

Research

Uncharted waters: the effects of COVID-19 on student paramedics

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Abstract

Introduction

The effect of COVID-19 pandemic shutdowns on education has been discussed broadly in both the media and among academics, however its true effects on paramedicine students and their ability to attend in-person lectures, skill sessions and clinical placements has not been widely researched. This study aimed to investigate the impact of COVID-19 on a group of paramedicine students at an Australian university.

Methods

A cross-sectional study using a convenience sample of first and second year paramedicine students was undertaken to explore their perceived experiences of COVID-19 through both qualitative and quantitative responses.

Results

A total of 83 paramedicine students from Griffith University in Queensland participated in the survey, demonstrating an 84.7% response rate. Of the participants, 78.3% (n=65) disagreed that online workshop sessions were as valuable as face-to-face sessions. Similarly, the majority of participants (61.5%, n=51) disagreed that online lectures and tutorials were as beneficial as in-person equivalents. A further 61.4% (n=51) of students agreed that COVID-19-associated lockdowns had negatively impacted their ability to formulate strong personal relationships that are important for university, however 78.3% of students agreed that communication platforms assisted in maintaining some form of social interaction.

Conclusion

The results from this study demonstrate that the educational and social impacts of COVID-19 on paramedicine students were highly diverse, and were contingent on several factors including but not limited to: year of study, learning style, previously established social connections and extenuating life circumstances.

Keywords:

paramedicine student; COVID-19; coronavirus; paramedicine education

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Introduction

The coronavirus disease, COVID-19, has caused worldwide shutdowns with immense impact on education, industry and community (1). Effects on education have been discussed broadly across the media and among academics. The significant impact of the COVID-19 pandemic is demonstrated by the United Nations Educational, Scientific and Cultural Organisation's claim that 177 countries had closed all educational institutions completely or moved to online learning as of May 2020 (2).

Although not largely understood or widely documented, COVID-19 has affected paramedicine students, particularly their ability to attend in-person lectures, skill sessions and clinical placements. The practical nature of paramedicine degree programs makes these experiences an integral part of paramedic education, with the cessation of these activities causing major disruptions across the board (3). Although beneficial in ensuring students did not fall behind, the shift to online education for practical content proved challenging for some paramedicine students. As most paramedicine students are kinaesthetic learners, the lack of 'hands-on' learning has hindered their ability to consolidate theoretical knowledge (4). Additionally, the closure of university campuses and shift to remote learning meant that students were required to study at home, away from their peers. Although differences in opinion are evident, most paramedicine students prefer to study in larger groups, with many agreeing that they find their home environment too distracting for adequate study sessions (5).

Furthermore, a global lockdown and transition to online learning has directly impacted the social aspect of tertiary education. University develops a sense of community and provides a platform for immense social growth and expression, both of which are vital to student success (5,6). For paramedicine students, teamwork and positive community engagement is a fundamental aspect of their learning journey that increases their employability (7). With in-person learning halted due to COVID-19, students, particularly first-year undergraduates, began to feel isolated and anxious (6). While this may prove detrimental to their academic performance, the adverse effects on students' mental health is of utmost concern (8). The introduction of online learning platforms has provided some level of connectedness despite social distancing and isolation measures.

While the immediate impact on student education has been acknowledged (1), the effect on future clinical placements and employment is also recognised. Following the outbreak of COVID-19 in Australia, paramedic students were defined as non-essential personnel due to the increased risk posed to frontline healthcare workers (2,9). This led to clinical placements being cancelled and interrupted the professional development of some paramedicine students. However, these unprecedented circumstances have driven paramedicine students to expand their clinical horizons and find new ways to utilise their skills (10).

The COVID-19 pandemic altered the way in which learning opportunities were presented, thus altering how paramedicine students engage and interact with new content. Although inconvenient, these changes have enabled paramedicine students to become more adaptable and resourceful. The objective of this study was to investigate the impact of the COVID-19 pandemic on the education of paramedicine students across two cohorts at an Australian university.

Methods

Design

A cross-sectional study using a convenience sample of first and second year paramedicine students was utilised. Perceived experiences of paramedicine students affected by COVID-19 were recorded through both qualitative and quantitative responses.

