

COVID-19 Impact Among Spine Surgeons in Latin America

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Abstract

Study Design: Cross-sectional study.

Objective: The aim of this study was to evaluate the impact of the COVID-19 outbreak in spine surgeons in Latin America.

Methods: A questionnaire was sent to Latin American spine surgeons from April 4 to 6, 2020. Surgeon characteristics were recorded. The impact of COVID-19 on economic well-being, work, and mental health were also determined. All variables were compared and analyzed.

Results: Two hundred four surgeons answered the complete survey; most of them were male (96.6%), the average age was 47.7 years; 58.8% (n = 120) were orthopedic surgeons and 41.2% (n = 84) were neurosurgeons. The majority of the respondents were from Argentina (59.8%, n = 122), followed by Brazil (17.2%, n = 35), Chile (6.4%, n = 13), and Mexico (5.9%, n = 12). Most of the surgeons reported performing emergency procedures only during the pandemic (76.5%, n = 156). Half used telemedicine or online consultation modalities (54.4%, n = 111). The average concern about the financial situation due to the pandemic was 7.53 in a scale of 1 to 10 (10 being the worst scenario). Twenty-two percent (n = 45) of the surgeons had a score over 10 in the Patient Health Questionnaire (PHQ-9; scores higher than 10 needs referral to confirm depression diagnosis). Young age and neurosurgery as a specialty were associated with higher PHQ-9 scores.

Conclusions: COVID-19 has an impact in the daily working practice and financial situation of spine surgeons in Latin America. The long-term psychological impact should be taken into consideration to avoid a heavier burden for health care providers.

Keywords

depression, Patient Health Questionnaire-9, spine surgery, spine surgeons, Latin America, COVID-19, SARS-Cov-2

Introduction

The world is facing a new infectious disease, the COVID-19 outbreak, a highly transmissible respiratory syndrome that has spread worldwide.

The new COVID-19 outbreak caused by the SARS coronavirus 2 (SARS-CoV-2) that started in Wuhan, China, in December 2019 has spread to almost all regions in the world, and was characterized as a pandemic by the World Health Organization (WHO) on March 11, 2020. The pandemic has become an international public health issue that represents a significant challenge to health care, economic, and social systems around the globe.^{1,2}

The SARS outbreak has provided some evidence regarding the long-term impact of the outbreak; however, there is scarce

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evidence about the real impact on health care workers during the COVID-19 pandemic. Moreover, there is an urgent need to understand the potential impact of this coronavirus outbreak.³⁻⁷

The objective of this study was to conduct a regional survey to study the impact during the COVID-19 outbreak among spine surgeons in Latin America.

Materials and Methods

Study Design

This cross-sectional study included a survey administered to spine surgeons actively working in Latin America countries during the first days of the mandatory quarantine applied due to the COVID 19 pandemic (April 2020).

Survey Distribution

A questionnaire was distributed through social network media, that is, WhatsApp groups, LinkedIn, and Facebook using a listserv, and also e-mailed to the active SILACO (Sociedad Ibero-Latinoamericana de Columna) members between April 4 and 6, 2020. Only surgeons that received the invitation could participate and there was no public access to the questionnaire.

In compliance with the US federal regulation for institutional review board exemption 45 CFR 46 104 (2,i), once a response was accepted it was immediately and permanently anonymized.

The questionnaire was sent to 471 surgeons on a Google Form format. The authors were blinded as to the identity of the spine surgeon responding. The software generated a unique network identifier (number without IP address) for every answer. A brief introduction to every question was made, and the total time needed to complete it was less than 3 minutes. The answers could be sent from any electronic device available (smartphone, tablet, or computer) and could be answered by the same person only once due to its design. The complete questionnaire is available as an appendix (available online).

