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ORIGINAL ARTICLE

Exploring the perceptions and experiences of medical students in the care for patients diagnosed with COVID-19: A qualitative content analysis

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ABSTRACT

Introduction: Medical students faced numerous problems to combat the COVID-19 pandemic as the least experienced medical staff members. Awareness of the impact of the COVID-19 pandemic on medical students is essential to manage and control its adverse effects.

Objective: This study aimed to explore medical students' perceptions and experiences during the COVID-19 pandemic.

Methods: We conducted a qualitative study in May and June 2020 involving semi-structured phone interviews with 19 medical students. Data were collected through in-depth telephone interviews and analyzed with MAXQDA 10 software using the conventional content analysis proposed by Graneheim and Lundman.

Results: Thirty subcategories, six categories, and three themes emerged from the data analysis. The themes included *perceived mental and emotional paradox* (pleasurable feelings complicated by negative feelings and emotions), *encountering catastrophe* (being confronted with a lack of equipment and disorganized management; working in turmoil), and *attempting to adapt to unpleasant conditions* (individual efforts toward psychological adjustment; attempting to resile as a professional).

Conclusion: The COVID-19 pandemic had multiple positive and negative emotional, educational, and occupational effects on medical students. This study highlighted these effects by exploring the students' experiences. Design of an organized pandemic response plan for medical student is recommended in various aspects of education, patient care and coping skills for future pandemics.

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ARTÍCULO ORIGINAL

Explorando las percepciones y experiencias de estudiantes de medicina en la atención a pacientes diagnosticados con COVID-19: un análisis de contenido cualitativo

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RESUMEN

Introducción: los estudiantes de medicina enfrentaron numerosos problemas para combatir la pandemia de COVID-19, en la que fueron los miembros del personal médico con menos experiencia. Conocer el impacto de esta pandemia en los estudiantes de medicina es fundamental para gestionar y controlar sus efectos adversos.

Objetivo: este estudio tuvo como objetivo explorar las percepciones y experiencias de los estudiantes de medicina durante la pandemia de COVID-19.

Métodos: realizamos un estudio cualitativo en mayo y junio del 2020, el cual involucró entrevistas telefónicas semiestructuradas con 19 estudiantes de medicina. Los datos fueron recolectados a través de entrevistas telefónicas en profundidad y analizados con el software MAXQDA 10. Se utilizó el análisis de contenido convencional propuesto por Graneheim y Lundman.

Resultados: surgieron treinta subcategorías, seis categorías y tres temas del análisis de datos. Los temas incluían *paradojas mentales y emocionales percibidas* (sentimientos placenteros complicados por sentimientos y emociones negativas), *enfrentarse a una catástrofe* (enfrentarse a la falta de equipo y a una gestión desorganizada; trabajar en medio de la confusión) e *intentar adaptarse a situaciones desagradables* (esfuerzos individuales hacia el ajuste psicológico; intento de resiliencia como profesional).

Conclusión: la pandemia del COVID-19 tuvo múltiples efectos emocionales, educativos y laborales, tanto positivos como negativos, en los estudiantes de medicina. Este estudio destacó estos efectos al explorar las experiencias de los estudiantes. Se recomienda el diseño de un plan de respuesta organizado ante una pandemia, el cual contemple varios aspectos de la educación de los estudiantes de medicina, así como la atención al paciente y las habilidades para afrontar futuras pandemias.

INTRODUCTION

In December 2019 the Chinese government announced clusters of pneumonia patients in Wuhan, Hubei Province (1). In February 2020 the virus causing the disease was named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (2). The sudden spread of its consequent disease, coronavirus disease 2019 (COVID-19), challenged many countries with trials and tribulations to provide adequate patient care. Emergency departments at hospitals were overloaded by patients with respiratory symptoms (3).

