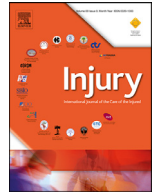




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The hidden impact of rapid spread of the COVID-19 pandemic in professional, financial, and psychosocial health of Latin American orthopedic trauma surgeons

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ABSTRACT

Objective: To assess the quality of life of Latin American orthopedic trauma surgeons during the beginning of COVID-19 pandemic in Latin America.

Methods: A total of 400 orthopedic trauma surgeons from 14 Latin American countries were invited to complete an electronic survey aiming to understand the general situation of COVID-19 in each country and how COVID-19 had impacted life's participant financially and psychosocially. The relationship between the occurrence of the disease and the existence of legal regulations on the medical activity in the respondent's country, protocols for tracking the disease among patients hospitalized in an emergency basis due to skeletal trauma, and personal protective equipment to deal with patients diagnosed with COVID-19 who need orthopedic trauma surgery was investigated, as well as the financial and psychosocial impact caused by the disease. Data was statistically analyzed with significance $p < 0.05$.

Results: 220 respondents completed the survey. 21 respondents were diagnosed with COVID-19. Local regulation was decisive in terms of increasing the risk for COVID-19 disease ($p = 0.001$). 91.8% of the respondents reported being concerned about their financial health and 57.7% described a state of feeling emotionally overextended. 75.0% believe that pandemic can change their professional activity.

Conclusion: The rapid spread of the COVID-19 pandemic in Latin America has negatively impacted the professional, financial, and psychosocial health of orthopedic trauma surgeons. It seems reasonable to state that the combination of psychosocial distress and deprivation together with financial uncertainty and decreased revenue can be straightly related to development of burnout symptoms among doctors.

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Introduction

Since the first description in December 2019 in People's Republic of China, the COVID-19 pandemic has spread rapidly across the world, with devastating consequences [1, 2]. Since June 2020, Latin America has become the epicenter of the disease, with the virus spreading aggressively mainly in countries like Brazil, Peru, Chile, Suriname, and Haiti [3]. After approximately 150 days after the first case of COVID-19 was diagnosed in Latin America, the region has more than 4.4 million confirmed cases, which is higher than the combined number of cases reported in the North American countries [4]. Moreover, Latin America accounts for 30% of all COVID-19 deaths with only 8% of world's population, potentially leading to unprecedented direct and indirect consequences that will influence the lifestyle and professional activity in the short and long term [5]. As such, it is necessary to assess the economic and social effects that are occurring at the individual and community level to plan the steps that must be taken in the near future.

As doctors, it is our responsibility to ensure appropriate treatment to all patients during these exceptional time [6]. On the one hand, the pressure of overwhelming demand is giving doctors the opportunity to maximize the disproportionate small and scarce resources, forcing medical systems to work more efficiently [7]. On the other hand, however, given the pressures of the need to maintain high quality medical care during a pandemic, combined with doctors' reluctance to seek help or publicize their difficulties, it is possible that this type of professional commitment is strongly related to presenteeism [8]. Having to balance their own safety with the needs of patients, family and employers and in the face of limited resources can lead to distressing ethical dilemmas for doctors and potentially, to moral injury [8, 9]. Indeed, during this strenuous circumstance, doctors must take control of their wellbeing and improve help-seeking behavior and attitudes against negative psychological outcomes [9].

Although orthopedic trauma surgeons continue to play a crucial role in emergency services, much of their elective practice has been completely suspended by government agencies compromising public and private health [10, 11]. In Latin America, the stoppage of elective orthopedic practice, which is generally carried out in pri-

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vate clinics, represents a significant financial loss, which will affect the financial reserves of health professionals in the event of prolonged confinement. In addition, the risk of being infected during emergency care, increased by limited hospital resources and protective equipment for health personnel, has been shown to be directly associated with higher rates of depression, anxiety, distress, and job dissatisfaction [12–15].