Questionnaire Structure

The structured survey included the following sections: demographics and professional data, impact in surgical development due to mandatory lockdown, economic impact, and evolution of mood based on the Patient Health Questionnaire on Depression (PHQ-9) validated in Spanish.⁸

The PHQ-9 is the abridged version of the PHQ designed for Primary Care Evaluation of Mental Disorders (PRIME-MD) used at present to achieve better clinical reproducibility.^{9,10}

This is a multipurpose questionnaire for screening, diagnosing, and measuring the severity of depression that includes 9 items related to the criteria used by the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* to diagnose depressive disorders. It uses a 4-point Likert-type scale to rate the presence of symptoms in the prior 2 weeks.

Table 1. PHQ-9 Depression Severity Score.

Score	Description
0-4	No depression
5-9	Mild depression
10-14	Moderate depression
15-19	Moderately-severe depression
20-27	Severe depression

Abbreviation: PHQ-9, 9-item Patient Health Questionnaire.

Depression Score Severity

A severity score was used to analyze the results based on a 4-point scale, where 0 is the least severe and 3 the most severe. So, a score between 0 and 27 was obtained for each of the participants.

When PHQ-9 is used as a screening tool, previous research showed a good combination of sensitivity (0.88) and specificity (0.88), with a cutoff value of 10.^{10,11}

With a score higher than 10 a referral to a psychiatrist or professional clinical interview is recommended in order to confirm the diagnosis, including an assessment of the patient's level of distress and functional impairment. With a score under 10, watchful waiting and repetition of the questionnaire at follow-up should be recommended.^{10,11}

The validation and calibration in Argentina and other countries set categories based on the scores obtained, as follows: 0 to 4 points = no depression; 5 to 9 points = mild depression; 10 to 14 points = moderate depression; 15 to 19 points = moderate-severe depression; 20 to 27 points = severe depression (see Table 1).^{8,11}

Statistical Analysis

The data obtained in the survey was automatically included in an Excel spreadsheet (Microsoft 2013). A descriptive statistical analysis of the variables was conducted and the PHQ-9 score was analyzed.

To perform the exploratory analysis of demographic data, the statistic software Minitab 18 was used. To study the difference between variables, the nonparametric Kruskal-Wallis test was applied. To test which pairs of groups were different, pairwise Wilcoxon rank-sum test was performed. All comparisons were recorded. A $P < .05$ was considered statistically significant.

Results

Demographic Data

A total of 207 spine surgeons submitted valid responses from 471 (response rate 43.3%). Answers from 3 participants living outside Latin America were discarded. Of the 204 submissions included, the vast majority were male (96.6%), the average age was 47.77 years, and 58.8% ($n = 120$) were orthopedist versus 41.2% ($n = 84$) who were neurosurgeons. Demographic information appears in Table 2.

Table 2. Demographic Data (n = 204).

