“Every day that I stay at home, it's another day blaming myself for not being at #Frontline”–Understanding medical students' sacrifices during COVID-19 Pandemic

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"Every day that I stay at home, it's another day blaming myself for not being at #Frontline"–Understanding medical students' sacrifices during COVID-19 Pandemic

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Abstract
COVID-19 struck the world and stretched the healthcare system and professionals. Medical students engaged in the pandemic effort, making personal and professional sacrifices. However, the impact of these sacrifices on students` professional development is still unknown. We applied constructivist grounded theory to individual audio diaries (total time = 5h38 min) and interviews (total time = 11h57min) performed with 18 last-year medical students during the first wave of COVID-19 pandemic in Brazil. The perspective of making sacrifices caused initial emotional distress in medical students, followed by a negotiation process revolving around three themes: predisposition to sacrifice, sense of competence, and sense of belonging. This negotiation process led to three response patterns: Pattern A: "No sense of duty"–the sacrifice was perceived as meaningless, and students showed intense anger and a desire to flee; Pattern B: "Sense of duty with hesitation to act"–the sacrifice was acknowledged as legitime, but students felt unprepared to contribute, leading to feelings of frustration and shame; and, Pattern C: "Sense of duty with readiness to act"–the engagement with the sacrifice was perceived as an opportunity to grow as a doctor, leading to fulfillment and proudness. Students ready to engage with the COVID-19 effort experienced identity consonance, reinforcing their professional identities. Students who felt incompetent or found the sacrifice meaningless experienced identity dissonance, which led to emotional suffering and the consideration of abandoning the course. Monitoring students' emotional reactions when facing professional challenges creates opportunities to problematize the role of sacrifice in the medical profession and scaffold professional identity development.

Keywords Identity formation · Professional development · Undergraduate medical education · Qualitative research

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Introduction

Since 2019, COVID-19 successive cases waves burden the healthcare system and its devoted professionals (Guan et al., 2020; Wang et al., 2021). Although facing the COVID-19 pandemic in the frontline may bring professional fulfillment to healthcare workers (Johnson & Butcher, 2021; Royal Collage Of Physicians, 2020; Simons & Vaughan, 2020), it can also trigger higher levels of distress (Kisely et al., 2020; Lai et al., 2020; Pollock et al., 2020) and increase the risk of getting infected and sometimes becoming critically ill (Shanafelt et al., 2020). Medical students also joined the COVID-19 effort, taking up diverse roles with different levels of exposure and risk, often making personal and professional sacrifices. However, we still do not understand how medical students deal with and make sense of the sacrifice related to engaging in the COVID-19 pandemic effort. The existing literature on students' involvement in the pandemic is still mainly quantitative, survey-based, and the medical education field could benefit from more nuanced, qualitative understanding. For instance, realizing how students deal with and make sense of the sacrifices related to the pandemic may provide medical educators with insights to improve educational strategies to support students` professional development and guide educators in similar situations in the future.

The COVID-19 pandemic challenged healthcare professionals worldwide to stand up and engage in unprecedented sacrifice (Aschwanden, 2021; Wang et al., 2021). Risking becoming sick, working extra hours, dealing with the scarcity of resources, and self-isolating from loved ones are examples of sacrifices embraced with courage, responsibility and commitment (Rosenbaum, 2020). The pandemic also unsettled undergraduate medical education, raising new challenges for both educators and students (Balanchivadze & Donthireddy, 2020; Eva, 2020; Lapolla & Mingoli, 2020; McCullough et al., 2020). Initially, students were, in general, removed from clinical activities because of their potential for being infected or spreading the contamination (Long et al., 2020; Rasmussen et al., 2020; Soled et al., 2020). However, in different countries, medical students' role in the pandemic gradually changed, and they became part of the pandemic task force (Klasen et al., 2020; Rose, 2020; Tempski et al., 2021). This call to help with the pandemic effort imposed sacrifices to medical students similar to those imposed on healthcare professionals.

Sacrifice in medical education

The Cambridge dictionary defines sacrifice as "an act of giving up something valued for the sake of something or someone else regarded as more important or worthy" (Cambridge Dictionary, 2021). Sacrifice has a multidimensional nature and has been the subject of study in several academic areas, each contributing with a different perspective to its understanding (Florczak, 2004; Lambek, 2014). Theologians recognize the crucial role of sacrifice in many religions, such as Judaism, Christianism, Muslimism, and Hinduism, as a way to connect with God or the sacred (Florczak, 2004). Sociologists and anthropologists explore how many societal groups use sacrifice as a rite of passage or an asset to feed the interconnectedness of members and sustain membership (Mayblin & Course, 2014). Most psychological theories understand making personal sacrifices as a process of moving away from the comfort zone towards achieving personal development and maturity (Lambek, 2014). However, medical educators still debate the role of sacrifice in the realm of medical practice and have different views on the role of sacrifice in students' professional

development (McCullough et al., 2020; Nistelrooy, 2014; Rose, 2020; Tempski et al., 2021).

Historically, practicing medicine involves assuming the burden of exposing oneself to the risk of getting sick and an implicit acceptance of personal sacrifice (Florczak, 2004; Lambek, 2014; Nistelrooy, 2014). Many medical educators and practitioners consider the disposition to sacrifice as a cornerstone of the medical profession (Cruess et al., 2016; Nistelrooy, 2014; Ritchie, 1988). They believe that sacrifice in the format of altruism is a virtue present already in the Hippocratic oath, and medical educators should embrace and even encourage professional sacrifice during medical training (Wicks et al., 2011). Those authors argue that when a physician is caring for a patient, there is always a degree of self-sacrifice in order to prioritize patients` needs and interests over her/his own (Nistelrooy, 2014). Following this line of thought, the moral duty to help needs to prevail over doctors' personal interests (Post et al., 1995) to achieve patient-centered care.

