Exploratory Evaluation of Anxiety, Compliance and Perceptions of the COVID-19 Pandemic of Medical Students and Medical University Staff

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INTRODUCTION

Medical education is an ever-changing field fraught with uncertainty for students. Events over the 4 years determine the majority of their careers, which makes the task daunting and stressful. When a pandemic that hinders their learning experience enters the mix, many feel lost and left behind (Ferrel and Ryan, 2020). The recent pandemic has placed a significant strain on education systems across the world. Medical students had licensing examinations cancelled, clinical experiences cut short, and lab time put on hold. Clinical experiences help medical students develop their professional identities (Cullum et al., 2020), yet this opportunity has been stripped from many or hindered at best. For those who remained involved in clinical experiences, it was for a limited period of time. Telehealth became the new norm, personal protective equipment was scarce, and occupancy limits were decreased leaving students to stand in the background (Rose, 2020). These constraints altered many aspects of medical education and, as researchers, we were interested in learning more about how our community was impacted. The purpose of this data set is to provide the basis of an exploratory study to understand the evolution of medical student and university staff perceptions of COVID-19 over the course of 3 months during the pandemic. We investigate both staff and students in order to identify if there is a disparity in effects on mental health.

Current research explores the root cause of the increasing anxiety experienced by medical students during the pandemic. A study done at King Saud University College of Medicine aimed to understand the impact of quarantine on medical student well-being. The results of their online survey showed a significant increase in feelings of distress and depression. Students felt detached from family and friends, and they felt that the pandemic significantly decreased their overall performance (Meo et al., 2020). Another article by Huckins et al. (2020) reported on the behavior of college students before and during the COVID-19 pandemic. Behavior was analyzed using a Student Life mobile application. Depression and anxiety were assessed weekly through self-reporting. Results showed that students were more sedentary and reported increased depression and anxiety during the Winter 2020 academic term when compared to earlier academic terms (Huckins et al., 2020). For university staff the story is likely to be similar to students although there are some additional concerns since medical school staff often have clinical and classroom duties. A recent study in Saudi Arabia showed how the anxiety levels of health care providers working in an academic care center increased 41% with the recent pandemic (Temsah et al., 2020a), similar observations we made in s study in China (Cai et al., 2020), however their compliance to use protective equipment and to adhere to hygienic practices was affected by previous experiences with other infectious agents (Temsah et al., 2020b) Administrative duties that university staff add additional concerns for effective leadership during a continuously changing situation in this pandemic this situation is common across all people

involved in leadership (Papadimos et al., 2020). It is important to mention that academic professionals have shown to display lower anxiety and depression levels associated with the COVID-19pandemic than the regular population (Rakhmanov et al., 2020).

A common theme of the articles we reviewed about medical education during the pandemic was communication. Communication plays a vital role in the sense of comradery and wellness essential to a successful medical education. Reassurance is a key part of an institutional response regarding educational changes in response to the pandemic and should be given the highest priority, even more so than learning new technology or focusing on the actual content of study (Rose, 2020) this is highly relevant to both students and staff. It is recommended to have frequent communications even if there are educational uncertainties. A study by Byrnes et al. (2020) found that one-fifth of medical students who took part in a national survey are concerned that their choice of specialty in the future will be directly affected by COVID-19. Without the chance to fully participate in clinical rotations, students are not only losing exposure to potential fields of interest, but they are also missing opportunities to network and obtain the all-important letters of recommendation required for residency applications (Byrnes et al., 2020). Medical student success is an important concern for university staff regardless of the pandemic (Newble and Entwistle, 1986) and is likely to be exacerbated by all the limitations COVID restrictions have imposed in their mission.

As COVID-19 continues to surge in our society and anxiety about their futures persist, communication from medical institutions, including from national governing bodies for medical education, must be a priority. There are essential gaps in the explanation for the mental health effects felt specifically by medical students and university staff during this pandemic, including the evolution of their reactions over time. Future pathways of research should focus on the development of clear operational indicators that will allow for gauging effective communication methods and counseling efforts to alleviate the anxiety felt by medical students and university staff during this trying time.

METHODS

We looked more closely at how the COVID-19 pandemic affected the behaviors and perceptions regarding educational/career success and the gravity of the pandemic. This was investigated by conducting an emailed survey gauging student and staff experiences during this pandemic. The survey was designed as the basis of an exploratory study of a group conceptualization construct that is likely to be multidimensional and which may include as suggested by the literature dimensions such as anxiety level, compliance and perception. Our survey was designed to explore the student and staff body as a group with the intention of further developing a pertinent course of action where the pertinent dimensions can be defined. The questionnaire was based on the recommendations put forth by the CDC during

the emergence of the pandemic, such as social distancing, restricting travel, and wearing masks (US Center for Disease Control, 2020). We included questions regarding public behavior, such as panic buying, and shared sentiments among our community, including study/work habits and feelings of isolation. Questions were measured each using a nominal scale with two responses (Agree/Disagree) with the exception of Question 11 which had three responses and each was evaluated using a nominal scale with two responses (Yes/No). Three months later in June of 2020, the original survey was followed up with a second survey that included the same items. The goal of these surveys was to determine if a shift in behavior occurred from the beginning of the pandemic to several months later, and if there were any differences between medical students and university staff.