Country	Age	Gender		Years of experience in spine surgery					Specialty			Workplace	
		Female	Men	0-5	5-10	10-20	+20	Neurosurgery	Orthopedics	Public	Private	Both	
													Specialty
Argentina (n = 122)	44.44	4 (3.2%)	118 (96.7%)	19 (15.6%)	29 (23.8%)	45 (36.9%)	28 (22.9%)	64 (52.5%)	58 (47.5%)	4 (3.2%)	59 (48.3%)	59 (48.3%)	59 (48.3%)
Brazil (n = 35)	43.14	1 (2.8%)	34 (97.2%)	7 (20%)	6 (17.2%)	14 (40%)	8 (22.8%)	10 (28.6%)	25 (71.4%)		25 (71.4%)	10 (28.6%)	10 (28.6%)
Chile (n = 13)	45.76		13 (100%)	2 (15.4%)	4 (30.7%)	3 (23.1%)	4 (30.7%)		13 (100%)		9 (69.2%)	4 (30.7%)	4 (30.7%)
Colombia (n = 7)	52.71		7 (100%)	1 (14.2%)	1 (14.2%)	1 (14.2%)	4 (57.1%)	2 (28.6%)	5 (71.4%)		5 (71.45%)	2 (28.6%)	2 (28.6%)
Costa Rica (n = 1)	64		1 (100%)		1 (100%)			1 (100%)				1 (100%)	1 (100%)
Ecuador (n = 2)	62	1 (50%)	1 (50%)		1 (50%)		1 (50%)		2 (100%)		2 (100%)		2 (100%)
Guatemala (n = 1)	39		1 (100%)						1 (100%)				1 (100%)
México (n = 12)	42.41	1 (8.3%)	11 (91.7%)	3 (25%)	4 (33.3%)	4 (33.3%)	1 (8.3%)	5 (41.6%)	7 (58.3%)		6 (50%)	6 (50%)	6 (50%)
Panama (n = 3)	49		3 (100%)		2 (66.6%)		1 (33.3%)	1 (33.3%)	2 (66.6%)		1 (33.3%)	2 (66.6%)	2 (66.6%)
Paraguay (n = 1)	39		1 (100%)		1 (100%)				1 (100%)				1 (100%)
Dominican Republic (n = 5)	39.2		5 (100%)		5 (100%)			1 (20%)	4 (80%)		3 (60%)	2 (40%)	2 (40%)
Uruguay (n = 1)	52		1 (100%)			1 (100%)			1 (100%)		1 (100%)		1 (100%)
Venezuela (n = 1)	67		1 (100%)				1 (100%)		1 (100%)		1 (100%)		1 (100%)
Total (N = 204)	44.77 (average)	7 (3.4%)	197 (96.6%)	33 (16.2%)	52 (25.4%)	71 (34.8%)	48 (23.5%)	84 (41.2%)	120 (58.8%)	4 (1.9%)	111 (54.4%)	89 (43.6%)	89 (43.6%)

