



Psychosocial factors impacting the mental health of the orthopaedic workforce

Divya Talwar¹

Soroush Baghdadi¹

Heidi Nocka¹

Alexandre Arkader^{1,2}

¹Department of Orthopaedic Surgery
The Children's Hospital of Philadelphia

²Perelman School of Medicine,
University of Pennsylvania

Introduction

Since the outbreak of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), healthcare workers have been at the forefront of the pandemic¹. The United States has witnessed over 30,085,827 cases with over half a million fatalities². Physicians and nurses have been the frontline workers involved heavily with the treatment, diagnosis, and screening of the infected individuals. However, while managing the ever-increasing crisis during the pandemic, psychosocial impact on the mental health and welfare of healthcare professionals cannot be ignored. Some of the most common concerns include increased professional workload, work-life balance due to shutdowns, increased risk of cross-contamination, and fluctuating availability of personal protective equipment³.

Previous reports have cited lower epidemiological rates among pediatric patients undergoing orthopaedic surgeries compared to adult patients⁴. However, most of the infected patients were asymptomatic. Treating such patients pose challenges to healthcare workers by possibly increasing the risk of infections along with an increased psychosocial impact with unknown consequences. Currently, no studies have been conducted to identify possible factors that contribute to the psychosocial impact of COVID-19 on pediatric orthopaedic healthcare workers. The purpose of this study is to assess the psychosocial factors associated with the mental health status of pediatric orthopaedic clinicians at an academic tertiary care center during the COVID-19 pandemic.

Methods

An electronic survey via RedCap^{6,7} was sent to the pediatric orthopaedics healthcare team members including surgeons and advanced practice providers. All surveys responses were collected during September 2020. The participants were recruited from an academic tertiary care pediatric orthopaedic department.

The psychometric item scales in the survey were selected based on Bandura's Social Cognitive Theory and Theory of Planned Behavior – based on an integrated framework to

identify the psychosocial factors that may impact providers negatively or positively. Six validated surveys were chosen, namely, Obsession with COVID Scale (OCS), Coronavirus Anxiety Scale (CAS), Emotional Exhaustion inventory (EE), Insomnia Severity Index (ISI), PROMIS Emotional Support, Grit-S survey, and Trauma Coping Self-Efficacy Scale (C-SET). The survey instruments were chosen to evaluate the provider's attitude, provider's behavior, provider's social support, and provider's "state of mind". A detailed breakdown of survey instruments can be found in Table 1. We also collected demographic variables such as gender, professional experience, marital status, race, ethnicity, and number of children. Based on the normality of data, correlations, Mann Whitney U-test and Chi² and Fisher's Exact tests were conducted.

Results

In total, 39 providers participated in the study (surgeons: n = 22; 56.4%; nurses: n = 17; 43.6%) with a response rate of 71% (39/55). Our participant demographics were white (84.6%); a mean age of 44.9 years (range: 28 - 72); female (59.0%); married (79.5%), had two children (35.9%) and mean professional experience of 16.6 years (range: 1 - 41). The mean score of survey items were as follows: "Obsession with COVID-19" - 3.39 (± 2.3) indicating mild dysfunctional thinking and obsession with COVID-19; "coronavirus anxiety" - 1.18 (± 2.7) indicating mild anxiety; no insomnia symptoms: 5.76 (± 4.2); emotional support: 56.2 (± 6.9) indicating slightly above acceptable threshold; grit: 3.9 (± 4.9) meaning robust resolve and lastly, trauma coping self-efficacy was 43.3 (± 9.4) meaning medium coping style from traumatic situations. About 36% had one or more symptoms of burnout.

No significant differences were seen based on provider role. Grit and emotional support had significant and protective effects on trauma coping self-efficacy. However, the provider's coping ability with trauma was significantly and negatively impacted by insomnia. In addition, provider burnout was significantly correlated with insomnia and sleep quality (p < 0.001).

Table 1: Survey instruments and interpretation

Item Scale	Scale interpretation	No. of items	Scoring	Score interpretation
Obsession with COVID Scale (OCS) ⁷	Constant thoughts about COVID-19	4	5-point Likert scale	Score of ≥ 7 is interpreted as probable problematic and constant thinking about COVID-19 pandemic.
Coronavirus Anxiety Scale (CAS) ⁸	Anxiety due to COVID-19	5	4-point Likert scale	Score of ≥ 9 indicates problematic and constant anxiety towards COVID-19 pandemic.
Maslach Burnout Inventory: Emotional Exhaustion inventory ⁹	Physician burnout	1	7-point Likert scale	Score of ≤ 2 is interpreted as no symptoms of burnout). Score of ≥ 3 indicate that participant has one or more symptoms of emotional exhaustion.
Insomnia Severity Index (ISI) ¹⁰	Sleep difficulty	7	Score range: 0-28	0–7 = No clinically significant insomnia; 8–14 = Subthreshold insomnia; 15–21 = Clinical insomnia (moderate severity); 22–28 = Clinical
PROMIS Emotional Support ¹¹	Emotional support from family and friends	4	T scores; Computer Adaptive Test	Raw score is converted standardized score with a mean and a standard deviation
Grit-S ¹²	Tenacity to persevere through difficult situations	8	5-point Likert scale	Score of 1 represents “not gritty at all” while score of 5 indicates “extremely gritty”
Trauma Coping Self-Efficacy Scale (C-SET) ¹³	Self-ability to cope with trauma	9	7-point Likert scale: Range: 9 - 63	Lower score indicates lower coping self-efficacy for trauma