Participants

All 112 students, 54 first year and 58 second year, enrolled in Bachelor of Paramedicine programs at Griffith University in Queensland, were eligible to participate in the study. Participants were included in the study if they were enrolled in semester 1, 2020. There were no exclusion criteria for this population cohort. However, third year students were excluded from the study sample because at the time of the survey these students were no longer on campus.

Instrumentation

An adapted student experience survey was utilised to collect self-reporting data about the perceived experiences of paramedicine students affected by COVID-19. A 5-point Likert-scale (1 = strongly disagree and 5 = strongly agree) was utilised to report experiences. Several demographic questions such as age, gender and year level were included.

Procedures

Students were notified of the study by an announcement on course sites and invited to participate on a voluntary basis. At the conclusion of a regular on campus paramedicine workshop, students were advised about the study by a member of the research team. Those who voluntarily agreed to participate were given an information and consent form and provided their email address to a member of the research team. These students were sent a link to the online questionnaire to complete in their own time. Participants were given 14 days to complete the questionnaire. Consent was implied by completion and submission of the questionnaire.

Data analysis

Questionnaire data was transcribed into a spreadsheet following submission of the electronic questionnaire. Error checking occurred before the analysis of the quantitative data using Statistical Package for the Social Sciences (SPSS). Descriptive statistics including proportions, frequencies (%), means and standard deviations (SD) were performed to summarise the

demographic and questionnaire findings. Statistical significance was set at 0.05 and confidence intervals (CI) at 95%. Qualitative data was thematically coded into categories of common themes and ideas. Thematic coding was undertaken individually by members of the research team and then reviewed by other members.

Ethics

Ethics approval was granted through Griffith University Human Research Ethics Committee (GU Ref No: GU ref no: 2020/516).

Results

Demographics: 83 paramedicine students from Griffith University participated in the survey, representing an 84.7% participation rate. This population included both first (56.5%, n=47) and second (43.4%, n=36) year paramedicine students; 65.1% (n=54) of participants were 21 years of age or less; 65.1% were female (n=54), and 34.9% were male (n=29). Table 1 provides further information on demographic distribution. Table 2 outlines students' responses to statements regarding learning, connectedness, placement and employment. Table 3 summarises common themes from qualitative responses.

Table 1. Participant demographics

Variable	Descriptor	N	Percentage (%)
Gender	Male	29	34.9
	Female	54	65.1
Year level	First year	47	56.5
	Second year	36	43.4
Age (years)	18-21	54	65.1
	22-25	19	22.9
	26-30	7	8.4
	31-35	1	1.2
	36-40	1	1.2
	41-45	1	1.2

Learning and teaching

In-person practical workshops were considered integral to student learning, with 94% (n=78) of participants agreeing or strongly agreeing they are a valuable learning resource. However, 78.3% (n=65) of participants disagreed or strongly disagreed online workshop sessions were as valuable as face-to-face workshops. Similarly, many participants (61.5%, n=51) disagreed or strongly disagreed that online lectures and tutorials were as beneficial as in-person equivalents. Students in their first year of study were more likely to conclude that online lectures and tutorials are less valuable (p=0.021, F=5.539). Participants had mixed experiences regarding whether studying online enabled them to cover course content more thoroughly, with 44.5% (n=37) agreeing or strongly agreeing and 42.1%

(n=35) either disagreeing or strongly disagreeing. Despite this, 86.8% (n=72) of participants concluded (agreed or strongly agreed) that studying paramedicine online was more challenging than studying in person.

Qualitative responses reflected that students found it "much harder to motivate" themselves or "difficult to find [the] motivation" to learn content and attend online classes (Table 3). Others noted that they "struggled to solidify knowledge" and "stay focussed" when studying online. However, some students identified positive outcomes from the online learning process. These included: "less time travelling to campus", more time to "fully understand the theory" and to improve "clinical skills and reasoning", and an "opportunity to learn the content more in-depth". Students further noted their gratitude towards staff for the "efforts put in... to allow [them] to continue [their] studies".

Connectedness and community

Personal relationships were significantly impacted during the lockdowns with 61.4% (n=51) of students agreeing or strongly agreeing that COVID-19-associated lockdowns negatively impacted their ability to formulate strong personal relationships, and only 24.1% (n=20) disagreeing or strongly disagreeing. Despite non-statistical variances between cohorts (F=0.662, p=0.42), 31.9% (n=15) of first year students strongly agreed in comparison to 13.9% (n=5) of second year students. Impact on ability to perform in laboratories was less clear, with 27.7% (n=23) of students agreeing or strongly agreeing that a lack of strong peer connections left them uncomfortable performing simulations in laboratories, whereas the majority of students (n=47, 56.6%) felt that the statement did not apply to them. There was no statistically significant variance between first and second year students.