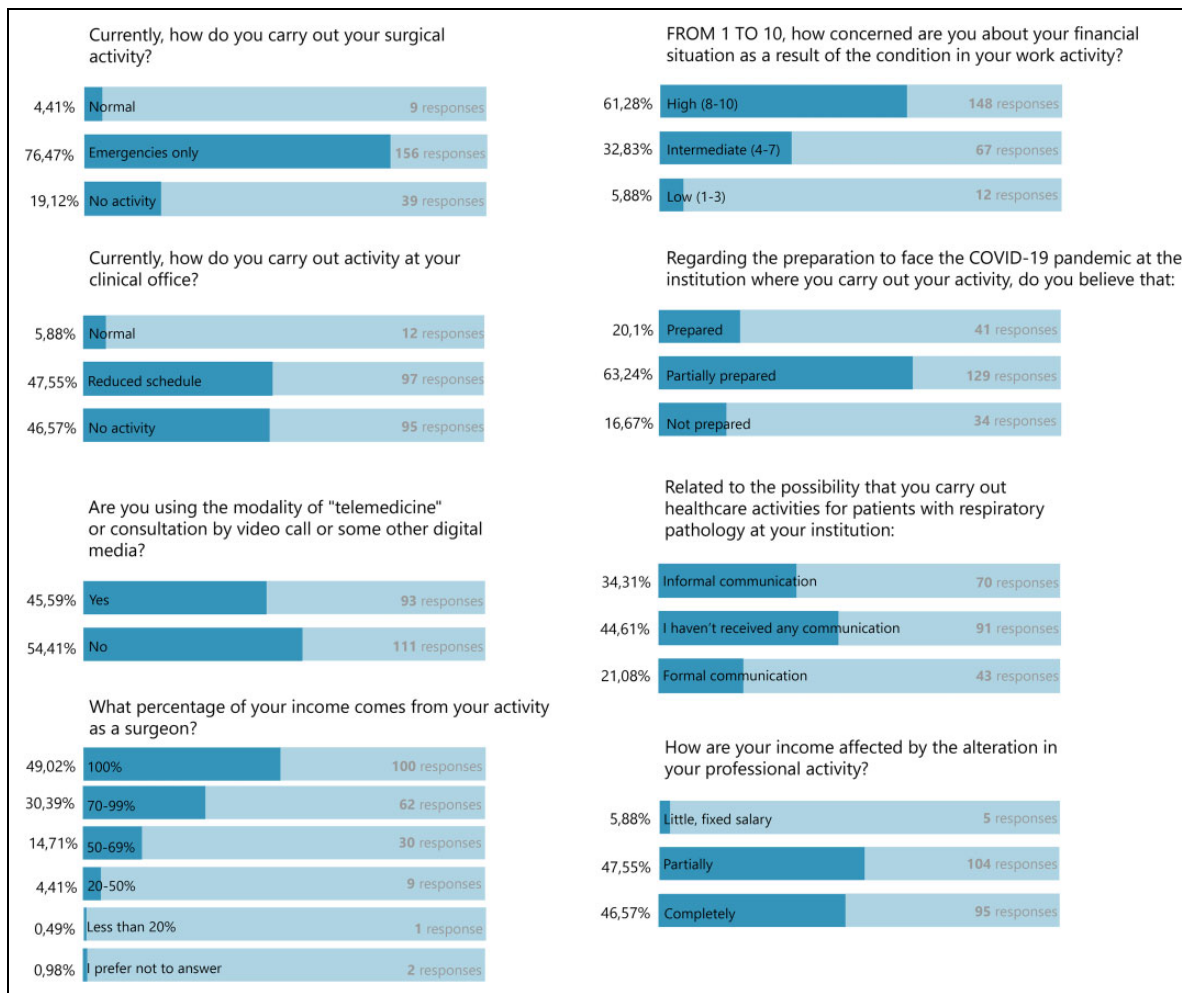


Figure 1. Professional, institutional, and economic impact during COVID-19.

Professional, Institutional, and Economic Impact

Most of the respondents (53.43%, $n = 109$) worked in private practice, 43.63% ($n = 89$) worked in the public health system and only 2.94% ($n = 6$) in both. Most of the surgeons were performing only emergency procedures during the outbreak (76.5%, $n = 156$); 19.1% ($n = 39$) of them had no surgical activity at all; and 4.4% ($n = 9$) were doing their normal activity. A small number of surgeons continued with their regular office activity (5.9%, $n = 12$), whether the others were doing care-related activity in reduced time frames (47.5%, $n = 97$) or not doing any care-related activity at all (46.6%, $n = 95$). About telemedicine, 45.5% ($n = 93$) adopted this practice, and 10.4% ($n = 21$) mentioned the limitation of this modality on performing the physical exam. In a scale of 1 to 10 (1 being the best and 10 being the worst), the average level of concern about the financial situation due to the pandemic was 7.53. In relation to this, most of the surgeons (79.4%, $n = 162$) reported their primary incomes came from surgical activity (more than 70% of the income), and only 5 of the 204 participants (2.5%) mentioned fixed salaries. When asked about the capacity of their

institution to deal with the COVID-19 situation, 63.2% ($n = 129$) mentioned that they were partially prepared, 20.1% ($n = 41$) said it was prepared, and 16.7% ($n = 34$) that there was no preparation at all (Figures 1 and 2).

Emotional Impact

Almost half of the 204 participant surgeons (48.5%) reported depressive symptoms based on PHQ-9 score. In this group, mild depression was the most common category (54.5%, $n = 111$), followed by moderate depression (25.3%, $n = 52$), moderately severe depression (15.2%, $n = 31$), and severe depression (5.1%, $n = 10$).

When considering a cutoff point of 10, 22.1% ($n = 45$) of participants showed a high risk of depression.

