



# How Has COVID-19 Affected Orthopedic Surgeons and Residents in Chile?

## *¿Cómo ha afectado el COVID-19 a traumatólogos y residentes de traumatología en Chile?*

Constanza Ramírez<sup>1,2</sup> Pía Stefano<sup>3</sup> Juan C. Ocampo<sup>1,2</sup> Rodrigo Yáñez<sup>1,2,5</sup> Alejandro Gündel<sup>1,4</sup>

<sup>1</sup>Pediatric Orthopedic Service, Complejo Asistencial Dr. Sótero del Río, Santiago, Chile

<sup>2</sup>Department of Orthopedics and Traumatology, Clínica MEDS, Santiago, Chile

<sup>3</sup>Universidad Finis Terrae, Santiago, Chile

<sup>4</sup>Department of Orthopedics and Traumatology, Hospital Militar de Santiago, Chile

<sup>5</sup>Department of Orthopedics and Traumatology, Pontificia Universidad Católica de Chile, Santiago, Chile

Address for correspondence Constanza Ramírez, MD, Departamento de Traumatología Infantil, Clínica MEDS La Dehesa, Av. José Alcalde Délano 10.581, Lo Barnechea, Santiago, Chile (e-mail: constanza.ramirez@meds.cl).

Rev Chil Ortop Traumatol 2022;63(3):e150–e157.

### Abstract

**Background** Since March 2020, Chile has been affected by the coronavirus disease 2019 (COVID-19) pandemic, which has caused disruptions throughout the world, greatly impacting health services and healthcare workers.

**Objective** To describe the demographic characteristics related to the COVID-19 pandemic in orthopedic surgeons and orthopedic surgery residents in Chile.

**Methods** We conducted an on-line survey requesting data on demographics, work, exposure to and infection by COVID-19, symptoms, and protection practices.

**Results** A total of 567 surgeons answered the survey; 37 (6.4%) had had COVID-19, without gender differences. There was a higher rate of infection among residents, 9 from 73 (12.3%), than among surgeons, 28 from 494 (5.7%), as well as higher rates of infection among those working more than 60 hours ( $p < 0.05$ ). Among those infected, 31 (83.8%) were from the Metropolitan Region (MR), where the rate of infection was significantly higher compared with other regions ( $p < 0.05$ ). Only 8 (21.6%) of those infected had medical history. Hospitalization was required by 3 (5.4%), 1 of them in the Intensive care Unit (ICU), and the remaining were handled at home. The most frequent location of infection was the workplace, with the common areas being the main suspected sites, followed by outpatient clinics and orthopedic surgery wards. In total, 40.5% (15) of the sample reported having infected other individuals. There was also an impact in the surgeon's income: 14.8% (84) reported a decrease lower than 20%, and 45% (256), a decrease higher than 50%. This decrease was higher among surgeons than among residents, and higher among those from the MR compared to other regions ( $p < 0.05$ ).

### Keywords

- ▶ COVID-19
- ▶ orthopedics
- ▶ survey
- ▶ traumatology

received  
July 21, 2021  
accepted  
April 13, 2022

DOI <https://doi.org/10.1055/s-0042-1749617>.  
ISSN 0716-4548.

© 2022. Sociedad Chilena de Ortopedia y Traumatología. All rights reserved.

This is an open access article published by Thieme under the terms of the Creative Commons Attribution-NonDerivative-NonCommercial-License, permitting copying and reproduction so long as the original work is given appropriate credit. Contents may not be used for commercial purposes, or adapted, remixed, transformed or built upon. (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

Thieme Revinter Publicações Ltda., Rua do Matoso 170, Rio de Janeiro, RJ, CEP 20270-135, Brazil

**Conclusion** Even though orthopedic surgery practice has been reduced by the pandemic, orthopedic surgeons have been exposed to the risk of infection by COVID-19. The workplace seems to be the site that poses the greatest risk, especially the common areas.