Many medical educators, however, claim that this call to sacrifice may inadvertently become an idealization of sacrifice, which may alienate doctors from their own motivations and beliefs, bringing negative consequences for doctors' physical and mental health (Johnson & Butcher, 2021; Jones, 2002). These educators believe that when sacrifice is idealized, students and doctors alike risk ending up feeling insufficient and, consequently, frustrated, invaded by feelings of low self-esteem, burnout, and compassion fatigue (Bishop & Rees, 2007). For instance, this culture of sacrifice may drive doctors to embrace excessive workload and accept sub-optimal work conditions (Bishop & Rees, 2007; Johnson & Butcher, 2021; Rosenbaum, 2020). According to this view, doctors need to prioritize their own well-being to be able to take care of others (Bishop & Rees, 2007; Cox, 2020; Rosenbaum, 2020; Sarkar & Cassel, 2021).

Aim

By combining the two arguments, it is reasonable to assume that sacrifice in medicine can both drive to connection with patients and the profession (Florczak, 2004; Nistelrooy, 2014), and also trigger emotional suffering and detachment (Nakatsu, 2021). We believe that the COVID-19 pandemic offers an opportunity to explore how medical students deal with and reflect on the idea of sacrificing themselves for the benefit of patients and society. Understanding students` processes of making sense of the sacrifice related to engaging in the COVID-19 pandemic effort may both shed light on the role of sacrifice in the medical training and also offer insights on how pedagogical approaches could scaffold students` personal and professional development when dealing with situations related to perceived self-sacrifice.

Methods

Study design

This is a qualitative study performed under a constructivist paradigm, which means that we acknowledge reality as a plural and subjective construct born within a certain context. We used constructivist grounded theory methodology to guide the collection and analysis of a data set comprised of last-year medical students' audio diaries and individual interviews (Kennedy & Lingard, 2006; Monrouxe, 2009; Tai & Ajjawi, 2016; Watling & Lingard,

2012). Consistent with this methodology, we collected the audio diaries, scheduled the interviews, and analyzed the data iteratively so that data analysis informed data collection and vice-versa (Watling & Lingard, 2012; Watling et al., 2017). This study received ethical approval from the research ethics committee of the State University of Campinas (CAAE:36,882,620.3.0000.5404).

Study context and participants

We carried out this study with last-year medical students from one school in Brazil. In the Brazilian context, undergraduate medical training lasts six years. The last two years are clinical, and medical students have daily responsibilities in the direct care of patients. It is worth noticing that recently graduated physicians in Brazil are allowed to work autonomously in primary and emergency care, both areas directly involved in the frontline of the COVID-19 effort. We collected the data in a public university connected to a Brazilian public hospital that provides tertiary care for a population of six million inhabitants (Hospital de Clínicas da Unicamp, 2022). This hospital operates in an overcrowded and low-resource context. During the pandemic, it became a reference center for COVID-19 care, which increased demand and reduced the availability of already low resources. Over the study, it recorded 36.614 COVID-19 cases with 593 confirmed deaths (Hospital de Clínicas da Unicamp, 2021).

During this study, medical students' engagement with the pandemic effort had different phases. Initially, Brazilian medical schools discontinued onsite practical activities, which were replaced by lectures and small group sessions in an online environment. During this initial period, students could: (a) volunteer to work with telemedicine initiatives related to COVID-19, (b) engage in practical activities with COVID-19 patients in temporary field hospitals created to deal with the overflow of patients, or (c) participate solely in the online activities. As the pandemic grew, some medical schools, including the one where this study was conducted, resumed curricular clinical activities and senior students had to participate in the mandatory practical activities at the university hospital and primary care facilities, where the exposure to COVID-19 patients was inevitable (Legislativa, 2021; Tempski et al., 2021). We did not observe an impact of the nature of the activities (volunteer x mandatory) on students' internal negotiation process.

Recruitment

DLR, the first author, who worked in the frontline supervising medical students, contacted class representatives directly and explained the research plan and objectives. The class representatives shared the information about the project with the students. The ones interested in participating contacted DLR by phone or email. The research team purposefully included students of different ages, genders, and socioeconomic backgrounds. The selected students received the instruction as follows: "We invite you to record audio diaries about the experiences you are living during the pandemic. We are particularly interested in the daily incidents involving choices about whether or not to participate in practical clinical activities related to COVID-19. We would like you to share your thoughts, doubts, and feelings and how they affect your professional development. During this period, I will schedule an interview with you to talk about your experiences."