A multivariate analysis showed that younger age was associated with higher levels of depression, and a significant reduction on the mean value of the PHQ-9 was seen with age increase. In addition, neurosurgeon's PHQ-9 media score was 6.8, in comparison with orthopedists with PHQ-9 media score of 5.2, and this difference was statistically significant

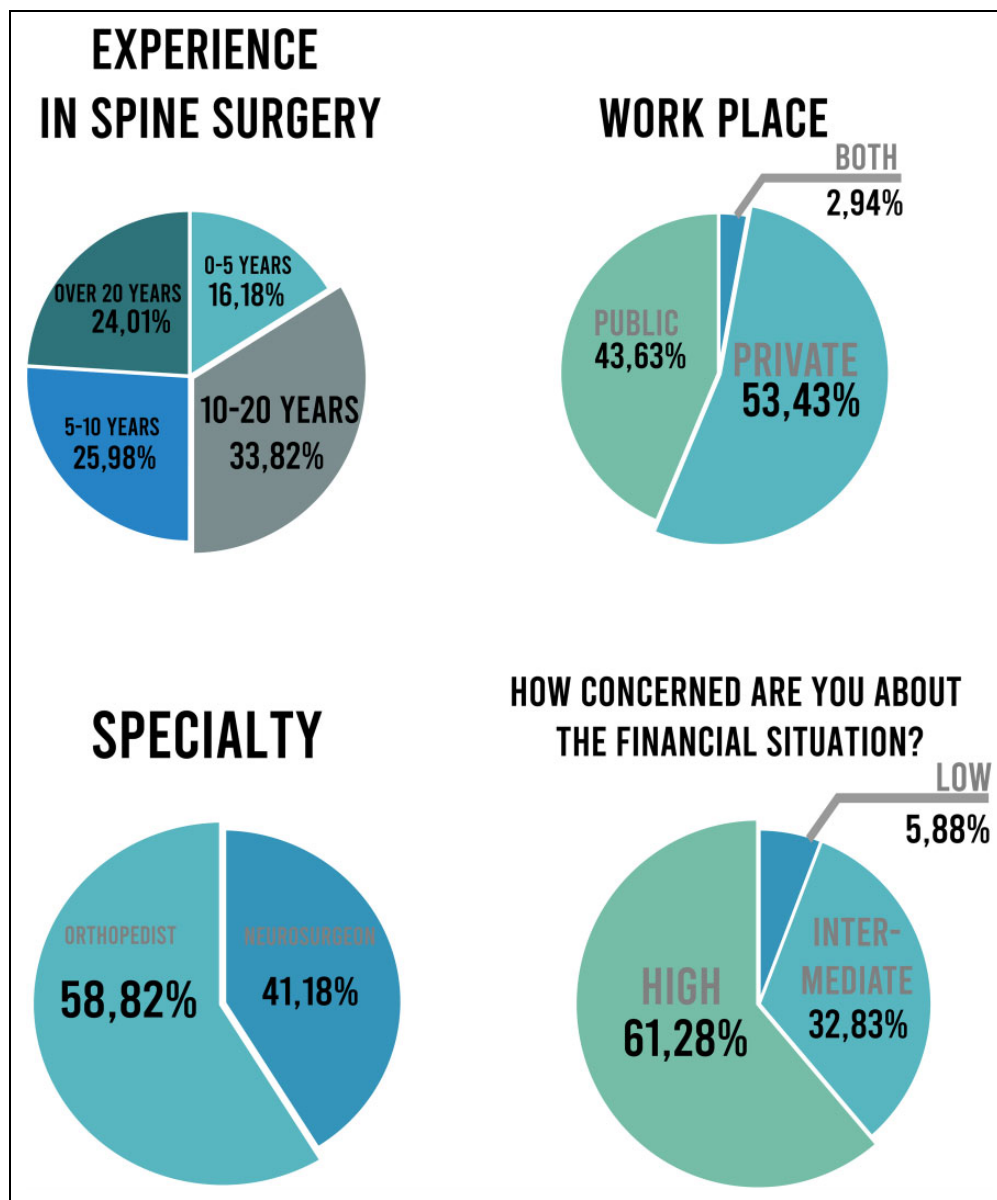


Figure 2. Results of the survey about years of experience, work place, specialty, and concern about financial situation.