**Level of Evidence** V.

## Resumen

**Introducción** Desde marzo del 2020, Chile se ha visto afectado por la pandemia por coronavirus 2019 (*coronavirus disease 2019*, COVID-19, en inglés), que ha provocado alteraciones en todo el mundo, causando un gran impacto en los servicios de salud y el personal sanitario.

**Objetivo** Describir características demográficas y laborales relacionadas al contagio de COVID-19 en traumatólogos y residentes de traumatología en Chile.

**Métodos** Realizamos una encuesta on-line, solicitando información demográfica, datos laborales, exposición y contagio de COVID-19, sintomatología y medidas de protección.

**Resultados** En total, 567 médicos contestaron. De ellos, 37 (6,4%) tuvieron COVID-19, sin diferencia significativa respecto a género. Se observó mayor contagio entre residentes, 9 de 73 (12,3%), que entre traumatólogos, 28 de 494 (5,7%), así como mayor contagio entre quienes trabajaron más de 60 horas ( $p < 0,05$ ). De los contagiados, 31 (83,8%) eran de la Región Metropolitana (RM), cuyo contagio es significativamente mayor que en el resto de las regiones ( $p < 0,05$ ). Sólo 8 (21,6%) de los contagiados presentaban antecedentes médicos. Requirieron hospitalización 3 (5,4%), 1 de ellos en Unidad de Cuidados Intensivos (UCI), y el resto fue manejado en forma domiciliaria. El sitio de contagio más frecuente fue el trabajo, siendo las áreas comunes las más sospechadas, seguidas de la atención ambulatoria y las áreas de hospitalización traumatológica. Un 40,5% (15) reportó haber contagiado a alguien más. Hubo además un impacto en los ingresos de los traumatólogos: un 14,8% (84) refirió una disminución menor al 20%, y un 45% (256), disminución mayor al 50%. Esta fue mayor en los traumatólogos que en los residentes, y en aquellos de la RM que en otras regiones ( $p < 0,05$ ).

**Conclusión** Aunque la actividad traumatológica se ha visto disminuida por la pandemia, los traumatólogos se han visto expuestos al riesgo de contagio por COVID-19. El trabajo parece ser el lugar de mayor riesgo, sobre todo las áreas comunes.

**Nivel de Evidencia** V.

## Palabras Clave

- ▶ COVID-19
- ▶ encuesta
- ▶ ortopedia
- ▶ traumatología

## Introduction

Chile has been affected by the coronavirus disease 2019 (COVID-19) pandemic since March 2020, with a significant impact on healthcare services and personnel. The outbreak began in Wuhan, Hubei Province, China, which registered the first cases of severe acute respiratory syndrome (SARS) caused by a new coronavirus, SARS-CoV-2, in December 2019.

The high virulence and transmissibility of COVID-19, even in an asymptomatic or presymptomatic stage, led to its quick dissemination to the rest of the world.<sup>1</sup>

The first Chilean COVID-19 case was confirmed on March 3, 2020, on a patient coming from abroad, which marked the beginning of the first and subsequent waves of infections. This led authorities to take several measures to

reduce the populational contagion risk and increase healthcare capacity.

Severe acute respiratory syndrome coronavirus 2 has spread to all corners of the world, infecting millions of people and killing hundreds of thousands. Places of high risk of contagion include hospitals and medical centers.<sup>2</sup>

The prevalence of physicians infected with SARS-CoV-2 remains unknown. However, as of February 11, 2021, 1,716 healthcare professionals were infected in China,<sup>3</sup> and the United States Centers for Disease Control and Prevention (CDC) reported 9,282 COVID-19 infections in healthcare personnel on April 14, 2021.<sup>4</sup>

The risk factors for healthcare personnel contagion have been studied. The evidence suggests that using adequate personal protection equipment (PPE) reduces the risk of infection; in contrast, specific exposure during certain

procedures (such as intubation), long working hours, or direct contact with infected patients increases the risk.<sup>5</sup>

Orthopedics services implemented protective measures based on international guidelines, including suspending scheduled elective surgeries, restricting care, and using the operating room only for emergencies or procedures that could not be postponed. These measures reduced hospitalizations, surgeries, and outpatient visits. In addition, they recommended the use of PPE, such as masks, face shields, shoe covers, gloves, and other specific measures during surgery.<sup>6,7</sup> Chilean orthopedic surgeons and residents were reassigned to provide direct care to suspected or confirmed COVID-19 patients according to the demands of each service. Others volunteered to assist in services with the greatest need for personnel, including intensive care units (ICUs) dedicated to severe COVID-19 cases.