Students were free to send as many audio diaries as they found relevant and were interviewed during the data collection period (March-December 2020) by DLR. The interviews

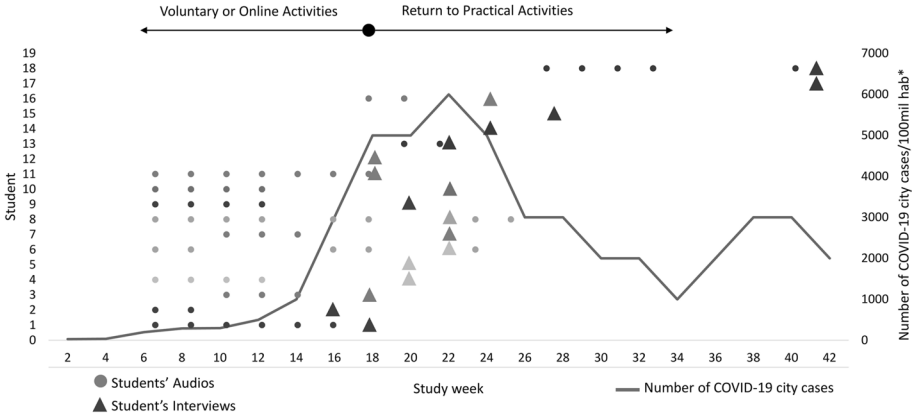

Fig. 1 Audio diaries and interviews of medical students during the first wave of the COVID-19 pandemic in Campinas. Campinas State University, Campinas, Brazil, 2020

and audio diaries were collected throughout the first pandemic wave (Ministério da Saúde, 2021; Secretaria Municipal de Saúde, 2020), as shown in Fig. 1.

As the research group realized that students had different perspectives, emotional reactions, and attitudes about their participation in the pandemic effort, DLR purposefully recruited new participants to cover different behaviors and emotional reactions. The fact that DLR had daily contact with students during the clinical work helped in this matter.

Data collection and analysis

Eighteen medical students participated in the study, resulting in 89 audios (average of 4.94 audios per student) with a total time of 5h38min and 18 interviews with a total time of 11h57min (average of 40min23sec per student). The students recorded the audios and sent them to DLR through a storage cloud or smartphone messages (by their choice). DLR transcribed and anonymized the audio files before sending them to MACF and DS. The interviews happened through videoconference and were recorded and transcribed verbatim without identifying data.

The audio diaries were intended to capture students' immediate reactions when confronted with the idea of participating in the COVID-19 effort. These diaries were collected throughout the first pandemic wave and included the period when students had to migrate from voluntary work to mandatory clinical activities.

At the time of the interviews, the research team had already collected and analyzed some of the audio-diaries transcripts. The concept of "sacrifice" appeared spontaneously and remarkably. Thus, in the interviews, DLR (a) examined how the pandemic fluid context (as governmental institutions and the university were making constant decisions to adapt to the ever-changing pandemic reality) was affecting students` personal and professional lives, (b) invited them to deepen their reflections (already started in the audio-diaries) on the sacrifice they were making individually and as a group, searching for the "why," "what," and "how"; and (c) explored the experiences narrated in the audio diaries, inviting students to make sense of these experiences. The interviews were also spread along the first pandemic wave to capture different moments and contexts and allow researchers to explore the nuances of this complex social process.

DLR was responsible for collecting the data. DLR, MACF, and DS analyzed the data iteratively and constantly compared new data and interpretations with previous assumptions and understandings, an approach consistent with the grounded theory methodology (Kennedy & Lingard, 2006; Tai & Ajjawi, 2016; Watling & Lingard, 2012). First, DLR, DS, and MACF read the initial audio diaries transcripts in detail, interpreting and identifying the first codes related to understanding how students were dealing with the COVID-19 pandemic. They met weekly to compare the codes in a process that allowed the addition, subtraction, or transformation of the codes. The first audio diaries' analysis allowed the research team to reflect and elaborate on the topics to address in the first interview. However, during the interview, DLR was thorough in keeping the conversation open, adopting an active listening attitude, constantly elaborating the following question from the perspective of the last answer.

Next, the same three authors read the first transcribed interview individually and coded it line by line. In a group discussion, the authors compared their interpretations to reach a consensus on the initial codes. Then, these researchers returned to the audio diaries to elaborate further on their coding process and contrast assumptions and understandings.

After the first interview, data analysis and collection went on in cycles that followed the structure: transcribing and coding the new audio diaries, elaborating on the interview protocol, coding the interview transcript, re-checking the audio diaries, and refining the coding. After each cycle, the researchers engaged in meaning-making and insightful discussions to elaborate on the elements, context, mechanisms, and relationships in place when students were dealing with the idea of sacrifice related to the COVID-19 pandemic. The codes and selected quotations were translated to English and shared with DJ so she could engage in the discussion. DJ, who comes from a different cultural background, helped the authors to make strange what was already taken for granted, enriching data analysis. DLR used a logbook to register discussions and insights and keep track of the process. The research group meetings were recorded to allow further reflection on the ideas, interpretations, codes, and diagrams, aiming to create meaning at a conceptual level. Along this process, the research team aligned the codes into themes, which were elaborated further at a theoretical level, generating the diagram shown in Fig. 2. Following information power theory in qualitative research, the researchers decided to stop data collection after the first pandemic wave when the data generated through the analysis and theoretical interpretation of audio-diaries and interviews conveyed sufficient information to construct new knowledge to answer our research questions (Malterud, 2012; Malterud et al., 2016; Morse, 2015; Varpio et al., 2017), i.e., we stopped data collection when we could comprehend the complexity of the student's emotional reactions, internal negotiation processes, and response patterns concerning the sacrifices made during the pandemic first wave.

Research group and reflexivity

The debate about sacrifice may inspire passions and pre-conceived ideas about what is "right" and what is "wrong" or, even, what should be expected from a doctor or medical student. For instance, frontline health care professionals may take the willingness to sacrifice for granted and negatively judge students who hesitate in engaging in the pandemic effort. With this in mind, we understood that we needed a diverse group capable of bringing different perspectives to this discussion.