($P = .0033$). We did not find any other statistically significant relation between the other variables (Figure 3).

Discussion

Since the beginning of the COVID-19 outbreak, many dynamic changes have been introduced for both the general population and health care providers in order to face the pandemic. In this new scenario, it is important to know the impact of COVID-19 among spine surgeons as well as other health care workers. In our study, a significant reduction of clinical and surgical activities has been observed with increased concern about financial consequences derived from quarantine measurements. In addition, an emotional impact with nearly half (48.5%) of

respondents showing different degrees of depressive symptoms was detected.

Multiple interventions have been made worldwide in an attempt to manage the pandemic.

Most countries in Latin America declared a social preventive and mandatory lockdown to flatten the curve, limit the spread of the disease, and thus reduce the workload on health care systems. The population must remain at home and may go out only to buy food and medication. Regarding this measure, several medical associations in North and South America have recommended postponing or canceling elective surgeries (American College of Surgeons, American Hospital Association).^{12,13}

In this survey, we found that 76.5% ($n = 156$) of respondents were performing only emergency procedures, and 46.6% ($n = 95$) cancelled their clinical activities. Similar results were

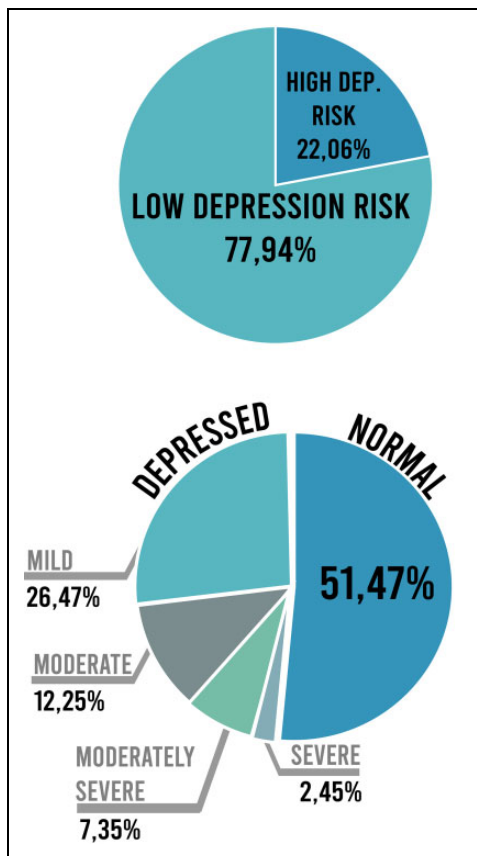


Figure 3. Low and high depression risk according to PHQ-9 score and severity percentages.

recently reported by Jean et al¹⁴ in their study about the global impact on neurosurgeons during COVID-19 pandemic, with 52.5% (n = 258) of participants who had cancelled all elective surgeries as well as office visits and consultation.

Social distancing as an effort to mitigate transmission of the virus led to a greater interest in some telemedicine practices. Telehealth is limited by the lack of physical exam but has high rates of satisfaction from patients and clinicians.^{15,16} In our study, we found that almost half of the spine surgeons were using telemedicine and the most usual concern was about the lack of physical exam (10.4%, n = 21).

Quarantine and isolation may be a devastating experience leading to the occurrence of psychological disorders.¹⁷⁻¹⁹ This impact after quarantine among health care professionals has previously been reported.²⁰ Liu et al⁴ published that health care providers who experienced quarantine were more likely to report anxiety, irritability, low concentration, lower work performance, and unwillingness to return to work. Another study examined depression-related symptoms after 3 years on health personnel in Beijing, showing a rate of 9% of severe depression and posttraumatic stress disorder. Other studies have shown similar results after SARS and Middle East outbreaks.²⁰⁻²⁶ In this study, we found that nearly 50% of spine surgeons experience depressive symptoms during this outbreak, with some association between young age and neurosurgery as a specialty

and a higher rate of depression. This symptom may also be associated with burnout and anxiety in this time-consuming and demanding specialty as observed by other authors in the United States. Despite the fact that there are no studies on depression available in the region before the outbreak, the increased concern about the financial situation along with the reduced surgical and clinical activities could be related to this depressive symptoms among respondents.^{27,28}