The main objective of the present study is to describe demographic and occupational characteristics related to the spread of COVID-19 among orthopedic surgeons and residents in Chile. As a secondary objective, we report the clinical picture of the COVID-19-infected subgroup, characterize PPE use in the daily practice, and evaluate the economic impact of the pandemic for physicians.

## Materials and Methods

We prepared a survey using Google Forms and sent it through the formal channels of Sociedad Chilena de Ortopedia y Traumatología (SCHOT) and its subspecialty committees by e-mail and WhatsApp to Chilean orthopedic surgeons and residents. The survey was self-completed and anonymous.

The information collected from the participants included demographics, working places and hours, health and rest history, exposure to patients with confirmed or suspected COVID-19, PPE use, coronavirus infection, and decreased income during the pandemic. Those infected with COVID reported symptoms, hospitalization requirement, disease duration, tests performed, suspected place of infection, and transmission to third parties.

The Institutional Scientific Ethics Committee approved the study. The participants authorized the use of the information in scientific publications when accessing the survey.

The data were tabulated in Microsoft Excel (Microsoft Corp., Redmond, WA, United States) spreadsheets, and the statistical analysis was performed with the Real Statistics tool using the Chi-squared test and considering statistical significance as values of  $p < 0.05$ .

## Results

In total, 571 participants answered the survey. However, we excluded four responses because they were not from orthopedic surgeons and residents. As a result, the final sample was composed of 567 surveys.

The participants were from different parts of Chile, but most were from the Metropolitan Region (MR), with 391

(68.9%) physicians, followed by Valparaíso, with 40 (7%), and Biobío, with 32 (5.6%) participants.

Regarding gender, 473 (83.4%) participants were male, and 94 (16.6%) were female. A total of 68 (11.9%) were residents, 5 (0.8%) were in subspecialty training, 114 (20.1%) were general orthopedic surgeons, and 380 (67%) were subspecialists. Infection rates were higher in specialty and subspecialty residents (i.e., personnel in training), with nine (12.3%) cases, compared orthopedic surgeons with subspecialties or not, with 28 (5.7%) cases ( $p = 0.03$ ) (► **Table 1**).

Most physicians (316; 55.7%) worked in 2, 3, or 4 different places, whereas 251 (44.2%) worked in a single location (108 in public or Armed Forces [FFAA] hospitals, 105 in clinics and 38 in other places). The infection rate was not significantly different ( $p = 0.8$ ) among physicians working in the public system alone, the private system alone, or both (► **Table 1**).

Of those infected, 31 (83.8%) were from the MR, where the contagion rate was significantly higher compared to that of other regions ( $p < 0.05$ ). In addition, the contagion rate was higher among those who worked more than 60 hours per week compared with participants working fewer hours during the pandemic ( $p < 0.05$ ). There were no significant differences in infection rates between physicians working shifts or not, and neither were there differences in the quality or hours of sleep (► **Table 1**).

Most infected physicians had no comorbidities. Only 8 (21.6%) reported any medical history, mainly autoimmune diseases, followed by cancer, obesity, and diabetes.

A total of 37 (6.4%) participants had COVID-19 from March to July 2020, including 6 (16.2%) women and 31 (83.7%) men, with no significant difference between genders.

Most participants reported that symptoms began between May and June, with 11 (29.7%) cases in the second half of May (► **Table 2**).