In this scenario, monitoring behavioral trends among health professionals in response to increasing spread of COVID-19 is essential to identify risk factors and effectively protect doctors and their families against negative outcomes related to professional, financial, and psychosocial problems. We hypothesized that COVID-19 pandemic has already impacted on the Latin American orthopedic trauma surgeons' wellbeing, causing both personal and professional exhaustion. In the herein study, we assess the quality of life of Latin American orthopedic trauma surgeons during the first two months COVID-19 pandemic in the region.

Methods

Population

A total of 400 orthopedic trauma surgeons from 14 Latin American countries were eligible for the study. Eligibility criteria were to have 5 or more years of experience as orthopedic surgeon, to be active member of the local country Orthopaedic Association and to report more than 90% of the professional time dedicated to skeletal trauma surgery. Targeted respondents were from Argentina, Brazil, Chile, Colombia, El Salvador, Ecuador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela.

Study design and data source

We conducted a cross-sectional study to identify how COVID-19 pandemic impacted on the Latin American orthopedic trauma surgeons' wellbeing after 60 days of decreed lockdown in all region. For this purpose, it was developed an electronic questionnaire aiming to understand the general situation of COVID-19 in each country and how COVID-19 had impacted life's participant financially and socially. Questions focused on potential professional, financial, and psychosocial problems caused by the disease. The composition of the questionnaire followed the recommendations by Shaughnessy et al. [16], employing 6 steps to produce reliable and valid results, and reviewed by some researchers of the Clinical Decision Rules Study Group (VG, WB, AGS, REP, JAX, and PL) to check for inconsistencies or lack of relevant information before validation and translation into Latin America countries official languages. The questionnaire included 4 sections with a total of 32 questions and was validated and translated into the Portuguese language in Brazil and into the Spanish language in the other 13 countries (Attachment 1). All questions were structured, thus offering participants a limited set of responses from which to choose. The study was approved by the Ethics Committee of the Universidade de São Paulo (IOT 1450/SGP 15,552).

It was used the online platform SurveyMonkey® (<https://surveymonkey.com>), which allowed construction of the questionnaire with different types of question. An online questionnaire was preferred as it allows the participation of surgeons from the entire Latin America region. Pilot testing was conducted by two researchers and no corrections made. The survey took between 10 and 15 min to be completed. Respondents received an email invitation via platform with a brief letter presenting the project. Participants were given the option of not being identified either directly or by tracking the IP address of their computers. Multiple Responses option was turned off, so it was allowed only one response per browser or email address. The survey was distributed

online from April 17 to April 27, with two follow-up emails at five and nine days after the survey was opened. All participants signed a virtual Informed Consent Form, authorizing the researchers to use their information.

Statistical analysis

The proportion of respondents reporting a positive COVID-19 test was calculated, as well as of a relative who had the disease. We examined the relationship between the occurrence of the disease and the existence of (1) legal regulations on the medical activity in the respondent's country prohibiting elective orthopedic surgeries, (2) protocols for tracking the disease among patients hospitalized in an emergency basis due to skeletal trauma, and (3) personal protective equipment to deal with patients diagnosed with COVID-19 who need orthopedic trauma surgery. For this purpose, those items were categorized at different levels, so the total sum score could be transformed into binary variables, which facilitated the comparison. The COVID-19 disease was graded into 2-level items, grade 1 – positive for COVID-19, requiring or not hospitalization, or symptomatic, but without any tests confirming for COVID-19, and grade 0 – negative for COVID-19. Country's legal regulation was graded into 2-level items, grade 1 – Government / Institution prohibited elective orthopedic surgeries, and grade 0 – Government / Institution didn't prohibit elective orthopedic surgeries. In-hospital protocols for tracking the disease was graded into 2-level items, grade 1 – PCR and/or antibody detection, and grade 0 – no testing. Existence of personal protective equipment (PPE) was graded into 2-level items, grade 1 – complete or almost complete PPE, and grade 0 – no PPE. The relationship between the occurrence of the disease and the existence of (1) legal regulations on the medical activity in the respondent's country prohibiting elective orthopedic surgeries, (2) protocols for tracking the disease among patients hospitalized in an emergency basis due to skeletal trauma, and (3) personal protective equipment to deal with patients diagnosed with COVID-19 who need orthopedic trauma surgery were examined with either the Fisher's exact test or chi-square test, with significance $p < 0.05$.