This issue forced many healthcare organizations worldwide to use inexperienced personnel to combat the pandemic (4). Medical students faced numerous problems as the least experienced medical staff members (5). Many teaching hospital wards were converted to COVID-19 wards involving staff who lacked the necessary experience to treat the patients, resulting in adverse changes in medical students' work patterns and learning (6).

Awareness of the pandemic's impact on healthcare workers and medical students is essential for managing and controlling the adverse effects; by understanding their experience, we can provide protective measures, either physically or mentally. Studies in previous outbreaks of respiratory diseases have identified stress, depression, fear of infection of family members, social isolation, lack of diagnostic and therapeutic guidelines, and workforce shortages as the significant barriers to controlling an outbreak (7-9).

Besides, quantitative studies conducted during the present pandemic have shown that healthcare workers are experiencing a heavy psychological burden and new hardships (10-12). Since the start of the COVID-19 pandemic, most published qualitative or quantitative manuscripts have focused on the psychological and work experiences of nurses, physicians, and other healthcare workers (13-15). Limited studies have dealt with medical students' experiences, primarily focusing on educational and learning experiences (6,16). To the best of our knowledge, few investigations have been conducted to explore the perceptions and experiences of medical students during conditions that are unprecedented for them.

Hence, considering the new circumstances and the unpredictable future of the pandemic, investigating its effects on the mental state, training, and work experiences of medical students seems essential. Therefore, we aimed to explore the perceptions and experiences of medical students who worked in the COVID-19 specialized wards through a qualitative approach.

METHODS

This qualitative study was conducted using conventional content analysis in four hospitals from May to June 2020. Participants consisted of extern and intern medical students (medical students in 6th and 7th year of General Medical Education program in Iran) who had completed rotations in COVID-19 wards. Purposive sampling was used to recruit the key informants. Maximum variation was considered in terms of age, sex, marital status and year of education. The inclusion criteria encompassed interns and externs willing to participate in the study and share their experiences, with a history of delivering medical care services to hospitalized COVID-19 patients. The exclusion criteria comprised of the unwillingness to participate in the study at any stage and lack of fluency in the Persian language. Sampling was continued until data saturation.

Data were collected using in-depth, semi-structured telephone interviews with 19 participants. The first and third authors conducted the interviews. They were medical students that had passed qualitative research methodology courses before the study. Researchers avoided in-person interviews to minimize direct contact during the pandemic. Interviews lasted about 45 to 60 minutes. All interviews started with some general questions such as: «What are your experiences of treatment and caring for patients with COVID-19?» «Please describe your experiences of the initiation of the outbreak», «How do you feel when you are in close contact with COVID-19 patients?», and «How has this pandemic altered your lifestyle?», followed by probing questions to explore medical students' experiences during the pandemic comprehensively. All interviews were audio-recorded and transcribed verbatim after the end of each interview.

Data collection and analysis occurred simultaneously. Data were analyzed using conventional content analysis described by Graneheim and Lundman (17). Transcripts were read repeatedly to achieve immersion. Initial codes were identified according to the meanings extracted from the participants' statements. The identified codes were classified according to similarities and differences, and subcategories were determined. These subcategories were grouped into categories. The first and third authors agreed on how the codes and categories were labeled and categorized; in later stages, these were verified by the second and last authors. MAXQDA 10 software was used for data organization and analysis.

The trustworthiness of the research was considered by the four criteria of Guba and Lincoln, including credibility, dependability, confirmability, and transferability (18). To ensure credibility, prolonged engagement with the data, member checking and peer debriefing were used. Dependability of the data was promoted by peer debriefing and independent coding of the data by several researchers and reaching a general agreement on the findings. Providing an audit trail and documents of each research stage to follow the study process for other researchers was considered to ensure confirmability. To ensure transferability, the findings were checked and confirmed with a group of medical students who did not participate in the study.

This study was approved by the ethics committee of Shiraz University of Medical Sciences (ethics code: IR.SUMS.REC.1399.065, approval date: 2020-04-13). All participants were informed about the purpose of the study and informed consent was signed by all interviewees using electronic file for recording the interviews and participation in the study. Confidentiality and anonymity of the participants' identity was guaranteed. The right of all participants for withdrawal at any stage of the study was preserved.

