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Impact of COVID-19 on postgraduate medical education: Cross sectional survey from an Indian Medical College

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Abstract:

BACKGROUND: The corona virus disease (COVID-19) pandemic has caused widespread effect on the lives of health care professionals. The postgraduate medical students, who are the major pillars of medical institutions had to bear multitude of setbacks due to the pandemic involving academic, research and well-being issues.

MATERIALS AND METHODS: This was a cross sectional feedback based online survey done in the month of October 2021 to study the effect of COVID-19 pandemic induced changes in the postgraduate medical education; amongst 78 students pursuing MD/MS degree in all departments of a tertiary medical institute in Himalayan foothills of North India. The questionnaire consisted of ten questions; each of which needed to be answered on a five point Likert scale ranging from strongly disagree to strongly agree. Results were assessed for the most common answers of each question (represented by mode) and association between various components of the questionnaire analyzed by Spearman's rho correlation coefficient.

RESULTS: The internal consistency of the questionnaire as tested by Cronbach's Alpha (0.82) was good. Most number of respondents were from surgical branches ($n = 31, 39.74\%$). There was a generalized agreement towards preference of resumption of onsite education (75.64%), the lack of variety of cases causing hampering of thesis work (88.46%) and increased mental stress during the pandemic (58.9%). While more time for self-study was seen as the only consensual positive aspect of online teaching (64%), most students opined that technical glitches are a major roadblock in online education (80.76%). Significant positive correlation was seen between disciplinary ease and punctuality in online teaching ($R = 0.543, P < 0.001$), lack of interaction and its effect on learning and mental health ($R = 0.471; P < 0.001$) and the lack of diversity in cases and difficulties in dissertation work ($R = 0.351; P < 0.05$). Negative correlation was observed between the satisfaction from overall learning through online teaching and the desire of resumption of offline classes ($R = -0.491; P < 0.001$).

CONCLUSION: COVID-19 pandemic and its effects on medical education are long lasting. A comprehensive approach is required to rebuild the medical education curriculum, inculcating both traditional and newer virtual methods of education. A consistent support in academics and overall growth needs to be provided to medical postgraduate residents who have been the first line fighters in face of the massive disaster compromising their basic needs and education.

Keywords:

COVID-19, medical education, pandemic

Introduction

The corona virus disease (COVID-19) was declared a pandemic by World Health

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Organisation on March 15, 2020.^[1] This led to blanket restrictions all over the world, with Indian government declaring a strict nation-wide lockdown on March 25, 2020.^[2]

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Health care workers, who stood right in the eye of this gigantic storm faced many unprecedented problems including risks to their own health while treating the diseased, the lack of infrastructure, the lockdown related isolation and hindrance to education.^[3,4]

In India, the postgraduate residents form an indispensable part of the medical fraternity and are the pillars of strength of any teaching medical institute. These students were the first line recipients of the effects of the pandemic both in terms of clinical care and in deceleration of their medical education. Laced with immense paucity of resources at infrastructural and safety levels, the residents formed up an impervious wall of first line defence against the deadly pandemic roaring through the walls of Indian medical institutions.^[4-6]

However, postgraduate education which is essentially a tailor made, hands-on learning course for each speciality, suffered from severe impediment due to the disruption of classes, lack of variety of cases, hindered hands on training and continuous pandemic related duties.^[6,7]

The present cross-sectional survey based study aimed to study the impact of COVID-19 on postgraduate students in a tertiary Indian medical college and hospital as per the feedback provided by these students.

Materials and Methods

Study design and setting

A cross-sectional feedback based online survey was done in the month of October 2021 to study the effect of COVID-19 pandemic induced changes in the postgraduate medical education; amongst the students pursuing MD/MS degree in all departments of a tertiary medical institute in Himalayan foothills of North India.

Study participants and sampling

Inclusion criteria

All students pursuing MD/MS degree courses in all departments of the medical college at the time of the present study were included.

Exclusion criteria

MBBS students, nonacademic junior residents, passed out postgraduate students and senior residents were not included in the study. Also, postgraduate students who did not give due consent for the survey were excluded.

Data collection tool and technique

After due scientific and peer review, a ten-point questionnaire with a five-point Likert scale (ranging from Strongly Disagree to Strongly Agree) was created in Google forms covering the topics of online versus offline education, self-study, thesis related issues and

mental health issues amongst postgraduate students during COVID-19 pandemic.