DLR is a general clinical practitioner who worked in the emergency room in the frontline at the same institution where data was collected. He brought an insider view

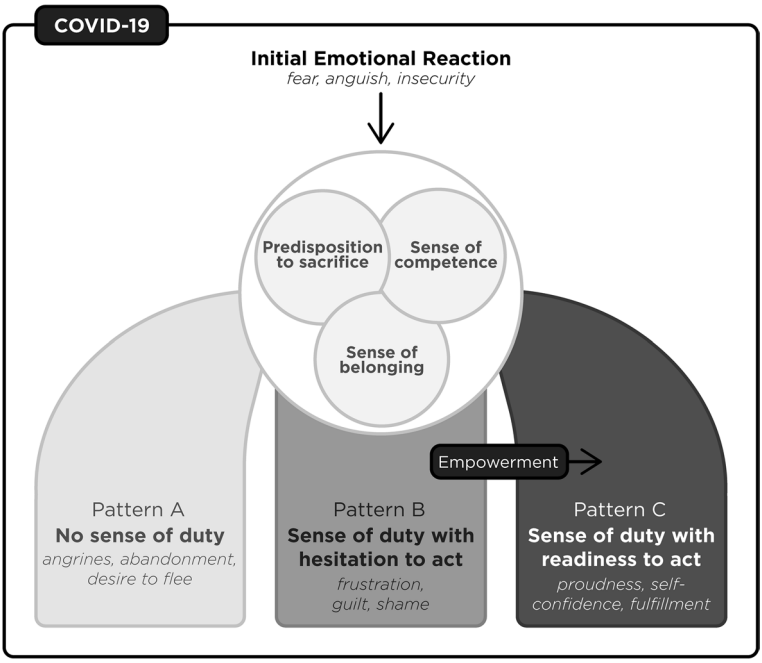

Fig. 2 Medical students' responses when facing sacrifices in COVID-19 pandemic. Campinas State University, Campinas, Brazil, 2020

tempered by his own sacrifices during the pandemic and his expectations as a clinical supervisor. DS is a psychologist and bioethics professor in the same institution with a particular interest in identity and moral development. She offered a non-clinical perspective and helped modulate the debate by pointing out the blind spots of the physicians. DJ is an experienced medical education researcher and has a different cultural background. She helped the group fine-tune data analysis to identify the most relevant contributions to the field and expand group insights on the general idea of sacrifice—a phenomenon deeply influenced by culture. Finally, MACF is also an emergency physician who has worked for fifteen years in the emergency department of the same institution as a clinical teacher but who went through a career change during the last five years, when he gave up clinical activities to become a medical educator and qualitative researcher full time, with a particular interest in medical students´ transition to practice. He did not engage in the pandemic effort as a clinician, which allowed him to combine the clinical and educational perspectives.

It is worth mentioning that the data was collected in Portuguese (the native language of DLR, DS, and MACF). Pieces of the data, the codes, and the themes, were translated to English to allow DJ to engage in the data analysis. DLR, DS, and MACF, who are also fluent in English, guaranteed that the translations were faithful to the meanings conveyed, especially when metaphors, slang, or idiomatic expressions were used (Helmich et al., 2017a, 2017b).

Results

The participants' ages ranged between 20 and 27 years old, and fourteen were women. Among the eighteen participants, four reported having financial difficulties, and at least six reported having no financial restrictions. We did not notice any connection between these different backgrounds and participants' narratives.

The frequent use of sarcasm, metaphors, and swearwords suggested that recording the audio diaries (quotations ending with the letter A) offered students an opportunity for catharsis and outbursts. The interviews (quotations ending with the letter I) provided complementary information by inviting students to deepen their reflections, which generated insights about their meaning-making processes.

In the following paragraphs, we will share our understanding of the mechanisms by which medical students make sense of the sacrifices related to the Covid-19. First, we describe the medical students' initial emotional reactions to the prospect of making sacrifices during the pandemic. Second, we elaborate on students' internal negotiation process that revolved around three themes (Predisposition to Sacrifice, Sense of Competence, and Sense of Belonging). Finally, we reflect on how this negotiation evolved to three different response patterns (A—"No sense of duty,", B—"Sense of duty with hesitation to act" and C -"Sense of duty with readiness to act"). These patterns involved attitudinal, emotional, and behavioral aspects, as show in Fig. 2.

Initial emotional reactions

Fear, sadness and anxiety were the first emotional reactions evoked by the perspective of making personal and professional sacrifices during the pandemic. The risk of getting severely ill or bringing the disease to their loved ones evoked fear. The perception of a global scenario of suffering brought sadness. The uncertainty about the fast spread of an unknown disease without any specific treatment, the initial lack of training to deal with this disease and the possibility of delaying graduation triggered high levels of anxiety. Moreover, this anxiety was particularly burdensome for students with a previous anxious personality.

> *ADA1I "I've always been an anxious person. In this quarantine, it is something that I have seen as a pattern for all my 6th-year friends. Everyone who already had some anxiety went crazy at some point. This thing… like, you do not know how your last year of graduation will be; you do not know when you will graduate. It is not only the graduation. But also, the fear: Do I have asymptomatic COVID? Will my mom get COVID and die? And sadness too, because all this suffering is terrible. I feel sorry for the (medical) residents who got sick…"*

After this initial reaction, students started an internal negotiation process to figure out whether they should or should not engage in making personal and professional sacrifices to embrace the effort to fight COVID-19. As the same student said:

> *ADA1A6 "I know that many people are terrified with the possibility of getting coronavirus, of getting sick, of dying… Anyway, I felt as if having to make a choice between my family, my boyfriend and doing something that I feel is my duty, you know?"*

In the next paragraphs, we elaborate on how this negotiation unfolded around three main intertwined themes (Fig. 2).