Limitations

This study has limitations. First, the prevalence of depression among spine surgeons in Latin America is unknown, mainly due to the lack of studies in this field. So, it is difficult to compare the present pandemic situation with the previous status in the region and therefore attribute this prevalence to the outbreak. However, with a high rate of professional activity having dropped and considering that more than half of the surgeons have a private practice, we are in a position to estimate that this high depression rate is somewhat related to the COVID-19 outbreak; however, more studies are required to further analyze this subject. Another limitation is based on the response rate of our survey, even when 207 (43%) responses are a reasonably sample size, it is far from representative of all Latin America spine surgeons, and this is a limitation inherent to every survey and may be a selection bias. On the other hand, we consider this one of the most valuable methods for collecting information during a short period, an important aspect during this outbreak. Other limitations may be related to the heterogeneity of responses in different countries with the highest response rate in Argentina compared to Venezuela or Mexico, making our results difficult to generalize. Furthermore, similar responses may be expected as this pandemic is affecting almost all countries in Latin America.

Conclusion

Based on our survey, a professional and emotional impact among spine surgeons has been observed. To our knowledge, this is the first study that analyzes the socioeconomic impact among spine surgeons in Latin America during the COVID-19 outbreak.* We hope this information may be useful for other professionals and organizations for the promotion of measurements to address this issue and mitigate its consequences.

*Authors' Note

At the time of the article's composition and peer review. However, the authors acknowledge that they have since become aware of similar studies that occurred around the same time.


Declaration of Conflicting Interests


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Supplemental Material

Supplemental material for this article is available online.