We collected a total of 600 responses using an online Google survey disseminated via institutional email, of which 52.5% responded to the initial survey deployment and 47.5% to the follow-up. 476 of the 600 identified themselves as either staff or students. Based on those responses, 72% were students and 28% were university staff, including faculty, administrators, and general university staff. All responses were voluntary and anonymous. Respondents were able to answer with either a "disagree" or "agree" response. A copy of the questionnaire is available as **Supplementary Material**. The collection of this dataset was reviewed and approved by the RVU Institutional Review Board #2020-0036. All participants were provided with informed consent to participate in this study. Our most important limitation in this dataset was the lack of ability to match survey responses between initial and follow-up surveys due to the restrictions on identifiers put in place by our IRB.

DATASET

The dataset and questionnaire presented in this study can be found in the Mendeley Data repository and are freely accessed through the following link: http://dx.doi.org/10.17632/xzwnpjyzwj.1. The dataset is contained in a Microsoft Excel v. 2016 format and contains no identifiable information, while the questionnaire is available in PDF form.

DESCRIPTIVE ANALYSIS OF THE DATA

We evaluated descriptively our data using Generalized Linear Models with a binary response (log-linear), where we evaluated the effects of the time point and the participant's role, either student or university staff as main effects. Cronbach's alpha of our exploratory study was of 61% which can be raised to 65% with the deletion of questions 2 and 10, 69% when deleting both questions. Linear model estimates of our analysis are presented in **Table 1**. The descriptive results from our survey showed that panic buying and plan cancellation were reduced significantly as time progressed (questions 5, 7, 9 and 10); we also observed a more extensive impact on students compared to university staff. COVID-19 closed down the medical school campus. Students

TABLE 1 | COVID pandemic survey descriptive data analysis. Total sample included 600 responses, from which 315 were initial and 285 were follow up responses, 343 came from students while 133 came from university staff. Estimates are presented for itemized questions where confidence intervals were estimated using a Bonferroni threshold (0.05/44 = 0.00113636). The total number of responses was 600. Significant tests are labeled with an asterisk (*).

Question		Timepoint					Role				
		Initial	Follow up	Odds ratio	95% confidence interval		Student	Staff	Odds ratio	95% confidence interval	
1	I am anxious about the COVID-10 situation	0.3517	0.5078	0.856	0.454	1.613	0.4613	0.3982	1.065	0.532	2.137
2	I am unlikely to catch COVID-19	0.3018	0.0914	1.234	0.662	2.301	0.0289	0.3643	0.715	0.361	1.416
3	The current COVID-19 situation is serious	2.6982	2.5646	1.143	0.299	4.368	3.0266	2.2362	2.203	0.607	8.000
4	Infection with COVID-19 would adversely affect my health	1.2016	0.8374	1.439	0.721	2.872	0.7627	1.2763	0.598	0.274	1.307
5	I have cancelled plans to meet friends, other students, family members	3.0452	−0.0566	22.238*	6.765	73.101	1.4323	1.5563	0.883	0.398	1.961
6	I have avoided busy public places e.g. shopping areas, cinemas, restaurants	3.1417	1.3281	6.133*	1.906	19.734	1.8797	2.5901	0.491	0.178	1.357
7	I have cancelled/postponed travel plans-interstate or international	1.8545	0.1278	5.622*	2.547	12.411	0.9098	1.0725	0.850	0.400	1.808
8	I have purchased hygiene products-face masks, hand wash to protect me from COVID-19	0.4326	0.4163	1.016	0.541	1.908	0.2529	0.5960	0.710	0.352	1.431
9	I have stocked up on food and/or other necessities	0.8483	−0.8015	5.206*	2.642	10.257	−0.1745	0.2213	0.673	0.321	1.410
10	I haven't changed any of my behavior/plans	−2.5743	−1.0585	0.220*	0.074	0.648	−2.0414	−1.5914	0.638	0.270	1.504
11	If I were sick, I would be willing to…										
	Self isolate	3.8340	3.0468	2.197	0.445	10.856	2.8895	3.9913	0.332	0.042	2.632
	Stay at home	2.6769	2.5181	1.172	0.309	4.444	3.0964	2.0986	2.710	0.767	9.615
	Wear a mask	1.9450	2.1427	0.821	0.292	2.310	2.4533	1.6344	2.268	0.806	6.369
12	I am encouraged by the actions taken by RVU to protect against COVID-19	4.0356	2.2516	5.953*	2.044	17.342	1.4884	4.7989	0.036*	0.003	0.396
13	I feel RVU has kept me adequately informed about the current COVID-19 situation	3.5261	2.0107	4.551*	1.600	12.944	1.5642	3.9726	0.090*	0.016	0.510
14	I feel the communication between RVU leadership and students has been appropriate	3.1237	1.5957	4.609*	1.816	11.699	1.2207	3.4987	0.102*	0.024	0.436
15	News and social media have increased my concern regarding the situation	0.9418	0.0619	2.411*	1.242	4.677	0.5272	0.4764	1.053	0.522	2.119
16	I feel distracted by COVID-19	0.5392	0.0039	1.708	0.893	3.268	0.5784	−0.0353	1.848	0.927	3.676
17	I lack motivation to study/work when away from RVUCOM.	−0.0837	−0.1501	1.069	0.555	2.057	0.6106	−0.8445	4.292*	2.058	8.929
18	Lack of access to campus has been difficult for me	−0.3233	−0.6447	1.379	0.731	2.602	−0.0119	−0.9561	2.571*	1.224	5.405
19	I am concerned the lack of face-to-face communication with my peers will negatively affect my performance	−0.3832	−0.0615	0.725	0.383	1.373	0.3081	−0.7529	2.890*	1.412	5.917
20	I am concerned that my education will be negatively impacted by COVID-19	−0.4782	0.2770	0.470	0.206	1.071	1.4180	−1.6191	20.833*	8.130	52.632