Themes

Predisposition to sacrifice

Some students recognize sacrifice as a core element of the medical identity. These students started reflecting on the role of sacrifice in medicine even before entering medical school and often came from families who embraced making sacrifices to help others as a paramount moral or religious value. In fact, this willingness to sacrifice was nurtured by students` social interactions inside and outside the medical realm. These students considered making sacrifices a source of meaning, fulfillment, and even joy.

> *ADA5I "...oh, I think I have always learned that I need to get involved with what is going on. That I need to be useful. That I need to be proactive and help people. My father always gets involved with social matters, and my mother is a teacher. So, I was raised like that. There is also the religion I chose and I practice. My faith, the things I believe, all that influences my decision about what I should be doing in a moment of crisis. I want to be useful."*

This readiness to accept sacrifices helped students face complex and challenging situations related to the decision of engaging with patient care during the pandemic, such as isolating themselves from their families, abdicating from caring for sick relatives, or not going to funerals of loved ones. Choosing to embrace their professional duties while not being able to care for their families in these challenging times was particularly painful to those students.

> *ADA4A4 "... but also, I get really scared about getting sick and infecting people in my family, right? So, as I'm taking shifts in the emergency department and helping in the field hospital, I had to leave home because my father is old and my mother takes care of her mother, who has Alzheimer [...] I'm already two or three weeks away from home ... But this situation is very difficult."*

Some students did not recognize sacrifice as a core element of the medical profession. This group felt betrayed and treated unfairly when asked to engage with patient care during the pandemic as if they had received an "unexpected request". This group also pointed out a gap between society's expectations about how doctors should embrace sacrifice and the inadequate working conditions they face in the healthcare system, such as the high workload and lack of resources and structure. Besides, these students believe that the idealization of sacrifice is an instrument to sustain a paternalist and oppressive culture in which doctors, particularly the newcomers, have to accept the status quo without complaining. The perspective of being obligated to make (perceived) meaningless sacrifices generated anger and was so painful that some students considered giving up medical school. These students do not accept the idea that doctors are saviors or selfless heroes.

> *ADA8A2 "I have been reflecting a lot about the profession I chose, and more and more, I am sure that this is not my place. Being a doctor, for me, is not a vocation. It is not awesome. A doctor is a worker, a factory worker, like any other. There is nothing noble that you should be so grateful for. There are earnings, sometimes much more than one should have. There are no special places for doctors in heaven. I kept*

thinking that these noble and deified thoughts (about being a doctor) end up making doctors risk their lives. This devotion in moments of crisis does not fool me. For me, it is only food for the doctor's Ego fantasy."

A third group of students manifested an ambiguous attitude towards sacrificing during the pandemic. These students felt an urge to help and perceived the value of sacrificing themselves. Still, they could not transform this inclination into a concrete action because they were afraid of getting sick and not being prepared as doctors. Students in this group perceived their hesitation as a lack of resolution, which generated frustration and sadness, together with feelings of low self-esteem. Those hurtful emotional reactions were still latent during the interviews, and some students cried spontaneously or stopped talking abruptly.

ADA1A9 "I talked a lot about it with my friend, about what were the reasons I would not volunteer. Staying in the hospital twice a week with a few patients (with covid-19) and feeling the fear of bringing home the disease. And I'm not in my best mental health at this moment. I'm very anxious... and so far, I'm still not comfortable with my decision about not volunteering. I thought going wouldn't do me any good, but I'm feeling guilty about not going..."

Sense of competence

Some students felt competent to engage in patient care and were excited about the possibility of helping. They believed there is always something that one can do to help, regardless of one's skills level. Indeed, they mentioned they could establish a good doctor-patient relationship, gather relevant clinical information, conduct an efficient physical examination, develop a coherent diagnostic workout, and build up a structured therapeutic plan—all relevant competencies for taking care of COVID patients. They tried to seize the opportunity the pandemic offered to deepen their learning. They engaged in the care of as many patients as possible, optimizing the learning opportunities born from the contact with patients, residents, and supervisors. They also tried to participate as much as they could in clinical procedures. Feeling competent to engage in patient care brought those students professional fulfillment and a sense of purpose, making them proud of themselves.

ADA16I "I knew I had little time and that I had to absorb as much as I could in those days (of dealing with COVID patients). I was at the resident's feet: "What are you seeing? What do you think of the residency? This case … Show me the EKG! How is it? What should we do? What is the dose of this medication?" The whole time I was imagining it as if I was taking the lead [...] I wanted to stay longer. The fact that we have less time makes us waste no time: any patient who arrives, you go there, see, talk, so that you can really learn there. And you learn a lot there."

Students who judged themselves incompetent to engage in clinical care felt insecurity, fear, and low self-esteem. The lack of practical experience to perform complex procedures such as orotracheal intubation or central line placement froze those students. It prevented them from feeling confident to provide medical care during the pandemic. Worth noticing is that they mentioned that supervisors did not expect students to perform such complex procedures. These students did not see the pandemic context as conducive to learning and felt angry when called to join clinical care.