The most frequent symptoms were headache and myalgia, reported by 21 (56.8%) participants, followed by fatigue (19; 51.4%), and anosmia and ageusia (14; 37.8%). There were 2 (5.4%) asymptomatic participants. The laboratory tests showed increased C-reactive protein (CRP) levels in 5 (13.5%) patients, in addition to lymphopenia, elevated D-dimer, and increased ferritin in 2 (5.4%) patients respectively. The laboratory results were normal for 9 (24.3%) subjects, and 20 (54.1%) patients did not undergo any test. Regarding polymerase chain reaction (PCR) tests for COVID-19, 3 (8.1%) patients did not undergo them, 27 (73%) had positive results, and 3 (8.1%) were negative. However, these last three cases were positive for immunoglobulins M (IgM) and G (IgG) on a later date. Among the patients who underwent IgM and IgG testing, 14 (37.8%) were positive, and 3 (8.1%) were negative. A total of 8 (21.6%) patients underwent a chest computed tomography scan, with six (16.2%) presenting findings suggestive of pneumonia caused by COVID-19 (► **Table 2**).

Overall, 3 (8.1%) infected patients required hospitalization, including 1 in the ICU; the remaining 34 (91.9%) were managed at home. When answering the survey, 35 (94.6%) patients had improved from COVID, while 2 (5.2%) patients still presented symptoms (► **Table 2**).

**Table 1** Demographic and professional characteristics of orthopedic surgeons and residents evaluated in the survey

	Positive COVID-19: N = 37; n (%)	Negative COVID-19: N = 530; n (%)	p-value
<u>Gender:</u>			
Male	31 (83.8%)	442 (83.4%)	0.95
Female	6 (16.2%)	88 (16.6%)	
<u>Function:</u>			
Orthopedic resident/In subspecialty training	9 (24.3%)	64 (12.0%)	0.03
Orthopedic surgeon with subspecialty training	28 (75.6%)	466 (87.9%)	
<u>Years of professional experience:</u>			
< 3	5 (13.5%)	51 (9.6%)	0.001
3-10	8 (21.7%)	209 (39.4%)	
11-21	18 (48.6%)	118 (22.3%)	
> 21	6 (16.2%)	152 (28.7%)	
<u>Workplace:</u>			
Public/Armed Forces Hospital	23 (62.2%)	339 (64%)	0.8
Workers' compensation healthcare facilities	10 (27%)	78 (14.7%)	
Private hospital	20 (54%)	315 (59.4%)	
Private practice	7 (18.9%)	154 (29%)	
Primary healthcare network	0	1 (0.2%)	
<u>Work region:</u>			
Metropolitan Region	31 (83.8%)	360 (67.9%)	0.04
Other regions	6 (16.2%)	170 (32.1%)	
<u>Weekly workload:</u>			
< 40 hours	26 (70.3%)	382 (72.1%)	0.01
40-60 hours	6 (16.2%)	128 (24.1%)	
> 60 hours	5 (13.5%)	20 (3.8%)	
<u>24-hour shifts:</u>			
Yes	15 (40.5%)	216 (40.8%)	0.97
No	22 (59.5%)	314 (59.2%)	
<u>Hours of sleep:</u>			
< 6	15 (40.5%)	149 (28.1%)	0.18
6-8	18 (48.7%)	337 (63.6%)	
> 8	4 (10.8%)	44 (8.3%)	
<u>Sleep quality:</u>			
Good (restful sleep)	11 (29.7%)	202 (38.1%)	0.58
Moderate	21 (56.8%)	260 (49.1%)	
Poor	5 (13.5%)	68 (12.8%)	
<u>Medical history:</u>			
Healthy	29 (78.4%)	402 (75.8%)	0.28
Comorbidities	8 (21.6%)	165 (31.1%)	
Autoimmune conditions	4 (10.8%)	15 (2.8%)	
Steroid use	0	0	
Chemotherapy	0	4 (0.7%)	
Cancer	2 (5.4%)	10 (1.9%)	
Obesity	2 (5.4%)	42 (7.9%)	

