspects.

II. RESULTS:

a. Demographic Characteristics of Participants

Out of total participants, 40% were male and the rest 60% were female. All the participants were undergraduate students and all were well acquainted with online mode of education for more than a year of their course. (Table 01)

Table 01: Demographic Characteristics of Participants

Details		n	%
Gender	Male	8	40%
	Female	12	60%
Group	n1	10	50%
	n2	10	50%
Total participants	N	20	100%

b. Inference of Questionnaire:

Data showed that overall 75-80% students attend lectures online regularly, 40% (of G1) and 35% (of G2) agree with fact that online mode of education

gives flexibility for student to attend lectures from home. Over to advantage of flexibility, only 10% (of G1) and 15% (of G2) satisfied with online mode of education. It might be because 80% (of G1) and 85% (of G2) feel that this sudden move from offline to

online mode of education harmed their studies. There could be many reasons for that, one of the most important reasons is that students lost the chance to perform practical experiments, 100% (of G1) and 90% (of G2) felt so. In addition to it, 80% (of G1) and 85% (of G2) faced challenges during OL including technical issues, connectivity issues, device unavailability, disturbances from the surrounding etc. 80% (of G1) and 85% (of G2) faced technical issue during OL.

Table 02: Questionnaire and respective group % result

| Sr. No	Statements	G1 %			G2 %		
		Agree	Neutral	Disagree	Agree	Neutral	Disagree
1	Attended online lectures regularly	80%	20%	0%	75%	20%	5%
2	OL provides flexibility	40%	50%	10%	35%	55%	10%
3	Satisfied with OL	10%	60%	30%	15%	50%	35%
4	Difficulty/challenges during OL	70%	20%	10%	60%	20%	20%
5	Your studies were harmed by a sudden move from offline to online	80%	10%	10%	85%	10%	5%
6	Feel comfortable while asking doubts during OL	30%	60%	10%	20%	50%	30%
7	Online activities and projects conducted	100%	0%	0%	70%	25%	5%
8	Flexibility to Freely choosing group members	70%	30%	0%	70%	25%	5%
9	Healthy relationship with classmates changes	80%	10%	10%	70%	15%	15%
10	Lost chance to perform practical experiments	100%	0%	0%	90%	5%	5%
11	Understanding of concept of experiments in online mode	0%	40%	60%	0%	30%	70%
12	Preferance of library and hardcopy books than e-books	70%	30%	0%	70%	25%	5%
13	Face technical issues during OL	80%	20%	0%	85%	15%	0%
14	Receive live lecture recordings and past year question papers	40%	60%	0%	25%	45%	30%
15	Online examination is more scoring and easier	50%	40%	10%	70%	25%	5%
16	Easy to malpractice during online examination	40%	40%	20%	65%	25%	10%
17	Operates different social media during lectures	50%	40%	10%	75%	20%	5%
18	Lose interest in particular subject due to lots of online assignments	30%	30%	40%	40%	35%	25%
19	Face to face interactions with teachers are more impactful	100%	0%	0%	95%	5%	0%
20	Feel negative emotions such as de-motivated neglected and isolated	30%	60%	10%	40%	35%	25%
21	Future of health science sector may in danger due to this OL	80%	20%	0%	75%	25%	0%

When the participants were asked about projects and activities given to them online, 100% (of G1) and 70% (of G2) confirmed that their respective professors had assigned them such activities. But 70% students from both the group expressed disappointment over not being able to choose their activity group. One important finding of this survey was, 80% (of G1) and 70% (of G2) felt that online mode of education has harmed their healthy relationships with their peers. With regards to online experiment (practical sessions), no single student from both the group expressed agreement to understanding of practical concepts online. This may be due to lack of hands-on practice of the practical sessions. As both the groups are from health science streams, practical sessions are integral part of their curriculum and profession. Also 70% each of G1 and G2 agree that they prefer hardcopy of the reference materials than digital forms of books.