RESULTS

Nineteen medical students with a mean age of 25.37 ± 1.42 years participated in this study. The demographic characteristics of the participants are presented in Table 1.

Table 1. Demographic characteristics of the participants

Participant No.	Sex	Age (Years)	Marital status	Educational year
P1	Male	25	Single	7th
P2	Female	26	Single	6th
P3	Female	24	Single	6th
P4	Male	25	Single	7th
P5	Female	24	Single	6th
P6	Female	25	Single	7th
P7	Male	25	Single	7th
P8	Female	26	Married	6th
P9	Female	27	Married	6th
P10	Male	25	Married	7th
P11	Female	28	Married	7th
P12	Female	24	Single	6th
P13	Female	24	Single	6th
P14	Male	24	Single	7th
P15	Female	28	Married	7th
P16	Male	27	Married	7th
P17	Male	27	Married	7th
P18	Male	24	Single	7th
P19	Male	24	Single	7th

Source: own creation

Thirty subcategories, six categories, and three themes emerged from the data analysis (Table 2). The themes perceived were mental and emotional paradox, encountering catastrophe, and attempting to adapt to the unpleasant conditions.

Table 2. Subcategories, categories, and themes that emerged from data analysis

Subcategory	Category	Theme
Sacrifice	Pleasurable feelings	Perceived mental and emotional paradox
Feeling valued as a hero		
Increased responsibility and conscientiousness		
Sense of peace from helping patients		
Glad to learn new subjects		
Joy in discovering the disease		
Fear	Negative feelings and emotions	
Disappointment		
Feeling helpless		
Nervousness		
Distressfulness		
Emptiness		
Feeling victimized		
Concerns about getting sick and transmitting the disease to others		
Social isolation		
Being stigmatized		
Lack of protective facilities and equipment at the beginning of the epidemic	Being confronted with a lack of equipment and disorganized management	Encountering catastrophe
Inadequate management for equitable distribution of facilities		
Lack of thorough disinfection of the dormitories		
Lack of disease management guidelines		
Ambiguity of various aspects of the disease	Working in turmoil	
Curriculum changes and clutter		
High workload		
Inadequate experience		
Working and psychologically supporting each other	Individual efforts toward psychological adjustment	Attempting to adapt to the unpleasant conditions
Undertaking hobbies		
Expressing emotions		
Obtaining more information about disease management	Attempting to resile as a professional	
Trying to take advantage of new learning opportunities		
More attention to professional interactions		

Source: own creation

Perceived mental and emotional paradox

Management of patients with COVID-19 resulted in contradictory mental and emotional experiences in medical students. The theme consisted of two categories, including pleasurable feelings and negative feelings and emotions.

Pleasurable feelings

Although students experienced an unprecedented era and faced numerous challenges, they experienced some pleasurable feelings when caring for patients with COVID-19. These feelings included altruism, the sense of being valued as a hero, feeling more responsible and conscientiousness, and a sense of tranquility from helping patients. A student stated: «I often heard my colleagues saying that they could've gone to other wards [non-COVID-19] but didn't. What I mean is that there was a sense of self-sacrifice in all of us» (P1).

The sense of being a 'health defender' was experienced by most of the participants. One participant described feeling like a national hero: «I feel that at this point in time, we are the only ones that can do something [to help], and I sense the value of my work. I feel that we are protecting people's health in the same way that soldiers defended the country» (P4).

Most of the students implied that treating COVID-19 patients increased their sense of responsibility and conscientiousness. One student indicated: «During this period, I felt that patients really needed me and that I could help restore their health, which made me feel more responsible, and I would really try to help them. Due to my work conscience, I felt that I had to go and help the patients – it was a kind of duty» (P12).