The financial and psychosocial impact caused by the disease was tracked and assessed. Regarding the financial aspect, the proportion of participants who had some other source of income was calculated, such as the spouse's contribution and bank or stock investments. Regarding the psychosocial impact, a comparison between the individual-level actions to reduce stress and poor health symptoms pre- and post-lockdown was performed. Also, the respondents' source of information was evaluated, assuming that the lack of interest in seeking medical sources (scientific articles and WHO reports) represents a sign of stress due to denial of the disease. All participants were included together regardless of their country of residence, taking into account the similarity in economic and government policy of the entire Latin American region. Thus, no statistical inference techniques were performed.

Results

Respondents characteristics

A total of 220 respondents completed the survey (55.75% response rate). There were 12 (5.4%) participants from Argentina, 99 (45.0%) from Brazil, 6 (2.7%) from Chile, 9 (4.1%) from Colombia, 2 (0.9%) from Ecuador, 13 (6.0%) from El Salvador, 27 (12.3%) from Guatemala, 14 (6.4%) from Honduras, 12 (5.4%) from Mexico, 6 (2.7%) from Panama, 6 (2.7%) from Paraguay, 4 (1.8%) from Peru, 5 (2.3%) from Uruguay, and 5 (2.3%) from Venezuela. Respondents were 93.2% male and 6.6% female, with 55.5% between 30 and 49 years old (mean age 45 [range, 28–80]). About 41.4%

live in cities of the metropolitan areas, with an estimated population between 1 and 5 million. Only 7.3% refer to live alone. 21 (9.5%) respondents were diagnosed with COVID-19, 19 (8.6%) from Brazil, 1 (0.5%) from Argentina, and 1 (0.5%) from Panama. No respondent required hospitalization due to the COVID-19 disease. The incidence of COVID-19 was almost double in the age group < 49 years old (15/130–11.5%) when compared to the other older age group (6/90 – 6.6%), although the difference was not significant ($p = 0.11$). Twelve (5.4%) respondents' relatives were diagnosed with COVID-19, confirmed by a positive SARS-CoV-2 RT-PCR test, and one (0.4%) of whom required hospitalization. Respondents characteristics are presented in [Table 1](#).

Legal and institutional attitudes for preventing the COVID-19 transmission

In most Latin America countries, where lockdown was imposed in March. Allowing or not elective surgery entities was not decisive in terms of increasing the risk for COVID-19 disease, as all positive cases were from countries where elective surgeries and procedures were prohibited. Emergency procedures were significantly associated to a higher risk of contamination ($p = 0.001$). However, we found no significant relationship between a reported positive COVID-19 test and the existence of both protocols for tracking the disease among patients hospitalized in an emergency basis due to skeletal trauma ($p = 0.433$) and personal protective equipment to deal with patients diagnosed with COVID-19 who need orthopedic trauma surgery ($p = 0.225$).

COVID-19 financial impact

As for the financial aspect, 91.8% ($n = 202$) of the respondents reported being concerned about their financial health, 35.9% ($n = 79$) extremely and 55.9% ($n = 123$) slightly concerned. Of interest, 62.7% ($n = 138$) respondents have their largest source of income from private practice. Only 15.9% ($n = 35$) have public practice as their only source of income. The proportion of respondents who had some other source of income was 76.4% ($n = 168$). 62.7% ($n = 138$) of respondents referred to have spouse's contribution in the family income. Of these, 43.6% ($n = 96$) contribute with less than 50% of total family income, 14.5% ($n = 32$) in the same proportion of total family income, and 4.5% ($n = 10$) with more than 50% of total family income. Eighty-nine (40.5%) respondents have bank or stock investments, with 43 (19.5%) with investments in both banks and stock market shares. Almost the same number of respondents ($n = 88$, 40.0%) reported not having any financial investments. More than half of respondents ($n = 114$, 51.8%) expect that their professional activity will return to normal after 3 months, 28.6% ($n = 63$) after 6 months, and 5.9% ($n = 13$) after 12 months from the beginning of the lockdown in Latin American countries. As a result, 84.5% ($n = 186$) respondents took some measure to reduce spending.