The majority of students (n=56, 67.5%) felt less face-to-face interaction with lecturers and sessionals during the lockdown period did not make them more nervous in asking questions, however 24.1% (n=20) agreed or strongly agreed that they felt more nervous. Female paramedicine students (F=8.56, p=0.004) and younger students (F=2.87, p=0.02) were more likely to agree about increased nervousness. Overall, 49.4% (n=41) agreed or strongly agreed that COVID-19 lockdowns fostered feelings of isolation and a resultant lack of motivation to maintain study habits, compared to 38.5% (n=32) who disagreed or strongly disagreed. Despite physical isolation secondary to lockdown, 78.3% (n=65) believed online communication platforms assisted in maintaining some form of social interaction.

Through their qualitative responses (Table 3), students expressed common concern around isolation and difficulty maintaining connections with peers. This was especially challenging for first year students who had limited time to develop relationships at university before being pushed toward online learning activities. Another commonly expressed theme was a decreased confidence to perform OSCE-style simulations in front of peers upon return to on-campus life.

However, some second-year students expressed that their relationships and bond as a cohort appeared to strengthen following shared adversity throughout COVID-19 restrictions. Intensive laboratory sessions conducted during the semester holiday period also seemed to assist in developing some relationships and connectedness among students.

Placements and employment

The majority of students (n=52, 62.6%) disagreed or strongly disagreed that the impact of COVID-19 on their studies would have a detrimental effect on their placement preparedness. Despite this, 60.3% (n=50) of students believed they would acquire less hands-on experience due to COVID-19 restrictions, whereas 24.1% (n=20) were unsure. Though no statistical significance was detected on homogeneity analysis, first year students were more likely to agree or strongly agree that they would receive less hands-on exposure during placement (65.9%, n=31 vs. 52.8%, n=10).

Regarding employment, 48.2% (n=40) believed (disagreed or strongly disagreed) that COVID-19 would not increase employment opportunities, while 27.7% (n=23) were neutral. Second year students and students of older age were less likely to predict growth in employment opportunity (F=4.192, p=0.044; F=2.444, p=0.041). Moreover, while 33.7% (n=28) of students agreed or strongly agreed that COVID-19 has positively influenced their intentions to become a paramedic, 53% (n=44) were neutral.

On examination of qualitative responses (Table 3), it was found that many students appeared uncertain about the future regarding placements and employment. A common theme identified among students was that placement is vital for gaining “essential experience” as a paramedic. Some students expressed that they felt a “lack of confidence in practical skills” due to long periods of time spent learning online and speculated that this may result in them feeling incompetent

Table 2. Response distribution to Likert statements

Statement	N	SA (%)	A (%)	N (%)	D (%)	SD (%)	Mean (\bar{x})	SD (σ)
Online lectures are just as beneficial as face-to-face lectures and tutorials	83	4.8	18.1	15.7	47.0	14.5	2.52	1.097
Practical workshop sessions are an important and valuable learning resource	83	94.0	4.8	0.0	0.0	1.2	4.90	0.484
Online practical workshop sessions were as engaging and valuable as face-to-face sessions	83	0.0	8.4	13.3	56.6	21.7	2.08	0.829
Having near-peer mentors attend online practical workshop sessions enhanced my learning experience	83	13.3	51.8	27.7	7.2	0.0	3.71	0.789
Studying paramedicine online was more difficult than studying in person	83	45.8	41.0	7.2	4.8	1.2	4.25	0.881
I have been unable to formulate strong peer relationships due to COVID-19	83	24.1	37.3	14.5	19.3	4.8	3.57	1.191
Due to inadequate peer connections, I feel uncomfortable performing clinical demonstrations and simulations in front of my peers	83	10.8	16.9	15.7	54.2	2.4	2.80	1.102
I feel isolated and unmotivated to maintain my study habits	83	13.3	36.1	12.0	31.3	7.2	3.17	1.218
I feel nervous approaching lecturers and sessions for feedback due to less face-to-face interactions	83	2.4	21.7	8.4	53.0	14.5	2.45	1.062
Online collaborations through Microsoft Teams, Collaborate and Zoom have assisted in maintaining some form of social interaction	83	19.3	59.0	12.0	7.2	2.4	3.86	0.899
Due to the impacts of COVID-19 on my studies, I don't think I will be adequately prepared for placement	83	4.8	13.3	19.3	54.2	8.4	2.52	0.992
I think that there will be more employment opportunities when I graduate due to COVID-19	83	1.2	22.9	27.7	39.8	8.4	2.69	0.962
I think that as a student, I will get less 'hands on' experience on placement due to COVID-19	83	14.5	45.8	24.1	15.7	0.0	3.59	0.924
COVID-19 has positively influenced my thoughts on becoming a paramedic	83	10.8	22.9	53.0	10.8	2.4	3.29	0.891