were affected in their motivation to study and work when away from campus (questions 17 and 18). While university staff were also significantly concerned about the lack of face-to-face communication in question 19, they were less likely to lose motivation (question 17). Students felt that their performance in school would decline with lack of face-to-face contact with peers (question 19). University staff were less likely to believe their overall work performance would decline without face-to-face interaction. Most importantly, students felt that COVID-19 would negatively impact their medical school education. An important theme we observed was an apparent student concern about institutional communication efforts (questions 12–14). However, this view was not shared by their university staff counterparts. The discrepancy highlights how students' perceptions and confidence about their medical education is affected dramatically by the degree of effective communication between students and administrators.

Based on our descriptive analysis of the data, students felt that the communications they received from the institution were not effective in easing their fears and anxieties about education in the COVID-19 era, as compared to university staff (questions 12–14). We suspect the fear that students are experiencing has to do with their belief that they have more at stake than university staff. Students depend on their educational experiences, during both the didactic years and clinical years, to reach the career goals they have invested so much time and money into achieving. University staff mainly worry about job security due to added challenges, whether that means working from home or adapting curriculum. Students will not have the same opportunities to partake in the traditional aspects of medical education, such as in-person anatomy labs using cadavers, regular clinical rotations without significant restrictions, or other hands-on experiences designed to help mold them into competent physicians.

POSSIBLE RESEARCH PATHS

The COVID pandemic has had an important impact on medical education. The development of professional identity in medicine, or "how someone perceives himself as a physician" (Cullum et al.,

2020) has traditionally evolved during a student's time on clinical rotations. Without the opportunity to partake in clinical rotations, students may not form a strong professional identity. With our data, we hope to provide the basis to evaluate anxiety, compliance and perceptions of medical students and university staff as they may be involved in the development of a professional identity. Per Cullum et al. (2020), "a robust professional identity allows physicians to practice with confidence and professionalism", which are keys to being successful in the field of medicine (Cullum et al., 2020). Interestingly, a study by Choi et al. (2020) refutes the idea that hands-on experiences are necessary to produce confident future physicians. This study found that fourth-year medical students in the United Kingdom felt significantly less prepared to start their medical careers due to disruptions in clinical rotations. However, despite feeling unprepared, many felt confident entering the physician workforce during the COVID-19 pandemic (Choi et al., 2020). Although this shows that medical students are adaptable and ready to fulfill the oath they took to serve their patients, and that university staff are resourceful and creative to bypass the hurdles imposed by this pandemic; it is the responsibility of medical education to ensure that students are properly trained before having to enter the workforce. Having data available, will facilitate an objective evaluation and quantification of the COVID-19 impact. It is imperative that during COVID-19, communications from students' institutions provide a sense of reassurance to lessen anxieties that students feel about their futures. Further research is required to explore the best way to navigate medical education in uncertain times. Our research is limited to one institution; however, we suspect that medical education will be forever changed and more investigation is needed across multiple institutions to assess the impact of COVID-19. There may need to be a shift in perspective by students and university staff to understand that even during a typical year of medical education, "no medical student will ever feel prepared enough to be a doctor after graduation" (Tan et al., 2020). Improving communications and focusing on reassurance will help students understand that a sense of uncertainty is normal during medical education and is not unique to a pandemic. This sense of reassurance will help them move forward in their careers with an increased level of confidence.

Based on our preliminary descriptive analysis of our exploratory study, the COVID-19 pandemic has greatly impacted medical students, seemingly more so than university staff. The field of medicine has always relied on the ability to learn, adapt, and innovate, and there is no doubt that medical education will continue to evolve during this pandemic. Students are facing increased anxiety, depression, stress, and apprehension about their education and marketability in the future. The anxiety students feel stems from concerns about lost opportunities during both didactic and clinical years and is shared by the university staff who teaches them. Both students and staff fear that they will not be able to be prepared or to provide the preparation that is necessary to our future physicians. It is essential that medical institutions communicate to provide reassurance to university staff and especially to students in an effort to ease anxieties and increase confidence surrounding medical education in the face of COVID-19.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article is available at http://dx.doi.org/10.17632/xzwnpjyzwj.1.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Rocky Vista University IRB. All participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fcomm.2021.665314/full#supplementary-material

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