There is disparity between streams as to availability of live lectures recordings and past question papers, where 40% (of G1) while only 25% (of G2) agreed to receive those recordings and question papers. During this online mode, 30% (of G1) and 40% (of G2) admit to loss of interest in their particular subjects due to many assignments. It shows that, many of the population of both groups showed more interest doing practical and projects rather than only online assignments. As they lose interest in respective subjects during OL, they operate different social media during ongoing lectures, 50% (of G1) and 75% (of G2) admitted to doing so. Remarkably, 100% (of G1) and 95% (of G2) feel that face to face interaction with the subject professors is more impactful than online mode. Only 30% (of G1) and 20% (of G2) agree to feel comfortable while asking doubts during online sessions. Due to some limitations of the available platforms for conducting online examinations, 40% (of G1) and 65% (of G2) feel it is easy to malpractice during online examination,

additionally 50% (of G1) and 70% (of G2) feel online exams are easier and more scoring. Excluding 10% (of G1) and 25% (of G2) who disagreed, 60% and 30% (of G1) expressed neutral feeling and agreement respectively while 35% and 40% (of G2) expressed neutral feeling and agreement respectively to feeling negative emotions such as de-motivation, neglection and isolation. 80% of G1 and 75% of G2 feel their future may be in danger due to this online mode of education.

Graph1: Group1 response
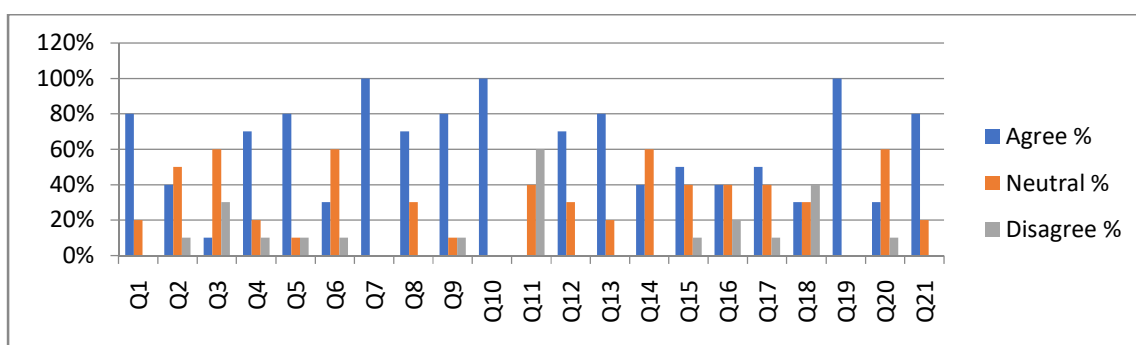
Graph2: Group2 response
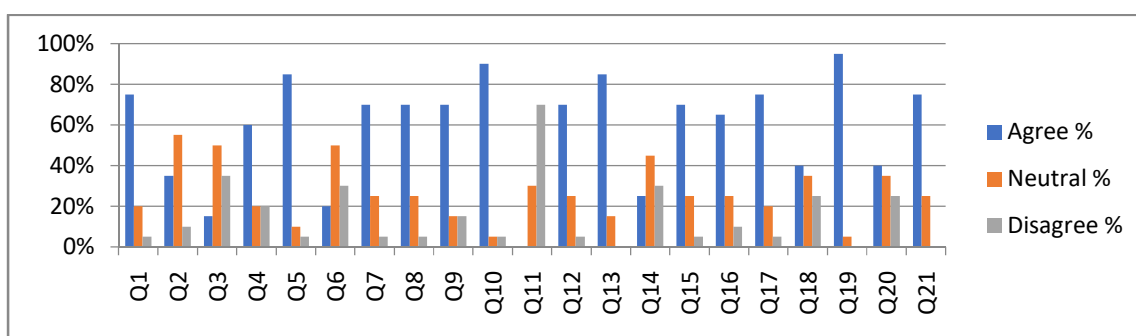
c. Statistical Analysis:

The data obtained by assigning scores to the points on Likert scale, viz. greater loss = 3 points, moderate loss= 2 points, no loss = 1 point; is usually does not follow a standard distribution curve. It cannot be treated as ordinal data. Therefore, a non-parametric test, i.e. The Mann-Whitney 'U' test (Wilcoxon) rank-sum test for independent sample groups was applied to the data. Through the Mann-Whitney U test, the degree of separation (or the amount of overlap) between the two groups was assessed.