SA strongly agree=5; A agree=4; N neutral=3; D disagree=2; SD strongly disagree=1

about their skills on placement. However, some commented that intensive workshops conducted during the semester holiday period assisted in solidifying practical content. Further, while some students “don’t believe [COVID-19] will impact [their] future employment” and the increased healthcare demand may “open up more doors for employment”, others predict “fewer opportunities for employment” post-COVID-19 due to the high intake of paramedics in some states during the pandemic.

Discussion

This study was the first, to the authors’ knowledge, to survey the social and educational effects of the COVID-19 pandemic on undergraduate paramedicine students in Queensland. Results indicate that the effects of COVID-19 have been wide-reaching and dependent on year of study, preferred learning style, gender, previously established relationships with university peers, and other extenuating circumstances including but not limited to finances, family difficulties, distraction in the home environment and mental wellbeing before online learning.

Learning and teaching

From a general standpoint, online learning throughout the COVID-19 pandemic has proved challenging for students; 86% of participants deemed online education more difficult than on-campus learning, -correlating with several other studies informed by the experiences of medical students (11-13). While acknowledging its benefit for continuing education, results indicated that the large majority of surveyed undergraduate paramedicine students strongly prefer face-to-face workshops,

tutorials and lectures as opposed to online alternatives employed during periods of lockdown and restriction. Similar trends exist in medical and allied health education across the literature (14-17). Butan (18) suggests such preferences are largely founded on the learning styles of students. Many participants expressed that the effectiveness of their learning throughout lockdowns were deleteriously impacted by a lack of hands-on application of theory. This aligns with the findings of Williams (19) which indicate that undergraduate paramedicine students prefer to learn through experiencing deep thinking and hands-on practice, which is naturally associated with in-person education. Other studies further support the notion that students studying health are primarily visual and kinaesthetic learners (18,20). In addition to this, student participants noted that distraction, decreased motivation and a lack of accountability while studying in the home environment made online study difficult. Despite its many hindrances to learning, participants expressed that by decreasing time spent in transit and at campus, COVID-19 gave them more opportunity to learn and retain content, a viewpoint also commonly expressed by medical students (13).

Connectedness and community

It is evident that students struggled to stay connected with peers and friends during the lockdown phase of COVID-19. The community aspect of university is an essential component in developing a sense of connectedness between students, both new and continuing (6). The lack of on-campus teaching dulled this experience because, while students would usually spend a few hours on campus socialising both during and between classes, online learning meant minimal to no face-to-face

Table 3. Response to open-ended questions

Stimulus	Identified themes
How has the shift of your paramedicine studies to online platforms impacted your learning?	Decreased motivation for engagement and attendance in online lectures, tutorials and workshops due to distraction, lack of accountability, independent learning, fear, nervousness and technological issues; decreased fluency with equipment, clinical simulations and systematic approach; increased stress for undergraduate paramedicine students with children or other familial responsibilities – university expressed as an escape; decreased ability to interact with and ask lecturers questions; requirement of initiative for learning yielded increased motivation to study; increased understanding and retention due to learning at own pace; Increased time for content and assignments
How do you feel your ability to formulate/maintain relationships with peers has been affected by COVID-19?	Feelings of isolation with first year students more so affected due to lesser pre-existing relationships; limited interaction fostering decreased confidence to engage and perform skills in front of peers; following return to campus for laboratory sessions exclusively, limited peer interacted still noted; strengthening of relationships with peers due to shared adversity, predominately expressed by second year students
Please elaborate how you believe your placement/s and potential employment as a paramedic may have been impacted by COVID-19	Concerns regarding placement cancellation; concerns regarding whether adequately prepared for placement due to decreased hands on time; decreased connectedness to peers impacting confidence for placement; concerns that students will be less involved with patient treatment, given infectious disease precaution protocols; concerns with financial stability during placement due to work cancellation or decreased hours; future employment more difficult due to economic downturn, decreased overseas opportunity, cancellation of volunteering/professional development opportunity, and less graduate paramedic demand following perceived increased paramedic employment in early 2020; employment more accessible due to greater emphasis on healthcare; concerns regarding delayed graduation