Some pleasurable feelings were related to the professional issues of medical students. They stated that with participation in patient care, they felt glad to learn new subjects and enjoyed discovering the disease. A participant stated: «Actually, I had a lot of fun during those shifts. In those days, we came across a lot of new tools (devices, masks, etc.) and learned many things. It was like taking up a new class, and we felt good about the learning» (P11).

Another student remarked: «This issue was so interesting and enjoyable for me that I was even prepared to become infected so that I could experience and discover» (P5).

Negative feelings and emotions

On the other hand, the heavy emotional and physical burden imposed on students would cause negative feelings. Nearly all participants indicated they experienced fear, disappointment, helplessness, nervousness, distressfulness, emptiness, and victimization. A participant stated: «Early on, fear and anxiety of the unknown rippled through us. What would ultimately happen? I was afraid that my lack of knowledge would harm my patients» (P17).

The use of personal protective equipment led to some negative feelings. A student said: «It was so warm inside the protective suits that it would get on your nerves» (P10).

Few participants did not wish to be involved in wards with COVID-19 patients and had a sense of being victimized. One said: «We felt why did we have to be put forth without adequate protection like sacrificial meat?» (P2).

Some negative feelings experienced by medical students were related to the nature of transmission of the disease and its social aspects. By implication, they referred to social isolation, concerns about getting sick and transmitting the disease to others and being stigmatized.

«I don't dare to be near my family in my own house, let alone be near people in society. At home, each person closes their door and stays in their room. I'm worried about getting them infected» (P17).

«I felt that my job had forced me to isolate myself from everyone. You know, I used to always be out with my friends or family, but I haven't seen any of them since dealing with COVID-19. Of course, because of our line of work, others are scared of being close to us and avoid us as they don't want to get infected» (P6).

Encountering catastrophe

The COVID-19 pandemic was an unexpected catastrophe for many healthcare organizations worldwide. Medical students, as members of the health team, were faced with unprecedented challenges.

The categories extracted from this theme were (i) being confronted with a lack of equipment and disorganized management and (ii) working in turmoil.

Being confronted with a lack of equipment and disorganized management

Medical students were faced with numerous shortages in management and equipment preparation, particularly during the first wave of the pandemic. Examples included a lack of protective facilities and equipment, inadequate management for equitable distribution of facilities, lack of thorough disinfection of the dormitories, and lack of disease management guidelines. A participant said: «Early on, there weren't enough masks and gowns. We did not have a centralized oxygen system and constantly had to ask the auxiliary staff to move oxygen capsules around to deliver oxygen to the patients» (P19). One medical student stated: «Our dormitories weren't disinfected regularly enough. We had to do it ourselves despite all the fatigue from our shifts» (P14).

Most participants highlighted the lack of management guidelines for patient care. «Initially, there were no clear guidelines on how to deal with patients. We would put all those suspected of having the disease near each other, meaning that a patient with even the slightest possibility of having the disease would be kept around others in the ward and would test positive like nine days later» (P15).

Working in turmoil

Following shortages in equipment, disorganized management, and the mysterious nature of the disease, medical students experienced work in a state of great confusion, disturbance, and uncertainty. Contributing factors included the ambiguity of various aspects of the disease, curriculum changes, clutter, a high workload, and inadequate experience. A participant stated: «The disease was unknown in many ways. We were working without being aware of the method of transmission, treatment, and disease course in different people» (P13). The other participant said: «The rounds were no longer for teaching purposes. Early on, we weren't even provided with a proper program for online classes» (P3).

Attempting to adapt to unpleasant conditions

Gradually, medical students tried to increase their capacity to adapt to the disaster and its consequences in all parts of their individual and professional life. They adopted two approaches: individual efforts to adjust and attempting to resile as a professional.

Individual efforts toward psychological adjustment

In the face of all the challenges and hardships, all students had developed approaches to adapt to the new circumstances like keeping themselves busy, psychologically supporting each other, undertaking their favorite activities, and expressing their emotions. A participant stated:

«We would talk, start discussions, or joke around and laugh. We would try to give each other [positive] energy. We had each other's backs. We would try to save ourselves from fear and depression by talking to one another» (P11).