The null hypothesis assumes that there is no difference between the scores of the two groups we have chosen, means there is no significant difference between the scores of the two groups.

Each and every participant from both the groups was assigned a rank on the bases of their score obtained by their responses and values were calculated to put up into the formula. The values obtained are $U\_stat=27$, $U\_critical=23$, and $Z= -2.1457$ at 0.05 level of significance.

Through the resulting calculations, following results were observed. U statistics 27 is greater than U critical 23, so we fail to reject null hypothesis. Calculated Z value -2.15 is less than the standard critical value 1.96 at the level of significance 0.05 so the null hypothesis is accepted. Hence, we could conclude that there is no significant difference between the test scores of both the groups.

III. Discussions:

The schematic survey which was conducted on health science students interprets perspective of health science students inOL. These outcomes indicates that students prefer to pursue traditional offline lectures and laboratory approaches over OL. Some students gave their opinion regarding OL in the comment/description section of the questionnaire.

1. Attitude of health science students towards online learning:

Most of the students attend lectures online. Some do think that OL provide flexibility but very few are satisfied with it. This depicts that many students face difficulty in OL and it come up as a great challenge to them. Almost everyone feels that their study was harmed by sudden move from offline to online lectures.

Students gave their opinion that this new mode of learning is not that effective as comparison to traditional learning.

"*Traditional learning methods are far better than online learning.*" *(G2.P11) [Group number. participant number]*

"*Offline lectures are better than online lectures.*" *(G1.P8)*

"*Online learning is not much effective as offline learning.*" *(G1.P6)*

2. Barriers of online learning:

Some students feel negative emotions such as de-motivation, neglection and isolation, due to this OL in COVID-19 pandemic. Some students endure that their future in health science sector may be in great danger due to this OL. The students have highlighted their several issues that they have faced during OL.Clinical and social skills are of immense importance that is not possible in e-learning, which should not only be based on the delivery of content, but students should also be able to work with the materials and receive feedback. Successfully implementing OL into the curriculum requires a well thought out strategy and a more active approach which was interpreted by the students' comments that

their teachers provided great helping hand and guided the students wherever possible.

Students face difficulty to learn concepts in OL, they lack concentration span, they face difficulty to concentrate and to look continuously at the screen, and due to low concentration level, they may miss out important concepts which hampers practical knowledge. Also, students are thankful to their teachers for their help and support.

"*In online learning is not that easy to clear all concepts.*" *(G1.P3)*

"*Online learning is tough. It is not easy to learn from screen where teachers are practically not in front of you. But out college faculty helps us a lot and I am thankful to them.*" *(G1.P5)*

"*Online learning has many effects on students such as, their concentration level decreases, students lack practical knowledge of their studies, mental stress and damage to vision of the students because of continuous use of mobile and other digital tool.*" *(G1.P8)*

3. Effect on mental and social health:

Students don't feel comfortable while asking doubts during online sessions. Due to online education students are unable to establish communication with friends, being unable to focus, not feeling the classroom atmosphere, being not accustomed to the system, lack of knowledge, skills and attitudes, feeling the need to socialize and remaining passive. Everyone wants that they get to choose their activity group which were frequently conducted by the college through online mode. And they have come across the fact that they have experience changes in their healthy relationships with classmates, during online sessions and when met personally face-to-face.

Online sessions lack social interaction, as this competence gives students exposure to learn many things such as build up their personality, improve communication skills etc. Strongly many students perceive face-to-face interactions with teachers are more impactful which is missing in online classes. This often leads to sense of isolation and increase of other insecurities in them[22,23].

Some students were mentally tired and frustrated because of this online method of teaching and learning. Some of the students miss out important instruction or notices given by the professors and had to struggle to find out meeting links. Students think that the OL in this current situation has affected mental health and balance in their educational field. The pressure to produce require results has evolve great amount of stress and anxiety.