interaction (21). However, 78.3% (n=65) of students agreed that communication platforms assisted in maintaining some form of social interaction. Despite this, social isolation was a frequently occurring theme in the qualitative data collected, with students expressing concern surrounding the lack of ability to form strong relationships with their peers. This topic was particularly prevalent among first year responders, who hadn't yet had the same opportunity as second year students to foster good peer relationships. These feelings of isolation and anxiety expressed by some students due to lack of interaction may contribute towards both poor mental health and declining academic performance (6,21).

Placements and employment

While the majority of the surveyed paramedicine students believed their placement preparedness was uninfluenced by COVID-19 lockdowns, the participants had access to laboratory intensives in the semester holiday period to ensure OSCE-readiness, which substituted the in-person laboratories cancelled throughout semester 1. Participants also had access to in-person laboratories throughout the entirety of semester 2, from July 19 to October 15. Due to differences in practical opportunities afforded to students because of varying interstate and overseas university policies and government-enforced lockdown measures, perceived placement preparedness of paramedicine students cannot be accurately generalised to all universities. Rather, this study's findings are reflective only of paramedicine students at Griffith University.

The study's findings also indicate that participants held varying opinions on how COVID-19 would impact their future employment as paramedics. Many participants expressed that the suspected decreased caseload during COVID-19 (22), coupled with increased paramedic employment in early 2020 in preparation for increased healthcare demand (23,24), would contribute to overstaffing and detrimentally impact their employment opportunities with ambulance services following graduation. Other participants believed an increased demand for healthcare would strengthen their employment options. Despite this, to the best of the authors' knowledge, no jurisdictional ambulance service in Australia has outlined how COVID-19 will impact the employment of graduate paramedics, and ultimately the impact is unknown.

Limitations

This study population is limited by the small sample size of two cohorts of paramedicine students at one Australian university. As such, the results displayed should be interpreted with caution as external validity is limited and the results obtained may not be representative of the experiences had by all paramedicine students. Furthermore, some parts of this study, for example, thoughts about future employment opportunities, required the study cohort to speculate. However, there is no concrete data to suggest that results obtained from these speculations will be accurate.

Recommendations

The results from this study demonstrate that a drastic move from on-campus teaching to online education during a global pandemic, has had a significant impact on paramedicine students at an Australian university. Based on the results of this study, the authors have formed the following recommendations:

- If learning is to be conducted online, students should have access to programs and other initiatives that allow them to engage with each other as much as possible. On computers, this may be via chat functions, microphone or webcam. This may assist students to feel less isolated and alone and may facilitate the development of peer relationships.
- University heads and other education faculties should consider the impact that COVID-19 has had on student learning and develop strategies to mitigate possible disruption to education should another global pandemic, or similar, occur.
- This study lacks external validity and therefore should be conducted on a larger scale. This may include a study population of paramedicine students across multiple universities in Queensland and/or in Australia.

Conclusion

The results from this study demonstrate that the educational and social impacts of the COVID-19 pandemic on paramedicine students are highly diverse and are contingent on several factors including but not limited to: year of study, learning style, previously established social connections and extenuating life circumstances. While students have been negatively impacted due to a lack of social connectedness with their peers and the inability to attend face-to-face laboratories, positive impacts of the COVID-19 pandemic on paramedicine students included having more time to understand and grasp theoretical concepts, alongside building greater critical thinking and reasoning skills. These findings highlight a need for change in the way universities facilitate online learning. Educators should focus on providing more opportunities for students to connect during online classes, and develop strategies to mitigate any future disruption to the education of students should similar events unfold in the future.

Competing interests

The authors declare no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

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