Another one remarked: «Many of us would lose it in the middle of a shift and start crying; maybe the tears would provide us with some relief» (P6).

Attempting to resile as a professional

As time went on, health authorities, healthcare teams, and medical students attempted to overcome their shortcomings through professional routes. After the formation of the National Corona Disease Management Headquarters, written plans for the treatment of patients were provided, and medical students tried to obtain more information about disease management. Most of them implied:

«Protocols for disease management gradually became available. I would participate in webinars in which professors explained the principles of treatment and diagnosis. Every day I tried to update my knowledge about the disease» (P9).

They also tried to positively view changes in their educational curriculum as a new learning opportunity. A participant expressed: «Online classes were short but beneficial and educational. They were recorded so those who didn't grasp a concept could watch the recording later on, as could those who missed the class» (P16).

Active participation in COVID-19 wards led medical students to pay more attention to professional interaction, strengthen doctor-patient relationships, and empathize with patients. A participant stated: «I didn't pay much attention to the psychological state of routine [non-COVID-19] patients. For example, if we had a COVID-19 and a non-COVID-19 patient, the COVID-19 patient would be more important to me, both as a source of the virus and as a sick and psychologically frail person. Usually, I wouldn't get so involved with my patients» (P14).

DISCUSSION

The present study demonstrated that medical students who participated in this study were exposed to certain difficulties and challenging occupational conditions during the COVID-19 pandemic. Our main findings consisted of three substantial themes that emphasized emotional challenges, pandemic-related encounters, and adaptation to difficulties. Numerous medical students experienced paradoxical feelings. On the one hand, due to the sense of duty and responsibility, they battled COVID-19 and served patients, feeling like a hero. On the other hand, due to the contagious nature of the disease and its unknown transmission routes, they feared affliction and were also concerned about their colleagues and families. In addition, owing to the ambiguity of the new infection and management modalities, the students felt incapable of dealing with the pandemic. This issue was also rooted in inadequate training about COVID-19 and its management strategies. Overall, negative feelings were dominant in the early phase of the pandemic, and positive emotions gradually appeared over time.

These findings are consistent with those of Sun et al.'s study on the psychological experience of caregivers while taking care of COVID-19 patients. This study also revealed that caregivers experienced negative feelings like fatigue, fear of viral infection, and anxiety due to lack of enough knowledge and environmental alteration besides positive emotions. Growth under pressure, increased gratefulness, and feeling more responsible were also mentioned as benefits of taking care of patients during the pandemic. This study also emphasized the gradual appearance of positive emotions (19). In contrast, there are some reports that are mainly focused on psychological trauma and negative feelings rooted in encountering the pandemic (20-22). For example, the study of Liberati et al. highlighted negative emotions such as distress and burnout experienced by mental healthcare workers during the pandemic. These feelings were mainly rooted in challenging dilemmas associated with more complex clinical responsibilities and insufficient organizational support (14).

Many challenges existed during the pandemic. As young healthcare providers, medical students did not have enough knowledge and experience to deal with the situation. The students under study mentioned that the lack of an organized educational curriculum during the outbreak led to a gap in medical training. Another problem rooted in improper pandemic management was the lack of considering isolation policies. Sometimes, due to insufficient COVID-19 ward beds, some COVID-19 patients were kept with other patients in non-COVID-19 wards. Besides, some patients themselves would not adhere to isolation protocols. These issues caused a delay in the control of the outbreak. Setting strict rules about the isolation of COVID-19 patients and training them can solve this problem. Some challenges like lack of enough protective equipment mostly existed in the initial phase of the pandemic when the healthcare system was not completely prepared.

Students also mentioned the difficulty of using the protective devices for several hours. This finding is consistent with that of Ardebili et al., who highlighted the hardship of using protective equipment during the pandemic (23).