The questionnaire was circulated to the postgraduate students of all departments through electronic correspondence requesting participation with assurance that due anonymity will be maintained. Response was considered as implied consent.

Results were assessed by the authors who were blinded to the respondents' names, on of October 31, 2021 after 1 month of circulation of the questionnaire.

Statistical analysis

The results of the survey were analysed by MS excel and MedCalc softwares. First of all, the internal consistency of the questionnaire was tested using Cronbach's Alpha.^[8] Mode was used as the preferred measure of central tendency. Categorical data was depicted in percentages and frequencies. Since the Likert scale used in the survey provided ordinal data, Spearman's rho correlation coefficient was used to assess the association between various components of the survey.

Ethical consideration

Ethical committee clearance was obtained from Institutional Ethical Committee, ECR/710/Inst/UK/2015/RR-21.

Results

The internal consistency of the questionnaire as tested by Cronbach's Alpha (0.82) was good.

The online survey questionnaire was sent to 150 postgraduate students, out of which 78 responded (52%). Majority of respondents were females ($n = 46$, 59%). Forty one (53%) respondents were from final year of postgraduate residency while 37 (47%) were from 2nd year of postgraduate residency [Figure 1]. Since, the national entrance of postgraduate medical education has been delayed this year in India due to the pandemic, there were no 1st year postgraduate residents in the institute at the time of the study.

While assessing the speciality subjects of various respondents, they were grouped under medical, surgical and pre and para-clinical groups. Forty percent ($n = 31$) respondents were from surgical branches, 38% ($n = 30$) from medical branches and 22% ($n = 17$) from pre and para clinical branches. Highest number of responses were from the departments of pathology ($n = 13$), radiology ($n = 10$), internal medicine ($n = 10$) and general surgery ($n = 8$) [Table 1].

While analysing the results, the positive responses of strong agreement and agreement were clubbed together

while the negative responses of disagreement and strong disagreement were clubbed together [Table 2 and Figure 2]. Specialty wise answers have been depicted in Table 3.

Online education

Students were asked to respond whether online teaching was better in terms of punctuality, disciplinary ease and self-study opportunities. Only 23% students agreed that time management is better in online education, while a majority of 47% students disagreed to this. Rest of 30% students had neutral opinion on this topic. Majority of students ($n = 50, 64\%$) agreed that self-study opportunity is better in online education system. These topics had similar responses amongst all three groups of residents from medical, surgical and pre and para-clinical branches. A mixed response was seen with 28 (35.9%) students disagreeing and 29 (37.17%) agreeing that disciplinary ease is more in online teaching. This variability of response was also seen among various student groups with most number of medical residents giving neutral reply, surgical residents disagreeing and para-clinical residents mostly agreeing that disciplinary ease is more in online teaching. There was statistically significant positive correlation between responses of students who agreed to better punctuality to those who agreed that disciplinary ease is better in online teaching ($R = 0.543, P < 0.001$). The residents had a heavy consensus ($n = 64, 82\%$) on the issue that technical glitches due to varying internet connectivity and software complexities are a major road block for online teaching.

Only 19 students (24.35%) felt that online teaching was a better method for comprehensive learning of the subject while the rest 75.6% students gave a mixed response with 37.1% ($n = 29$) students giving a neutral response and 38.5% ($n = 30$) disagreeing to this. The students were subsequently asked whether or not they want offline teaching to be reinstated post the pandemic. As many as 3/4th of the study group participants, across all specialties, agreed that offline classes should be restarted, with only 6.4% disagreement. A statistically

significant negative correlation was observed between the satisfaction from overall learning through online teaching and the desire of resumption of offline classes ($R = -0.491; P < 0.001$).

Dissertation work

A vast majority of the study participants agreed ($n = 63, 80.76\%$); that there has been a definite lack of variety in clinical cases due to the pandemic related lockdowns. Almost all study participants ($n = 69, 88.46\%$) believe that this has in turn led to hampering of dissertation work as it has been very difficult to gather the stipulated number of cases for their proposed thesis. These observations have been uniform amongst all groups of residents. A significant positive correlation was observed between the lack of diversity in cases and difficulties in dissertation work ($R = 0.351; P < 0.05$).