(Continued)

**Table 1** (Continued)

	Positive COVID-19: N = 37; n (%)	Negative COVID-19: N = 530; n (%)	p-value
Chronic lung disease	1 (2.7%)	23 (4.3%)	
Cardiovascular conditions	0	47 (8.9%)	
Diabetes	1 (2.7%)	21 (4%)	
Asthma	0	11 (2.1%)	
Hypercholesterolemia	0	4 (0.7%)	
Arterial hypertension	0	13 (2.4%)	
Insulin resistance	0	4 (0.7%)	
Hypothyroidism	0	4 (0.7%)	
Psoriasis	0	2 (0.4%)	
Gout	0	1 (0.2%)	
Parkinson disease	0	1 (0.2%)	
Thrombophilia	0	1 (0.2%)	
<b>Contact with COVID-19 patients:</b>			
Direct (hospitalization, outpatient care, or respiratory urgency)	11 (29.7%)	163 (30.7%)	0.79
Indirect (COVID patients at the workplace)	25 (67.6%)	334 (63%)	
No contact	1 (2.7%)	34 (6.4%)	
<b>COVID-19 exposure outside work:</b>			
Infected family members	6 (16.2%)	35 (6.6%)	0.08
Other infected people	3 (8.1%)	38 (7.2%)	
No contact	28 (75.7%)	456 (86%)	

Our survey indicated that the workplace was the most frequent potential site of contagion, with 21 cases (56.8%), mainly the common areas (lounge, cafeteria, boarding facilities, etc.), with 8 (21.6%) cases, followed outpatient facilities, with 6 (16.2%) cases, and trauma hospitalization areas, with 5 (13.5%) cases (→ **Table 2**).

As for PPE use, 54.7% (306) of the physicians declared that the PPE delivered in their workplaces were enough. However, the remaining 45.3% (253) of physicians reported a shortage of PPE, especially N95 masks, (according to 225 [40.3%] participants), surgical masks (74; 13.2%), goggles or face shields (114; 20.4%), and hand sanitizer (84; 15%). The shortage of PPE led us to inquire about the frequency of mask change. Most (56.4% [316]) participants changed masks daily, 21.1% (118) did it every 4 hours, 16.4% (92) did it every 2 to 3 days, and 6.1% (34) used them permanently.

Regarding training in PPE use and COVID management, 36.8% (204) of the physicians reported participating in courses provided by their facility, 23.1% (128) did not participate in those courses, 27.6% (153) declared that their facility field did not hold courses, and 19.1% (106) participated in courses provided by other institutions.

Most (378; 68.3%) physicians working at a hospital setting used PPEs permanently, while 424 (78.2%) participants at an outpatient setting did it. In the hospital setting and under direct contact with positive patients or subjects with respiratory symptoms, 114 (58.2%) physicians wore a surgical

mask, while 160 (81.6%) used an N95 mask. Under indirect contact, 231 (64.5%) and 234 (65.4%) wore those masks respectively. At the outpatient setting, 63.3% (342) of the participants reported using surgical masks and 58.8% (317), N95 masks.

In addition, on average, 73.6% (196) of the physicians from the hospital and outpatient settings wore face shields; among them, 86.2% (169) had direct contact with COVID patients. Physicians also used plastic apron covers and shoe covers, but to a lesser extent.

Moreover, 257 (93.7%) participants said COVID patients wore masks during hospitalization or outpatient care.

The pandemic impacted the income of Chilean physicians. Only 65 (11.4%) physicians did not experience changes in their income, while 84 (14.8%) reported a decrease lower than 20%, 163 (28.7%), a reduction between 20% and 50%, 168 (29.6%), a 50% to 80% drop, and 88 (15.5%) declared losing more than 80% of their initial income. There was no difference in income decrease between orthopedic surgeons who had COVID-19 during this period compared to those who did not have the disease ( $p = 0.56$ ).