COVID-19 psychosocial impact

191 (86.8%) respondents keep working regularly at hospital and/or private clinic, with 88 (40.0%) referring more than three times a week. Only 15.5% ($n = 34$) of respondents mentioned no contact either by phone or social networks with their patients since the beginning of the lockdown. Regarding the psychosocial impact, before the lockdown 154 (70%) respondents reported to practice some sport or physical activity on a regular basis versus 94 (42.7%) after the COVID-19 lockdown. However, in the post-lockdown, 92.7% ($n = 204$) respondents reported to be maintaining at least some leisure activity indoors. Nevertheless, 127 (57.7%) described a state of feeling emotionally overextended, anxiety, and

Table 1
Respondents characteristics ($n = 220$).

Response rate (%)	Argentina 12 (5.4%)
	Brazil 99 (45.0%)
	Chile 6 (2.7%)
	Colombia 9 (4.1%)
	Ecuador 2 (0.9%)
	El Salvador 13 (6.0%)
	Guatemala 27 (12.3%)
	Honduras 14 (6.4%)
	Mexico 12 (5.4%)
	Panama 6 (2.7%)
	Paraguay 6 (2.7%)
	Peru 4 (1.8%)
	Uruguay 5 (2.3%)
	Venezuela 5 (2.3%)
Gender distribution (%)	Male 93.2%
	Female 6.8%
Age (years old,%)	20–29 2.3%
	30–49 55.5%
	50–59 25.9%
	> 60 16.3%
Population ratios (%)	< 1 million (18.6%)
	1–5 millions (41.4%)
	5–10 millions (19.5%)
	> 10 million (20.5%)
Live alone (%)	Yes 7.3%
	No 92.7%
COVID-19 disease	Positive RT-PCR test 9 (4.1%)
	Triad symptoms with no laboratory confirmation 12 (5.4%)
	No symptoms / no laboratory confirmation 199 (90.5%)

Source: CDR Study Group, 2020.

exhausted, especially due to the COVID-19 social isolation and mainly due to the uncertainty of how long it will take for life to 'return to normal'. 47.3% ($n = 104$) of the respondents said they were looking for information about the disease only on social networks, such as WhatsApp, Instagram, and Facebook, instead of reliable medical sources, such as scientific articles and WHO daily reports. Moreover, 165 (75.0%) of respondents believe that the COVID-19 pandemic can change their professional activity at the end of the lockdown.

Discussion

During medical education and training, doctors face potentially long working hours and stressful situation, experiencing high levels of stress in their day-to-day work [17]. Job satisfaction, work engagement, and building resilience have been increasingly shown to reduce the risk of burnout among medical doctors and other health professionals [17–19]. However, COVID-19 has rapidly spread globally, causing a devastating psychosocial impact on the mental well-being of all healthcare professionals [8, 9]. During pandemic, many authors have pointed out a sizable portion of healthcare workers, especially frontline practitioners, reaching the cutoff levels of distress, anxiety, and depression [8, 9, 20, 21]. In particular for medical professionals, fear, work-related stress, and social deprivation have been observed more frequently as causative factors for burnout symptoms [20, 22, 23]. It has been shown that burnt-out doctors can lead to poor quality patient care, increased medical errors, poor retention, and patient dissatisfaction [16, 22]. In addition, it has been suggested that the fear of potential COVID-19 infection associated to several inadequate aspects of the work environment, such as incomplete or inexistent personal protective equipment, increase the risk of experiencing burnout among surgeons and other healthcare professionals [17, 20]. Moreover, the lack of personal protective equipment causes health professionals to face a complicated ethical dilemma generated by the ethical duty to care for patients in the absence of adequate personal