Ambiguity and turmoil where other challenges as the medical students did not have any insight into the nature of the disease and lacked experience working during disasters. As mentioned earlier, they were also concerned about the future of their education. Ardebili et al. also discussed the contradictory information from different sources, frequent changes of protocols, and unclear prevention and treatment methods. He stated that these factors might lead to ambiguity during the pandemic (23).

Adjustment to a new disaster through proper coping measures has a crucial role in psychological rehabilitation, requiring both individual efforts and social support (24,25). Epidemic pressure may stimulate medical students to use psychological defenses to adapt to the changes (19). In our study, the students adopted humor, conversations, hobbies, and crying as different ways to alleviate stress. In line with our findings, caregivers tried to reduce their stress levels and adapt to the new difficult situation through mindfulness, meditation, music, and relaxation (19). The study of Munawar and Choudhry suggested that appropriately managing emotions through limiting media exposure, minimizing the sharing of details related to COVID-19 duties, and coping through religiosity can persuade healthcare workers to continue working despite difficulties and discomforts (26).

The present study also indicated that medical students encountered many barriers to clinical learning at the start of the COVID-19 pandemic. They felt awkward and inessential due to the lack of skill and experience in providing care to COVID-19 patients. This resulted from a gap in the educational curricula regarding COVID-19 diagnosis and management. Through time, they attempted to resile as professionals by seeking more information about the disease, taking advantage of new learning opportunities, and paying attention to professional interactions. These findings were consistent with those of the study of Nolan and Owen on exploring the experiences of medical students during the COVID-19 pandemic. In that study, the researchers described that medical students could overcome learning barriers and form their professional identity after a period of feeling disoriented or incapable of facing the new condition (6). Academic and psychological support can prepare medical students to encounter the pandemic (27). Consistent with Khalil et al.'s study (16), some students mentioned the beneficial effect of online classes on their level of information and time management abilities.

Numerous studies have been published since the beginning of the COVID-19 pandemic. However, most of the prevailing records deal with the working experiences of healthcare providers like nurses, physicians, and auxiliary staff. Few articles explore medical students' experiences during the pandemic, most of which were conducted in developed countries. According to the fact that available resources in these countries are different from those in less developed countries, the experiences of medical students in the pandemic may be different. The strengths of this study lie in clarifying medical students' educational and working experiences in one of the developing countries during the pandemic.

Several limitations of this study need to be acknowledged. First, due to the nature of the outbreak and the prevention and control guidelines and protocols, we could not perform face-to-face and focus group interviews with medical students. The interviews were conducted via telephone calls that may not be effective enough for interviewers to understand the interviewees' mood and body language. Secondly, according to qualitative research characteristics and the limited sample size, the results cannot be generalized to the whole population of medical students.

Additionally, this research was done during the first peak of the COVID-19 pandemic. Hence, the study explored medical students' experiences at that time, and findings may not be a good indicator of the students' experiences and perceptions during the subsequent peaks.

Finally, the current research exclusively focused on the medical students involved in clinical settings, and the experience of others in lower educational years with less exposure to the clinical environment may be totally different. More long-term studies using in-depth analyses should be

conducted in the future to bring more insight into medical students' experiences during the various waves of the COVID-19 pandemic.

CONCLUSION

In conclusion, medical students as healthcare providers were affected by some adverse experiences while learning and working during the first peak of the COVID-19 pandemic. They did not have enough knowledge and expertise to deal with disasters like the COVID-19 pandemic. Their experiences consisted of an emotional paradox, encountering catastrophe, and adapting to the unpleasant conditions. Coping with all these mentioned items requires special skills that must be transferred to the trainees. The findings of this study clarify the areas that should be targeted for medical students' support during this pandemic and future disasters. Design of an organized pandemic response plan for medical students is recommended in various aspects of education, patient care, and coping skills for future pandemics.

CONFLICT OF INTERESTS

None to declare.

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