Table 1: Distribution of respondents as per branch/ speciality of residency

Department	n (%)
Medical	30 (38.34)
Internal medicine	10 (12.8)
Paediatrics	3 (3.8)
Radiology	10 (12.8)
Respiratory medicine	4 (5.1)
Dermatology	2 (2.56)
Psychiatry	1 (1.28)
Surgical	31 (39.7)
General surgery	8 (10.25)
Orthopaedics	4 (5.1)
OBG	5 (6.41)
Eye	6 (7.69)
ENT	3 (3.84)
Anaesthesia	5 (6.41)
Para and preclinical branches	17 (21.78)
Pathology	13 (16.66)
Pharmacology	1 (1.28)
Microbiology	1 (1.28)
Community medicine	2 (2.56)

ENT=Ear, nose, and throat doctor, OBG=Obstetrics and Gynecology

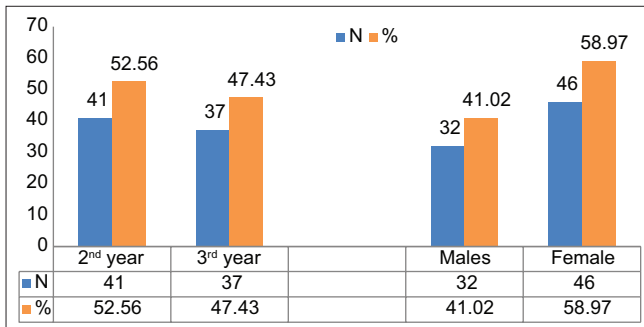


Figure 1: Distribution of respondents as per year of residency and gender

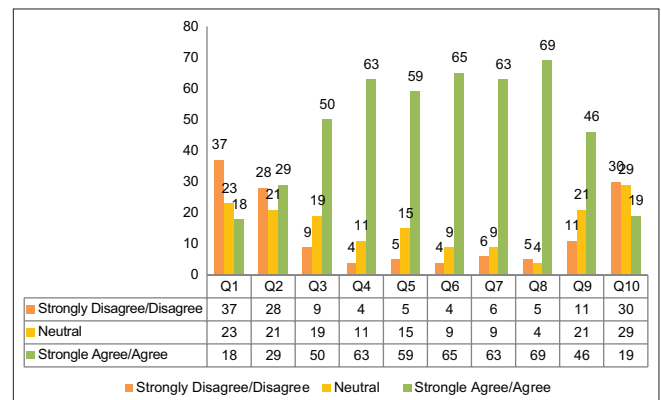


Figure 2: Responses to all survey questions

Table 2: Question wise answers to the online survey

	Strongly disagree/disagree	Neutral	Strongly agree/agree
1. Online training is better in terms of time and punctuality than onsite teaching	37	23	18
2. Disciplinary ease is more in online teaching system	28	21	29
3. Self-study opportunity is better in online teaching	9	19	50
4. Technical glitches are a strong roadblock in online teaching	4	11	63
5. You prefer resumption of offline classes once the pandemic situation settles	5	15	59
6. Personal interaction is better for learning of patient management skills	4	9	65
7. Variety of cases is lacking in the pandemic period due to lockdown restrictions	6	9	63
8. Your thesis work has been hampered in the pandemic	5	4	69
9. Your mental health has been affected due to restricted interaction with colleagues and teachers	11	21	46
10. Overall learning of subject is better in online system	30	29	19

Table 3: The most common responses to all questions of the survey questionnaire as per speciality groups

Department	n	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Medical	30	Disagree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Disagree
Surgical	31	Disagree	Disagree	Agree	Agree	Agree	Strongly agree	Agree	Strongly agree	Agree	Disagree
Para and preclinical	17	Neutral	Agree	Agree	Agree	Agree	Strongly agree	Agree	Strongly agree	Agree	Neutral
Total	78	Disagree	Agree	Agree	Agree	Agree	Strongly agree	Agree	Strongly agree	Agree	Disagree

Mental well-being

As many as 83.33% ($n = 65$) respondents agreed that personal interaction and hands on training were better for learning management skills. This was a consistent observation in students of both clinical and para-clinical branches. Forty six students (58.9%) agreed that the restricted interaction with colleagues and teachers has affected their mental health. About 1/4th students however, had a neutral reply to this mental health status query ($n = 21, 26.9\%$), while 11 students (14.1%) disagreed to any such effect. The lack of interaction and its effect on learning and mental health had a positive correlation ($R = 0.471; P < 0.001$).

Most common answers for each question have been shown in Figure 3. Various correlation analysis have been depicted in Table 4 and Figure 4.