protective equipment [24]. In our study, 21 respondents were diagnosed with COVID-19, either confirmed by a positive SARS-CoV-2 RT-PCR test ($n = 9$) or suspected by reported potential symptoms of COVID-19 ($n = 12$), but not requiring hospitalization. We decided to include suspected cases by reported potential symptoms of COVID-19, as it has been demonstrated that a combination of self-reported symptoms, including anosmia, fatigue, persistent cough, and loss of appetite, might identify individuals with COVID-19 [25]. The incidence of COVID-19 was almost double in the age group < 49 years old, although the difference did not reach statistical significance ($p = 0.11$). It was clear that emergency procedures were significantly associated to a higher risk of contamination ($p = 0.001$). One possible reason for that is the hospital environment in Latin America, where the Orthopaedic Trauma unit is closely located to the Emergency Department. Besides, emergency procedures in orthopedic trauma surgery generally requires the use of great volume irrigation and electrocautery, which potentially increase aerosol-generating particles inside the operating theater [26]. However, we found no significant relationship between a reported positive COVID-19 test and the existence of both protocols for tracking the disease among patients hospitalized in an emergency basis due to skeletal trauma ($p = 0.433$) and personal protective equipment to deal with patients diagnosed with COVID-19 who need orthopedic trauma surgery ($p = 0.225$). These findings can be attributed to the fact that up to 90% of respondents have in-hospital protocols for tracking the disease and personal protective equipment.

New studies have pointed out the negative economic impact brought up by the pandemic to both healthcare workers and healthcare systems [11]. Of particular importance for surgeons, to date the revenue loss imposed by drastically reducing the number of elective procedures as a preventive measure for both patients and healthcare workers is incalculable. A Medical Group Management Association (MGMA) survey revealed that 97% of physician practices experienced a negative financial impact from COVID-19 outbreak [27]. On average, practitioners reported 60% decrease in

patient volume and 55% decrease in revenue since the beginning of the pandemic. A decrease of overall acute trauma referral rates during the COVID-19 outbreak was also reported in several other regions along the globe [28–30]. In most Latin America countries, where lockdown was imposed in March, 91.8% of respondents in our study reported being concerned about their financial health, with 62.7% of them having their largest source of income from private practice. Guiroy et al. found very similar numbers in a cross-sectional study of the impact during the COVID-19 outbreak among spine surgeons in Latin America [31]. One of the strategies during this period to alleviate some of the economic burden seem to remain financially viable, mainly by reducing costs and improving revenue [32]. In our study, up to 87% of respondents referred to keep working on a regular basis, with 40% more than three times a week. Notably, 76.4% had some other source of income, with 40.5% having bank or stock investments and 19.5% having investments in both banks and stock market shares. Moreover, 62.7% referred to have some degree of spouse's contribution in the family income. Surprisingly, 40.0% of respondents reported not having any financial investments.