Table 2: Correlation of item scales within the sample

Variables	Professional Experience (in years)	Obsession with COVID	Anxiety due to COVID-19	Physician Burnout	Insomnia	Emotional Support	Grit	Trauma coping self-efficacy
Professional Experience	1							
Obsession with COVID-19	0.1212	1						
Anxiety due to COVID-19	0.1319	0.4525**	1					
Physician Burnout	0.1236	0.2631	0.3800**	1				
Insomnia	0.0197	0.2617	0.2331	0.4949***	1			
Emotional Support	0.0419	-0.0616	0.0994	-0.2700	-0.2212	1		
Grit	-0.0703	-0.1152	0.1549	-0.2613	-0.2865	0.1728	1	
Trauma coping self-efficacy	-0.0610	-0.2866	-0.1468	-0.6922*	-0.6839***	0.5761***	0.4765**	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2 summarizes our findings. More than three-quarters of the participants felt their scholarly activities decreased or remained the same (n = 30; 76.9%).

Discussion

After COVID-19 was declared a pandemic in early 2020, major disruptions were witnessed on all aspects of life globally. This included cancellation of elective surgeries as concerns

arose for limited personal protective equipment (PPE) and blood products along with increasing COVID-19 cases.¹⁴ Additionally, the orthopaedic workforce weathered major concerns of imparting infections on families along with their colleagues while treating their patients. Various changes were made overnight to incorporate changing practice patterns such as the incorporation of telemedicine, online education and trainings, and reallocation of staff members. Our study

aimed to quantify the impact of COVID-19 on the orthopaedic workforce in a tertiary care hospital.

While mental health indicators fluctuated substantially among our pediatric orthopaedics care team, most of the indicators revealed above-threshold results, which is concerning. We observed mild dysfunctional thinking and obsession, as well as mild anxiety about COVID-19, which indicate preoccupation with the disease among our responders. Furthermore, we found that more than a third of our responders are in a state of burnout. Anxiety and burnout are codependent and may lead to a vicious cycle that makes it impossible for the person to function well, both at their job and in the personal life. Orthopaedic providers in our sample exhibited grit, i.e., perseverance to withstand challenges. Grit and emotional support of providers were strongly correlated with coping with traumatic situations such as COVID in this situation.

Conclusion

Healthcare providers are under considerable pressure during the COVID-19 pandemic. While the rate of infection and complications are lower in children, COVID-19 has had a significant impact on the psychosocial health of nurses and provider working at children's hospitals.

References:

1. **Spoorthy MS, Pratapa SK, Mahant S.** Mental health problems faced by healthcare workers due to the COVID-19 pandemic-A review. *Asian J Psychiatr.* 2020; 51:102119.
2. **Centers for Disease Control & Prevention.** United States COVID-19 Cases and Deaths by State. 2020.
3. **Kisely S, Warren N, McMahon L, et al.** Occurrence, prevention, and management of the psychological effects of emerging virus outbreaks on healthcare workers: rapid review and meta-analysis. *BMJ.* 2020; 369:m1642.
4. **Blumberg TJ, Adler AC, Lin EE, et al.** Universal Screening for COVID-19 in Children Undergoing Orthopaedic Surgery: A Multicenter Report. *J Pediatr Orthop.* 2020; 40(10):e990-e993.
5. **Harris PA, Taylor R, Thielke R, et al.** Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform.* 2009;42(2):377-381.
6. **Harris PA, Taylor R, Minor BL, et al.** The REDCap consortium: Building an international community of software platform partners. *J Biomed Inform.* 2019; 95:103208.
7. **Obsession with COVID-19 Scale (OCS) - PhenX Toolkit** (2020).
8. **Ahn MH, Lee J, Suh S, et al.** Application of the Stress and Anxiety to Viral Epidemics-6 (SAVE-6) and Coronavirus Anxiety Scale (CAS) to Measure Anxiety in Cancer Patient in Response to COVID-19. *Front Psychol.* 2020; 11:604441.
9. **Bastien CH, Vallières A, Morin CM.** Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Med.* 2001; 2(4):297-307.
10. **Emotional Support – Health Measures.** Emotional Support.
11. **Angela Duckworth.** Grit Scale.
12. **Benight CC, Shoji K, James LE, et al.** Trauma Coping Self-Efficacy: A Context-Specific Self-Efficacy Measure for Traumatic Stress. *Psychol Trauma.* 2015; 7(6):591-599.
13. **Simon MJK, Regan WD.** COVID-19 pandemic effects on orthopaedic surgeons in British Columbia. *J Orthop Surg Res.* 2021; 16(1):161.