Discussion

The COVID-19 pandemic has caused immense burden on all aspects of life, with the front line workers especially health care workers bearing the major brunt of the disaster. The high infectivity of the disease essential forbade human contact, thereby necessitating strict restrictions and lockdowns world over. This in turn led to a significant paradigm shift in the lives of medical students.^[4,5,9,10]

The World Health Organization defines the social role of a medical college as “the obligation to direct their (students’) education, research and service activities towards addressing the priority of the health concerns of the community, region and nation that they serve.”^[11] During the deadly pandemic, the service of the

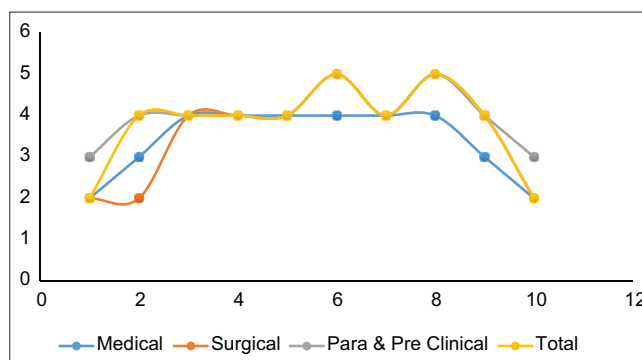


Figure 3: Most common answer (Mode) to each question distributed across student groups of various specialities

community suffering from this new illness, thus became the prime duty of postgraduate medical residents world over. In the prioritized process of putting all hands on deck for curbing the pandemic, unprecedented interruption occurred in medical education and healthcare system.^[3]

Postgraduate residency programmes in India are essentially based on specialty based curriculums which include clinical postings, hands on and bed side training, academic lectures, presentations and dissertation work. A variety of clinical exposure during the tenure of postgraduate training is essential for both research and learning experiences. All this was hampered during the pandemic with discontinuation of clinical classes, a significant reduction in clinical cases variety especially elective cases due to lockdowns and emergency rotation in COVID units.^[5,12,13]

While the overwhelming effect of the pandemic is seen world over on medical education, few studies have been

Table 4: Correlation evaluation between various components of the questionnaire

Question number	Details	Rho	P
6 and 9	Personal interaction is better for learning of patient management skills and mental health has been affected due to restricted interaction with colleagues and teachers	0.4176	<0.001
7 and 8	Variety of cases is lacking in the pandemic period due to lockdown restrictions and thesis work has been hampered in the pandemic	0.351	<0.05
5 and 10	Resumption of offline classes is preferred once the pandemic situation settles while overall learning of subject is better in online system	-0.491	<0.001
1 and 2	Online teaching is better regarding punctuality and disciplinary ease	0.543	<0.001

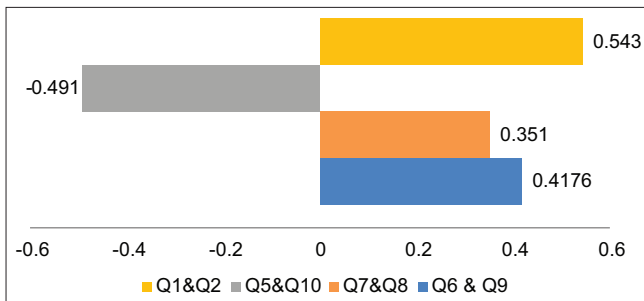


Figure 4: Spearman's Rho Correlation Coefficient for relevant survey topics as described

conducted to study the effect on Indian residents where infrastructural deficiencies and a mammoth population add to the plight of health care system.

The present study focused primarily on three aspects of postgraduate medical education, namely, online education, dissertation work and mental well-being during the pandemic.

Online education

With the advent of the pandemic, many web based educational options found their way into the mainstream medical education system. The lesser prevalent webinars replaced onsite seminars and conferences, on site clinical teaching was replaced by online presentations through various platforms. In the present study, the only positive aspect of online teaching that was agreed upon by the respondents was more time for self-study. The disciplinary ease and punctuality in online teaching also had debatable answers with mixed to negative leaning. An overall satisfaction rate of 24% with online teaching resonated with other similar studies on Indian postgraduates conducted by Wani *et al.*^[14] and

Singla *et al.*,^[6] who reported an 11% and 20% satisfaction rate in their respective surveys for online teaching. Upadhyay *et al.*^[15] observed a 27.27% satisfaction while Al-Balas *et al.*,^[16] reported an overall satisfaction rate of 26% for online teaching. Seifman *et al.*^[8] and Laloo *et al.*^[7] in their international surveys reported a significant fall in nonvirtual and clinical training during the pandemic bearing a lasting effect on the career goals of the postgraduate students.