## Discussion

Infections by SARS-CoV-2 have spread quickly worldwide since their onset in Wuhan at the end of 2019. Due to its high transmission rate and ability to cause severe disease and

**Table 2** Clinical features of orthopedic surgeons and residents with COVID-19 in Chile

Variables	Cases: N=37; n (%)
<b>Onset of disease:</b>	
March 1 <sup>st</sup> to 15 <sup>th</sup>	3 (8.1%)
March 16 <sup>th</sup> to 31 <sup>st</sup>	2 (5.4%)
April 1 <sup>st</sup> to 15 <sup>th</sup>	0
April 16 <sup>th</sup> to 30 <sup>th</sup>	1 (2.7%)
May 1 <sup>st</sup> to 15 <sup>th</sup>	5 (13.5%)
May 16 <sup>th</sup> to 31 <sup>st</sup>	11 (29.7%)
June 1 <sup>st</sup> to 15 <sup>th</sup>	5 (13.5%)
June 16 <sup>th</sup> to 30 <sup>th</sup>	8 (21.6%)
July 1 <sup>st</sup> to 15 <sup>th</sup>	2 (5.4%)
July 16 <sup>th</sup> to 30 <sup>th</sup>	0
<b>Symptoms:</b>	
Headache	21 (56.8%)
Muscle pain	21 (56.8%)
Fatigue	19 (51.4%)
Anosmia	14 (37.8%)
Ageusia	14 (37.8%)
Cough	11 (29.7%)
Fever	9 (24.3%)
Odynophagia	7 (18.9%)
Dyspnea	7 (18.9%)
Diarrhea	4 (10.8%)
Abdominal pain	4 (10.8%)
Chest pain	3 (8.1%)
Asymptomatic	2 (5.4%)
Nasal congestion	1 (2.7%)
Tinnitus	1 (2.7%)
<b>Laboratory tests:</b>	
Leukopenia	0
Lymphopenia	2 (5.4%)
Elevated levels of C-reactive protein	5 (13.5%)
Elevated levels of D-dimer	2 (5.4%)
Elevated levels of ferritin	2 (5.4%)
Normal findings	9 (24.3%)
No tests	20 (54.1%)
<b>Diagnostic tests:</b>	
Positive polymerase chain reaction	27 (73%)
Negative polymerase chain reaction	3 (8.1%)
Positive immunoglobulins M and G	14 (37.8%)

(Continued)

**Table 2** (Continued)

Variables	Cases: N=37; n (%)
Negative immunoglobulins M and G	3 (8.1%)
No tests	3 (8.1%)
<b>Chest computed tomography scan:</b>	
No	29 (78.4%)
Findings consistent with COVID	6 (16.2%)
Findings not consistent with COVID	2 (5.4%)
<b>Treatment:</b>	
At home	34 (91.9%)
Hospitalization (no intensive care unit)	2 (5.4%)
Intensive care unit	1 (2.7%)
<b>Outcome:</b>	
Improved	35 (94.6%)
Ongoing	2 (5.4%)
<b>Potential contagion sites:</b>	
Workplace	21 (56.8%)
Hospitalization room	5 (13.5%)
COVID-19 hospitalization room	4 (10.8%)
Intensive care unit	1 (2.7%)
Surgical ward	0
Outpatient facility	6 (16.2%)
Common areas within the workplace	8 (21.6%)
Outside the workplace	15 (40.5%)
<b>Transmission to other people:</b>	
Colleagues	1 (2.7%)
Family members	12 (32.4%)
Patients	0
Others	3 (8.1%)
None	22 (59.5%)

even death,<sup>8</sup> COVID-19 had a significant impact on health-care systems. The transmission risk to healthcare personnel has been a concern since the beginning of the pandemic, with initial studies suggesting that these professionals were more exposed to the disease and could present a more severe clinical picture.<sup>1,2,8</sup> Therefore, in addition to measures to reduce transmission risks, specific recommendations targeted healthcare personnel directly exposed to COVID-positive patients and working in remote areas.<sup>5-7</sup>

Even though the number of orthopedics procedures dropped during the pandemic, these physicians have been exposed to COVID-19 as any healthcare personnel. In the present study, 37 (6.4%) out of 567 physicians had COVID-

19 during the period analyzed. To the best of our knowledge, there is no data on the proportion of physicians or healthcare personnel infected in Chile. Therefore, we cannot say if orthopaedic surgeons were more or less infected than physicians of other specialties.