In the actual scenario of COVID-19 pandemic, it seems reasonable to state that the combination of psychosocial distress and deprivation together with financial uncertainty and decreased revenue can be straightly related to development of burnout symptoms among doctors, potentially as a consequence of acute exposure to stress and unfamiliarity with the disease. In our study, 127 surgeons described a state of feeling emotionally overextended, anxiety, and exhausted, especially due to the COVID-19 social isolation and mainly due to the uncertainty of how long it will take for life to 'return to normal'. In other countries where the number of COVID-19 cases were extremely high, authors have shown incredibly elevated numbers of frontline healthcare practitioners experiencing different symptoms of burnout [12–15, 31, 33, 34]. Intervention strategies for burnout should focus on modifications in the organizational structure at professional environment and on the promotion of healthy attitudes [17, 20]. A recent systematic review by Zaçe et al. [35] aimed to identify and outline the implemented interventions addressing psychiatric disorders among healthcare workers during different epidemics and pandemics, including the actual COVID-19. The authors identified four main categories of intervention, which are informational support, instrumental support, organizational support, and emotional and psychological interventions. However, they report that only 37.5% of the included articles presented data on the effectiveness of implemented interventions, with most of them describing the experience of high-income countries during the COVID-19 pandemic. In addition, most of these studies did not focus only on the medical professional, addressing more broadly to all health workers. Initiatives to moderate workload demand combined with resting and interacting with family has been mentioned as one of the best means through which burnout can be avoided [20, 36]. The healthy body, healthy mind connection has been shown an excellent prevention strategy against burnout by balancing sports and leisure activities [36]. In our study performed among orthopedic trauma surgeons from Latin America, it was shown that only 42.7% respondents reported to practice some sport or physical activity on a regular basis after the COVID-19 lockdown versus 70% before pandemic. Interestingly, 92.7% of respondents reported to be maintaining at least some leisure activity indoors, mainly books and movies. Finally, less than 50% of respondents said they are looking for information about the disease in scientific articles and WHO daily reports, with the vast majority searching on social networks. We interpreted this finding as a defensive behavior against negative thinking and harmful information about the disease, which has been demonstrated to seriously correlate to anxiety disorders [37].

We can point out as strengths of our study (1) the fact that we have obtained respondents from almost all countries in the Latin American region, (2) the focus on surgeons who perform orthopedic trauma surgeries, that is, who have remained at the forefront of emergency care, (3) the possibility of identifying the conditions provided for the care of emergency patients (personal protective equipment and test kits for COVID-19) and, most importantly of all in our conception, (4) the possibility of observing the early economic and psychosocial effects of the beginning pandemic of this disease in the region. Moreover, this is the first study focusing on the financial and psychosocial impact for orthopedic trauma surgeons in Latin America.

Our study has limitations, mainly related to the lack of uniformity in the number of respondents by country and the complete lack of knowledge about this new disease and its consequences. Brazilian orthopedic trauma surgeons accounted for 45.0% of all respondents, which can be interpreted as a potential bias. nevertheless, the similarity of governmental politics and health policies in almost all countries in the region can at least in part control this variable. A typical picture is that 75.0% of respondents believe that the COVID-19 pandemic can change their professional activity at the end of the lockdown, which reflects the professional, psychosocial, and economic impact the disease has brought to date to Latin American orthopedic trauma surgeons.

In conclusion, the rapid spread of the COVID-19 pandemic in Latin America has negatively impacted the professional, financial, and psychosocial health of orthopedic trauma surgeons. In the actual scenario of COVID-19 pandemic, it seems reasonable to state that the combination of psychosocial distress and deprivation together with financial uncertainty and decreased revenue can be straightly related to development of burnout symptoms among doctors, potentially as a consequence of acute exposure to stress and unfamiliarity with the disease. Initiatives to moderate workload demand combined with resting and interacting with family has been mentioned as one of the best means through which burnout can be avoided. The healthy body, healthy mind connection has been shown an excellent prevention strategy against burnout by balancing sports and leisure activities.

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Ethical approval

This study was approved by the Ethics Committee of the Universidade de São Paulo (IOT 1450/SGP 15,552).

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.injury.2021.03.022.

CRedit authorship contribution statement

Vincenzo Giordano: Conceptualization, Data curtion, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **William Belangero:** Conceptualization, Data curtion, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Writing – review & editing. **Alexandre Leme Godoy-Santos:** Resources, Validation, Writing – review & editing. **Robinson Esteves Pires:** Resources, Validation, Writing – review & editing. **José Arturo Xicarà:** Resources, Validation, Writing – review & editing. **Pedro Labronici:** Resources, Validation, Writing – review & editing.

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