References

- World Health Organization. *Occupational Safety and Health in Public Health Emergencies: A Manual for Protecting Health Workers and Responders*. World Health Organization; 2018.
- Wu P, Fang Y, Guan Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry*. 2009;54:302-311. doi:10.1177/070674370905400504
- Tam CW, Pang EP, Lam LC, Chiu HF. Severe acute respiratory syndrome (SARS) in Hong Kong in 2003: stress and psychological impact among frontline healthcare workers. *Psychol Med*. 2004;34:1197-1204.
- Liu X, Kakade M, Fuller CJ, et al. Depression after exposure to stressful events: lessons learned from the severe acute respiratory syndrome epidemic. *Compr Psychiatry*. 2012;53:15-23.
- Lancee WJ, Maunder RG, Goldbloom DS; Coauthors for the Impact of SARS Study. Prevalence of psychiatric disorders among Toronto hospital workers one to two years after the SARS outbreak. *Psychiatr Serv*. 2008;59:91-95. doi:10.1176/ps.2008.59.1.91
- Mak IW, Chu CM, Pan PC, Yiu MG, Chan VL. Long-term psychiatric morbidities among SARS survivors. *Gen Hosp Psychiatry*. 2009;31:318-326. doi:10.1016/j.genhosppsych.2009.03.001
- Brooks SK, Webster RK, Smith LE, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*. 2020;395:912-920. doi:10.1016/S0140-6736(20)30460-8
- Muñoz-Navarro R, Cano-Vindel A, Medrano LA, et al. Utility of the PHQ-9 to identify major depressive disorder in adult patients in Spanish primary care centres. *BMC Psychiatry*. 2017;17:291. doi:10.1186/s12888-017-1450-8
- Spitzer RL, Kroenke K, Williams JB. Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. Primary Care Evaluation of Mental Disorders. Patient Health Questionnaire. *JAMA*. 1999;282:1737-1744.
- Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. 2001;16:606-613.
- Urtasun M, Daray FM, Teti GL, et al. Validation and calibration of the Patient Health Questionnaire (PHQ-9) in Argentina. *BMC Psychiatry*. 2019;19:291. doi:10.1186/s12888-019-2262-9
- American College of Surgeons. COVID-19: guidance for triage of non-emergent surgical procedures. Published March 17, 2020. Accessed April 6, 2020. <https://www.facs.org/covid-19/clinical-guidance/triage>
- American Hospitals Association. AHA letter to Surgeon General. Re: Elective surgeries and COVID-19. Published March 17, 2020. Accessed April 6, 2020. <https://www.aha.org/lettercomment/2020-03-15-aha-letter-surgeon-general-re-elective-surgeries-and-covid-19>
- Jean W, Ironside NT, Sack KD, Felbaum DR, Syed HR. The impact of COVID-19 on neurosurgeons and the strategy for triaging non-emergent operations: a global neurosurgery study [published online April 21, 2020]. *Acta Neurochir (Wien)*. doi:10.1007/s00701-020-04342-5
- Hakim AA, Kellish AS, Atabek U, Spitz FR, Hong YK. Implications for the use of telehealth in surgical patients during the COVID-19 pandemic [published online April 21, 2020]. *Am J Surg*. doi:10.1016/j.amjsurg.2020.04.026
- Asiri A, AlBishi S, AlMadani W, ElMetwally A, Househ M. The use of telemedicine in surgical care: a systematic review. *Acta Inform Med*. 2018;26:201-206. doi:10.5455/aim.2018.26.201-206
- Centers for Disease Control and Prevention. Quarantine and isolation. Accessed May 4, 2020. <https://www.cdc.gov/quarantine/index.html>
- Manuell ME, Cukor J. Mother nature versus human nature: public compliance with evacuation and quarantine. *Disasters*. 2011;35:417-442. doi:10.1111/j.1467-7717.2010.01219.x
- Rubin GJ, Wessely S. The psychological effects of quarantining a city. *BMJ*. 2020;368:m313.
- Bai Y, Lin CC, Lin CY, Chen JY, Chue CM, Chou P. Survey of stress reactions among health care workers involved with the SARS outbreak. *Psychiatr Serv*. 2004;55:1055-1057.
- Wu P, Liu X, Fang Y, et al. Alcohol abuse/dependence symptoms among hospital employees exposed to a SARS outbreak. *Alcohol Alcohol*. 2008;43:706-712.
- Jeong H, Yim HW, Song YJ, et al. Mental health status of people isolated due to Middle East respiratory syndrome. *Epidemiol Health*. 2016;38:e2016048.
- Robertson E, Hershenfield K, Grace SL, Stewart DE. The psychosocial effects of being quarantined following exposure to SARS: a qualitative study of Toronto health care workers. *Can J Psychiatry*. 2004;49:403-407. doi:10.1177/070674370404900612
- Pellecchia U, Crestani R, Decroo T, Van den Bergh R, Al-Kourdi Y. Social consequences of Ebola containment measures in Liberia. *PLoS One*. 2015;10:e0143036.
- Mihashi M, Otsubo Y, Yinjuan X, Nagatomi K, Hoshiko M, Ishitake T. Predictive factors of psychological disorder development during recovery following SARS outbreak. *Health Psychol*. 2009;28:91-100.
- Brooks SK, Dunn R, Amlôt R, Rubin GJ, Greenberg N. A systematic, thematic review of social and occupational factors associated with psychological outcomes in healthcare employees during an infectious disease outbreak. *J Occup Environ Med*. 2018;60:248-257.
- McAbee JH, Ragel BT, McCartney S, et al. Factors associated with career satisfaction and burnout among US neurosurgeons: results of a nationwide survey. *J Neurosurg*. 2015;123:161-173. doi:10.3171/2014.12.JNS141348
- Attenello FJ, Buchanan IA, Wen T, et al. Factors associated with burnout among US neurosurgery residents: a nationwide survey. *J Neurosurg*. 2018;129:1349-1363. doi:10.3171/2017.9.JNS17996