ADA6I "A big concern I have this year, I think it should be for every medical student, is technical skills. I keep thinking that I'm very incompetent technically. I still need to learn a lot, and I feel very insecure about going into professional life. And especially at the beginning of the quarantine, I felt very anguish with that... I thought "I didn't pass through the anesthesiology (rotation) yet, so I've never performed an orotracheal intubation in my life"

Sense of belonging

Feeling part of the medical community motivated students to engage in the pandemic effort while feeling an outsider demotivated them. This sense of belonging to the medical community happened in three different but complementary spheres. First, for some participants, being a medical student during the pandemic created a sense of connection with all the students facing the same challenges and making the same sacrifices around the country and the globe. Next, some students also felt connected with the residents mobilized 'to fight' the pandemic, often migrating from their regular placements to COVID-19 observation units, helping in clinical activities different from their field of expertise. Finally, a group of students felt proud of belonging to the community of healthcare professionals in this unprecedented time. Feeling part of these groups nurtured students with courage. Also, these students felt that being part of the medical community and not volunteering to help would not be fair to their colleagues, especially in circumstances where health professionals were risking their own lives to protect others.

ADA13I "The residents are very overloaded, and they don't have a choice. So, as I had the option to help, I said "I'll help!". So, they (the residents and healthcare professionals) are working because they don't have a choice, but I have the option, I will work, I'll help, I think any help in this situation helps a lot."

On the other hand, some students felt isolated, abandoned, and did not identify with any of those spheres (medical students, residents, or health care professionals). Those students felt excluded or neglected most of the time, often referring to the medical community as "them"—a distant group they did not belong to. Besides, when they felt excluded from the decision-making process about their training activities during the pandemic, it reinforced their outsider stance.

ADA2A2 "You hear everywhere: "Ah, doctors are heroes! They are the front lines! What a wonderful profession!" And several friends are saying that they feel they have a duty to do something as a medical student, saying that they must do something... Then there's a report that medical students are doing volunteer work, saying: "Look, that's awesome!" And everyone says, "Wow, that's perfect!" And in my chest, I don't feel any of that, you know?"

Synergy among the predisposition to sacrifice, sense of competence, and sense of belonging

The themes mentioned above range in a spectrum of intensity and are interconnected reinforcing or hampering each other. Students who mentioned a predisposition to sacrifice were the same who felt competent to help and saw themselves as members of the medical community. Students who did not embrace the idea of sacrificing also felt incompetent and

outsiders. In-between, there was a group of students with an ambiguous attitude. After the negotiation around these themes, students came to a one-off decision-point related to their 'duty' as a doctor, showing three distinct response patterns (Fig. 2).

Students response patterns

Pattern A—no sense of duty (Angriness, Abandonment, Desire to flee)

Students with pattern A could not find meaning in helping with the pandemic effort and even considered it wrong. For these students, their lack of clinical abilities would jeopardize patient care, and their presence in the front line would only increase the circulation of the virus. Moreover, they felt harassed by the health and educational system. They considered the idealization of professional sacrifice an instrument of intimidation to obligate doctors to work in conditions they consider psychologically or physically unacceptable. Those students expressed constant anger throughout the pandemic that varied only in intensity. They demonstrated sarcastic attitudes towards peers, doctors, other health professionals, and health care institutions. This lack of identification with the medical profession made them feel very uncomfortable in the doctor's role. They steadily manifested a desire to flee, even by abandoning medical school and training.

> *ADA6A/I "I thought, "I'm just a student. I shouldn't go to the front line". I don't know how to do an orotracheal intubation, I do not know how to prescribe medicines[...] I would have to be on the front line totally unprepared! [...] I came to a conclusion with myself that, at that moment, I was not needed […]And when the practical activities became obligatory again, it was such a suffering for me. And it made me angry too because it started to cross my mind: "They (the clinical teachers) are definitely forcing us to come back." And then, there's a mix of feelings like anxiety and anger that it's been tough to deal with in the last two weeks."*

Pattern B—sense of duty with hesitation to act (Frustration, Guilt, Shame)

Students with pattern B acknowledged the importance of helping and engaging in the pandemic effort but suffered to transform this disposition into concrete action. Although they volunteered for remote/online activities, they did not feel ready to participate in onsite clinical encounters during the pandemic. These students perceived this lack of readiness as a failure, which led to frustration, guilt, and feelings of shame. The shame was often so intense that some students avoided making eye contact during the interviews when sharing their initial decisions of not participating in the clinical activities.

> *ADA2A2 "I keep thinking of doing this volunteer work… We learn a lot there, with the experience and everything else… To do what I believe is expected of us as medical students, as almost graduated doctors... But I can't identify what I really want to do and every day I stay at home, it's a day blaming myself for not being there in the hashtag frontline […]for being useless while Brazil needs me"*

Empowerment—During our study, some students who started the pandemic with this pattern changed their attitude and progressively felt empowered to embrace the clinical activities due to their growing sense of competence and belonging. Gradually, as they were exposed to the clinical care of COVID-19 patients, they realized that their skills were

sufficient. In addition, getting closer to the health professionals strengthened their bonds, increasing their sense of belonging. They also understood how to minimize the risk of getting sick by adopting the necessary protective measures. In the end, these students made sense of the sacrifice, and the hesitation, insecurity, and frustration turned into proudness and fulfillment.

> *ADA11I "So, I created this confidence that I didn't have before of being able to deal with situations like this. And then, this gave me security for taking the risk of being inside the hospital. After we had all that demonstration of how to use the individual protection equipment, I said, "well, of all the people who can volunteer and who will bring benefits to this place, I can be one of them." Then I decided that I already had the self-confidence to be able to do the work, I already had the means, and I felt like it, so I said, "it's possible."*

Pattern C—sense of duty with readiness to act (Proudness, Self-confidence, Fulfillment)

Students with pattern C could transform the initial fearful and sad reaction into a disposition to act and help. Their acceptance of sacrifice as a vital element of the medical identity, associated with a strong bond with their peers and an internal disposition to make themselves useful, culminated in a readiness to help and engage in the COVID-19 effort. Whenever these students could play the doctors´ role, they felt excited, proud of themselves, and professionally fulfilled.