While easy accessibility and no risk of COVID infection are the definite advantages of the online system of teaching, lack of personal interaction and hands on clinical training, are major causes of dissatisfaction. An important consensual issue reported by residents was that of technical glitches in online teaching. Both web connectivity and software challenges are major stumbling blocks. These issues would only be amplified in rural/difficult terrain medical institutes where web reach is still not satisfactory.^[5,16,17]

A significant majority of the study group, consisting of 75% of respondents desired a resumption of offline classes, indicating that online teaching could not replace the traditional onsite teaching. Wani *et al.*^[14] similarly reported a 91% response to the importance of face to face teaching in medical education which could not be replaced by virtual classes.

Dissertation work

Postgraduate dissertation is a major step on the pedestal of both clinical and research based learning. The essential requirements of a successful thesis to be completed within the stipulated tenure include able and visionary mentorship, meticulous research plan, availability and exposure to target patient population and desired infrastructural resources. During the pandemic, mentorship and clinical cases were the most affected of these factors. While a complete roll back of offline teaching occurred thereby hampering clinical and research mentorship, nationwide lockdowns and fear of COVID-19 infection prevented nonemergency clinical cases from presenting into health care institutions.^[13,15] Not only recruitment of new cases, but follow up, lab based research and due academic evaluation of thesis suffered during this time.^[5,18] The present study group also agreed in majority that the lack of variety of cases (80.7%) have led to a hampering of thesis work (88.4%) during the pandemic.^[14]

To overcome these effects of limited case availability, familiar topics had to be chosen by the freshmen residents limiting their research potential. Thus, an overall negative impact on quality of thesis and hence postgraduate education was observed.^[19]

Mental well-being

While being deputed in COVID war zones, the postgraduate residents faced not just physical burden of the immensely hectic duty hours and the tiresome protective gear, the mental burdens that popped up were also enormous. Even though, the duties continued it was a phase of stressful isolation, where the fear of catching and spreading the virus prevented interaction with colleagues, teachers and most importantly family. For months on end residents did not visit their families and cancelled or postponed all social and personal events. Residents posted in intensive units witnessed death as a menacing ritual every day, so much so, it will haunt them for the rest of their lives. The helplessness and hopelessness of the unending disaster, not being able to control or predict what is in store in future and the loss of essential education that they signed up for, bore severe mental effects.^[13,20,21]

It was agreed upon by 59% of our respondents that the restricted interaction with colleagues and teachers had led to mental stress. Also, as many as our 83% of our study participants believed that personal interaction was better for learning which was lacking during the pandemic period.^[6] More detailed evaluations by Saddik *et al.*^[22] and Upadhyay *et al.*^[15] revealed the causes of stress to be lack of academic activities, disrupted surgical exposure and uncertainty about future professional life in lack of proper training during postgraduation. It is hence enforced by psychiatric specialists to focus on comprehensive aspects of students' well-being including nutrition, conducive environment for learning, regaining of hands on and on site training and counselling wherever required to bring back on track the much deranged quality of life and education these residents have faced.^[21]

Limitation and recommendation

This was an online survey with predesigned questions which may not have covered all aspects of postgraduate students' issue during the pandemic. Also, the study was done in one medical college which was located in urban Indian setting, thus, the additional issues of distant locations and rural settings may not have been completely addressed.

Present study focusses on the impact of the pandemic on the junior doctors in a developing nation, thereby re-emphasizing the need for reforms in medical education and highlighting which areas need to be prioritized in wake of the pandemic. Very few such studies have come up as yet from nations like India, where infrastructure and human resource in medical field form a major roadblock in dealing with the pandemic and thus this topic needs to be highlighted. Further multicenter studies involving varied geographic and social settings will enlighten these issues of students even better.

Conclusion

COVID has left a lasting impact on medical residents' education and well-being. A vigorous team effort from both administrative and academic leadership will be required to take comprehensive steps for revisiting the educational pursuits for medical education, which should encompass bringing back the traditional ways and amalgamate newer virtual pathways of learning. Emphasis on non COVID exposure and promotion of a less stressful environment of mental health are also essentially indicated.

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Conflicts of interest

There are no conflicts of interest.

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