"During online lectures Interaction with friends became less, I was not able to talk about my thoughts and feelings to my peers. Teachers helped a lot during online mode, they were available even after college hours." (G1.P5)

"Since education was in online mode, we classmates didn't know each other, so interaction was limited and it was also difficult to communicate with teachers initially and doubts weren't solved because of lack of face-to-face interaction" (G1.P1)

"I missed some important notices be it exams or any other, because of lots of messages and replies in the group which really made me frustrated and irritated. I feel online learning and current pandemic scenario has great impact on student's mental health. This pandemic situation and simultaneous online studies were a bit difficult to handle, emotionally I have been felt drained and exhausted. Therefore, it was really difficult for me to attend lectures and do my studies." (G1.P3)

"'Zero social interaction and longer duration of screen time have impacted our mental health." (G1.P4)

4. Academic impact:

The students were unanimous in their views regarding that they lost the chance to perform practical experiments. As practical experience gives them a different exposure and experience which proves to be aid for future application of the knowledge in the respective fields. They find it difficult to understand the concept and application of experiments in online mode which is apparent as health science students needs practice of practical implementation of education[24].

Students are habitual of referring hardcopy books than digital/e-books. It gives them more fulfilling reading experience which connects the reader to the book. It does not cause strain to the eyes and students retain more of what they read from a paper book than the e-books. During OL students can't visit library which was one of the concerns. Some of them feel OL are boring and it is a barrier to the education of the students.

"Yes, we do miss practical knowledge in pharmacy it is more vital and helpful than theory." (G1.P4)

"In comparison of online learning, offline learning or face-to-face learning is best. During online lectures we cannot perform practical's and it is difficult to understand through just online explanation. Our professors have helped us and supported us whenever required, to cope up with online classes. I am thankful to all my professors for their assistance in our studies." (G1.P9)

"Online lectures are very much difficult to understand and attending them is boring, the way of teaching matters in online studies." (G2.P12)

5.Technological problems in online lectures:

Students face so many technical issues such as adaptability, connectivity problem, lack of technology and computer application, distractions etc. And because of this many students gets anxious about their academic loss and may get mentally disturbed and frustrated. Some struggle with device or the connectivity issue, mainly students who live in rural areas. Due to these obstacles, they get disconnected and miss out important concepts. More-or-less students agree that they receive live lecture recording and past year question papers.

"Since I use mobile phone to attend online lecture, I face many technical issues and didn't have stable connection due to which I frequently get disconnected from the lectures. I use to attend lectures for 4-6 hours so the device used to get overheated and sometimes it uses to get switched off." (G1.P1)

"Students living in rural area don't have proper network this causes difficulty for them to attend online lectures." (G1.P3)

6. Long term impact of online learning:

Everyone accepts that online examination is more scoring and easier, may be because it is easy to malpractice during online examination. This is inevitable in most cases of online education. This will lead to a generation with lack of practical and theoretical knowledge and will indirectly impact the society, especially health care sector. Due to procrastination as pointed out by P1 of G1, students would acquire neglection attitude towards their responsibilities. A few students lose their interest in particular subject due to lots of assignment work, lack of communication and interaction with teachers. Therefore, they operate different social media during lectures, which affects their study pattern and distract them form the live sessions[7].

"I think in future it will be more difficult to cope up with the work, since we carry out our examination through online mode, we are likely to cheat in exams, we start procrastinating our work and study. Due to lack of interaction with teachers we don't have that communication skills and experience which is needed to tackle our problems infuture." (G1.P1)

IV.   CONCLUSION:

The purpose for this survey was to study and revealed the difficulties experienced by health science students during OL process imposed due to COVID-19 pandemic. It is mandatory to take measures to counter problems that may arise in such pandemics or in similar emergency situations. This study evaluates a real-life experience of students in this pandemic outbreak. Despite all efforts made, a significant gap remains, demanding some initiative or policy to provide health science students with hands-on clinical training, industrial exposure, hospital rounds, and retail residencies to stir the required level of confidence before entering professional life[25]. For many educational institute, this is completely new method of education that they have to adapt, hence it is difficult to manage by students. This recent globally accepted technique of OL will cause great impact in near future and also will cause long term fallout

According to this survey we came to the conclusion that 100% of students who participated in this survey, agree that there is educational loss in OL during COVID-19 pandemic. Intuition from the study can help faculty members and administrators to developed didactic involvement and academic support for students.

ACKNOWLEDGEMENTS:

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