> *ADA1I "All right, there is not really a right and wrong, but there is my right and wrong. Like, what kind of doctor do I want to be? I want to be a doctor who will be there when the population needs it. I want to be a doctor in the public health system, I want to work for people, I want to do... I want my work to help in some way, you know?"*

Discussion

Our results shed light on how students dealt with and made sense (or not) of engaging in the effort to control the COVID-19 pandemic. First, we recognize that the perspective of making sacrifices during the pandemic led medical students to three different response patterns: no sense of duty, sense of duty with hesitation to act, and sense of duty with readiness to act. Second, we understood that making sense of such a sacrifice is an intensely emotional process that can either culminate in personal and professional fulfillment or feeling abandoned, angry and/or ashamed. Third, we realized that these responses could intensify or attenuate students' connection with the healthcare community. Finally, it become clear that such a sacrifice can be so stressful that some students feel the desire to flee and experience intense emotional suffering to the point of needing psychological support.

The impact of medical students' sacrifices on their professional identity formation

We believe that the sacrifices related to COVID-19 challenged students` professional identity. Our findings are aligned with Goldie's Identity Theory (Goldie, 2012; House, 1977). Goldie highlights the roles of social structure, an individual's personality, and the interaction

between them in professional identity formation (Côté & Levine, 2014). According to Goldie, integrating new professional identities into personal identities is a more straightforward process for people whose personal identities align with their new professional role (Goldie, 2012). However, individuals who encounter an incongruity between their personal values and the belief system of the chosen profession experience identity dissonance (Joseph et al., 2017; Monrouxe, 2010; Wald, 2015). Identity dissonance can lead a medical student to intense emotional distress, including uncertainties about their own values, ambitions, and abilities (Dornan et al., 2015; Holden et al., 2015). In addition, students with identity dissonance can develop dysfunctional coping mechanisms, such as cynicism and emotional detachment–in an extreme, they may drop out of the course (Costello, 2005; Dornan et al., 2015).

In our study, when students' values and beliefs drove them towards what the medical community understood as their professional duty, students experienced identity consonance (Goldie, 2012; House, 1977). In this case, engaging in the pandemic effort was rewarding and offered an opportunity for medical students to bond with the profession (Côté & Levine, 2014), peers, and patients, strengthening their professional identity (Goldie, 2013; Joseph et al., 2017; Monrouxe, 2010). Being capable of helping meant being ready to become a doctor, empowered to be "part of the group". This empowerment was also observed by Badger et al. (Badger et al., 2022), who registered that volunteering positively impacted medical students' well-being and professional identity formation. According to Badger, the "sense of belonging and pride in achievement are drivers of engagement in authentic workplace-based practices and therefore learning". Compton et al. (Compton et al., 2020) also pointed out that feeling part of the team influenced medical students' preferences to participate in clinical activities during the pandemic: "This is consistent with students' desire to be held to the high ethical standards of medical professionals and to be part of the medical team." However, students who experienced identity dissonance struggled to make sense of professional sacrifices and felt forced to adopt behaviors and attitudes perceived as meaningless or even harmful. These students felt powerless outsiders and experienced intense emotional suffering.

Extrapolating our data to other sacrifices related to the medical practice, we suggest that identifying whether sacrifices trigger identity consonance or dissonance is crucial to understanding what kind of support medical students will need.

Coming back to the debate about the role of sacrifice we addressed in the introduction, we believe that both the idealization of sacrifice and its avoidance may restrain open and clear discussions about this theme. Open, safe, and democratic discussions about the role of sacrifice in medicine are fundamental to support students during their developmental process of approaching, giving meaning, and dealing with situations where they have to give up something of value to connect with patients, the profession and themselves. According to Costello, 'integrating new professional identities into personal identities is an easy process for people whose personal identities are consonant with their new professional role, but traumatic for those whose personal identities are dissonant with it' (Costello, 2005).

Practical implications

Students' emotional responses are a thermometer that indicates whether they are experiencing identity consonance or dissonance

If educators manage to create a safe space for students to share their emotional responses, they will be able to identify students with different needs (Dornan et al., 2015). These

sensitive conversations should be facilitated by a mentor who is not a medical professional because it can be very challenging for doctors to set their own expectations aside when addressing issues related to elements close to the core of their professional identities (Vries-Erich et al., 2016), such as the role of sacrifice in the medical profession.

Students feeling proud and ready to sacrifice need to become aware of the dangers of compassion fatigue and need to learn about setting limits that respect their well-being (Bishop & Rees, 2007). Students feeling frustrated and ashamed, which often reflects a conflict between "what they want to do" and "what they feel ready to do," need support to come up with a plan to build up competence and self-confidence to engage in activities initially perceived as unachievable. Finally, students feeling angry, who cannot make sense of the challenges they have ahead, need time and space to engage in a more profound reflection about the profession, themselves, and their next steps (Dunn et al., 2008). These students would probably benefit from open conversations about medicine's different professional trajectories—trajectories with varying types of sacrifice and lifestyles. These conversations may enlighten their professional course, bringing comfort and hope. However, depending on the level of their suffering, these students may also need professional psychological support to deal with the career choices they have to face, even to reflect on the possibility of finding joy in a different profession (Dunn et al., 2008).