In Europe, healthcare staff accounted for a significant proportion of infections: 12.2% in Italy (mainly Lombardia) at the end of June,<sup>9</sup> and approximately 24.1% of confirmed cases of COVID-19 in Spain as of May 2020.<sup>10</sup> In a publication evaluating physicians who died due to COVID-19 in the United Kingdom,<sup>11</sup> among 106 deaths, none corresponded to physicians of at-risk specialties, that is, those involving air management, such as anesthesiologists and intensivists. This may indicate that those professionals exposed to greater risk received training on the precautions to reduce the risk of contagion since the beginning of the pandemic in their country.

We also observed a higher rate of contagion among physicians still in training, like specialty and subspecialty residents, and those working more than 60 hours a week. The former may result from lower experience in PPE use, whereas the latter can be due to greater exposure to patients.

Most of the surveyed population reported the workplace as a transmission site, which is consistently the location of highest risk for healthcare personnel. The main potential transmission places were the hospital common areas, including lounges, cafeterias, and boarding facilities. Only 13.5% (5) of the physicians reported COVID-19 hospitalization rooms, including ICUs, as a possible site of contagion. These findings may reflect the biggest concern regarding personal care, proper PPE use, and precaution measures while dealing with higher-risk patients. On the other hand, in common areas, where physicians eat and rest, PPE use is lower.

The onset of symptoms in the positive subgroup occurred mainly in May and June 2020, which coincides with the period in which the maximum number of cases were reported in the Metropolitan Region.<sup>12</sup> It is worth noting that 5 (13.5%) physicians reported the onset of symptoms in March, when COVID-19 cases had just started in Chile.

Among the infected participants, 21.6% (8) had a medical history relevant to the condition, but only 8.1% (3) required hospitalization or went to the ICU.

The most frequent symptoms were headache and myalgia, which is consistent with the main symptomatology observed in the infected population who did not require hospitalization.<sup>12</sup>

Proper PPE use reduces the risk of infection, especially masks<sup>5,13</sup> and other specific measures, depending on the procedures performed. Most trauma services suspended elective surgeries, performing only emergency procedures. In addition, following international recommendations, outpatient practices only treated emergency patients or those with conditions that could not be postponed.<sup>6,7</sup>

However, since the pandemic started, the lack of access to PPE has been a global problem, and Latin America was not an exception.<sup>14</sup> Even though up to 45% (253) of the participants reported a PPE shortage in their workplaces, up to 76% (424) of the physicians used them permanently, and 23% (130) did

it most of the time. This may reflect the personal acquisition of PPE and the reuse of masks, since 16.4% (92) of the participants changed them every 2 to 3 days, and 6.1% (34) used them permanently with no replacements.

Of the physicians with COVID-19 included in the study, 43.2% (16) reported infecting someone else, most frequently a family member. This is a cause of great concern for healthcare personnel worldwide, and it should lead to the reinforcement of known precaution measures, both in the workplace and at home.

As for financial aspects, it is logical to assume that the suspension of elective surgeries and outpatient procedures impacted the monthly income of each professional. Up to 45% (256) of the participants reported a reduction greater than 50% in their income.

## Conclusion

The present study has some limitations. The participation of physicians depended on their access to the survey, which was sent through e-mail and WhatsApp to different groups of orthopedics surgeons in Chile. However, this strategy could exclude professionals with no access to these social networks or who were unable to answer at the time for health or other reasons.

Even so, the present study is the only global survey in orthopedics field at a national level carried out in the year the pandemic began. In addition, it includes descriptive demographics, clinical features, and the impact on the quality of life of physicians, both experienced and still in training.