The trajectory to become a doctor is a collective enterprise but an individual journey

In the last years, educators in general and medical educators in particular have discussed the importance of individualizing learning trajectories to optimize students' development (Cruess et al., 2015). We believe that this individualization is also necessary for professional identity development (Joseph et al., 2017). Although medical students have similar educational and professional experiences along the medical course, their professional identities develop at a different pace and probably follow different pathways. The three patterns we identified are living proof of this heterogeneity. Interestingly, students initially hesitating to engage with the pandemic effort were able to adopt a more proactive behaviour when they had the opportunity to feel empowered by increasing their competence level. This transition towards agency suggests that these patterns are dynamic and may be influenced by contextual forces, such as educational interventions targeting the specific professional skills needed to deal with the sacrifices at hand.

Medical educators and clinical teachers should realize that students will make sense of the sacrifices according to their personal values and professional identity developmental stage. Discussing the meaning-making process around sacrifices may offer an opportunity to discuss professional identity development and personal fulfillment. As Picton recently suggested, students believe that there is a "cross-generational" and "underlying culture of self-sacrifice within medicine that could influence their work-life balance" (Picton, 2021). We hope this manuscript will contribute to the conversation about the role of sacrifice in medicine, going beyond the controversy about the "idealizating" or "demonizing" sacrifice, towards embracing the inherent complexity surrounding this topic.

Sacrifices in low-resource settings

We carried out this study in a middle-income country where physicians often work in understaffed teams, and frequently deal with the lack of structure, such as insufficient ICU

beds, mechanical ventilators, and specific high-cost medications. Health care professionals, including doctors, in this context, are exposed to increased risks of contamination by infectious diseases such as tuberculosis (Ibañez, 2015). The lack of personnel often oblige doctors to work extra hours, which culminates in higher levels of stress, burnout, and emotional detachment (Kruk et al., 2018). Although the sacrifice imposed by the pandemic is exceptional (Dreifus, 2020), because of the magnitude (worldwide healthcare system impact), the intensity (brisk and significant increase in mortality rates), and the time-frame (long-lasting pandemic), it shares similarities with sacrifices physicians encounter in low-income and middle-income countries (Ibañez, 2015; Kruk et al., 2018). Medical students who are in-training in low-resource settings face these sacrifices routinely, which may lead to moral distress and influence their professional identity formation (Helmich et al., 2017a, 2017b; Silveira et al., 2019).

Limitations

Although our study has strengths, we suggest some caveats. First, in the context of our study, students were mandated at some point to engage with the caring of COVID patients. If students had more autonomy and freedom to decide whether and how to face the sacrifice related to the pandemic's efforts, perhaps the findings would be different. For example, if students had more autonomy or ownership over the process of engaging with the pandemic effort, they could come up with individualized and tailored approaches, which would possibly evoke different emotional reactions and response patterns. Second, our study comprises the first pandemic wave period only, so we could not investigate how and if these response patterns changed (or not) over the following pandemic waves. Third, we could not explore how and if these response patterns relate to sacrifices experienced in regular clinical experiences. Forth, DLR, the first author, worked on the pandemic frontline and supervised students, so his judgments and reflections on sacrifice may have influenced the data analysis and collection. However, as MACF and DS, who have different backgrounds and work contexts, analyzed the data independently, they helped DLR minimize that influence. Also, DJ has a diverse experience and comes from another culture, allowing the authors to "make strange" what was already accepted as natural or part of the culture. Fifth, we translated the coded audios and interviews from Portuguese to English to allow researchers with different cultural backgrounds to engage in data interpretation, broadening our perspectives. However, nuances and meanings can be lost during the translation, preventing a full comprehension of participants' perspectives. We minimized this impact by having frequent "reading-together" sections with the non-Portuguese speakers of our research group (Helmich et al., 2017a, 2017b). Sixth, the study was carried out in a single center (from one country), which makes the study's external validity difficult to ascertain. Seventh, there are inherent methodology limitations—the students who participated in the study could be more interested in sharing their experiences, and their responses may differ from the general student population. Also, we did not make before and after quantitative measurements since, as a qualitative study, it focused on exploring how medical students deal with and reflect on the idea of making sacrifices during the pandemic. Nonetheless, qualitative studies provide a singular opportunity to understand medical students' behavioral responses and therefore provide complementary knowledge to quantitative studies. Finally, we did not know our students' previous emotional and developmental status to

understand whether the identity dissonance and consonance observed were solely related to the pandemic or processes already in course.

Conclusion

Students reacted differently to the sacrifice imposed by the COVID-19 pandemic. The three response patterns we described (no sense of duty, sense of duty with hesitation to act, and sense of duty with readiness to act) were accompanied by intense emotional reactions. Students who undergo a lack of alignment between personal beliefs and professional expectations experience identity dissonance and develop an "identity crisis." Students who see the sacrifice as an opportunity to grow, serve society, and connect with their peers and future profession experience identity consonance and reassure their professional identity development. We wonder if exploring further these moments of "identity crisis or reassurance" could offer opportunities to shed light on the process of professional identity development while offering insights to devise supportive pedagogical interventions. We foresee that reflecting on these moments of crisis or reassurance may help students to develop ownership over their personal and professional development, and amplify their understanding about the profession they chose, and the career options they have. Fundamentally, elaborating on the process of handling professional sacrifices may guide students in matching their values, expectations, and beliefs with professional and societal needs.

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