In summary, healthcare staff is at risk of COVID-19 due to their occupational exposure, including specialties that do not directly treat infected patients. Therefore, we should implement PPE use and precaution measures for all specialties regardless of the apparent risk that may entail.

The number of healthcare workers, specifically physicians, infected by COVID-19 in Chile remains unknown. We believe this information is relevant, since it could improve care measures and increase the sense of safety at work.

## References

- 1 Rothe C, Schunk M, Sothmann P, et al. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. *N Engl J Med* 2020;382(10):970-971
- 2 Kamps BS, Hoffmann C. Covid Reference Edición 2020-1. <http://www.covidreference.com/>. Uploaded July 13, 2020. Accessed August 5, 2020.
- 3 Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. *JAMA* 2020;323(13):1239-1242. Doi: 10.1001/jama.2020.2648
- 4 CDC COVID-19 Response Team. February 12-April 9, 2020. *MMWR Morb Mortal Wkly Rep* 2020;69(15):477-481
- 5 Ran L, Chen X, Wang Y, Wu W, Zhang L, Tan X. Risk Factors of Healthcare Workers With Coronavirus Disease 2019: A Retrospective Cohort Study in a Designated Hospital of Wuhan in China. *Clin Infect Dis* 2020;71(16):2218-2221

- 6 Hirschmann MT, Hart A, Henckel J, Sadoghi P, Seil R, Mouton C. COVID-19 coronavirus: recommended personal protective equipment for the orthopaedic and trauma surgeon. [published correction appears in *Knee Surg Sports Traumatol Arthrosc*. 2020 Jun 12;] *Knee Surg Sports Traumatol Arthrosc* 2020;28(06):1690–1698 Doi: 10.1007/s00167-020-06022-4
- 7 Awad ME, Rumley JCL, Vazquez JA, Devine JG. Perioperative Considerations in Urgent Surgical Care of Suspected and Confirmed COVID-19 Orthopaedic Patients: Operating Room Protocols and Recommendations in the Current COVID-19 Pandemic. *J Am Acad Orthop Surg* 2020;28(11):451–463. Doi: 10.5435/JAAOS-D-20-00227
- 8 The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) China, 2020. *China CDC Wkly* 2020;2(08):113–122
- 9 Integrata S. COVID-19. Instituto Superiore di Sanita. 2020. [https://portale.fnomceo.it/wp-content/uploads/2020/06/Infografica\\_22giugno-ITA.pdf](https://portale.fnomceo.it/wp-content/uploads/2020/06/Infografica_22giugno-ITA.pdf) Accessed September 7, 2020
- 10 Análisis de los casos de COVID-19 en personal sanitario notificados a la RENAVE hasta el 10 de mayo en España Accessed September 7, 2020 <https://www.isciii.es/QueHacemos/Servicios/VigilanciaSaludPublicaRENAVE/EnfermedadesTransmisibles/Documents/INFORMES/Informes%20COVID-19/COVID-19%20en%20personal%20sanitario%2029%20de%20mayo%20de%202020.pdf>
- 11 Kursumovic E, Lennane S, Cook TM. Deaths in healthcare workers due to COVID-19: the need for robust data and analysis. *Anaesthesia* 2020;75(08):989–992. Doi: 10.1111/anae.15116
- 12 Epidemiológico I. N°70, departamento epidemiología, MINSAL. 2020
- 13 Guo X, Wang J, Hu D, et al. Survey of COVID-19 Disease Among Orthopaedic Surgeons in Wuhan, People's Republic of China. *J Bone Joint Surg Am* 2020;102(10):847–854. Doi: 10.2106/JBJS.20.00417
- 14 Delgado D, Wyss Quintana F, Perez G, et al. Personal safety during the COVID-19 pandemic: realities and perspectives of healthcare workers in Latin America. *Int J Environ Res Public Health* 2020;17(08):2798. Doi: 10.3390/ijerph17082798