

Frequency of acute stress disorder in health care workers of a tertiary level pediatric hospital during the National Safe Distance Strategy for COVID-19 prevention

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Abstract

Background: Acute stress disorder (ASD) is one of the most frequent mental illnesses occurring during sanitary emergencies. This study aimed to estimate the frequency of ASD in health care workers of a tertiary level pediatric hospital during the coronavirus disease (COVID-19) pandemic. **Methods:** We conducted a cross-sectional study in which health care workers completed a virtual questionnaire, including sociodemographic information and the ASD scale. **Results:** We analyzed 206 questionnaires. The population was divided into three groups: attending physicians, medical residents, and nursing personnel. The frequency of health care workers who showed at least nine symptoms of ASD was 88.8%. No significant differences were found between the studied groups. **Conclusions:** ASD is a frequent condition in health care workers in the context of the COVID-19 pandemic. We need to investigate further and assess risk and protective factors for developing this and other psychopathologies in this population.

Key words: COVID-19. Acute stress disorder. Pandemic. Health care workers.

Frecuencia de trastorno por estrés agudo en el personal de salud de un hospital pediátrico de tercer nivel durante la Jornada Nacional de Sana Distancia para la prevención de la COVID-19

Resumen

Introducción: El trastorno por estrés agudo es una de las enfermedades mentales más frecuentemente manifestadas en emergencias sanitarias. El objetivo de este estudio fue conocer la frecuencia con la que se presentó el trastorno por estrés agudo en el personal de salud de un hospital pediátrico de tercer nivel durante la epidemia de COVID-19. **Método:** Se realizó un estudio transversal en el que trabajadores de la salud contestaron un cuestionario virtual que incluyó datos sociodemográficos y la Escala de Trastorno por Estrés Agudo. **Resultados:** Se analizaron 206 encuestas. La población se dividió en tres grupos: médicos adscritos, residentes y personal de enfermería. El 88.8% de los trabajadores de la salud reportaron más de nueve síntomas de trastorno por estrés agudo. No se encontraron diferencias significativas entre los grupos de estudio. **Conclusiones:** Los síntomas del trastorno por estrés agudo son frecuentes en los trabajadores de la salud en el contexto de la COVID-19. Es necesario investigar acerca de los factores de riesgo y protectores asociados al desarrollo de esta y otras psicopatologías en dicha población.

Palabras clave: COVID-19. Trastorno por estrés agudo. Pandemia. Trabajadores de la salud.

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Introduction

Coronavirus disease (COVID-19) is a respiratory illness caused by severe acute respiratory syndrome coronavirus 2¹. It is airborne and characterized by shortness of breath, fever, muscle pain, and dry cough². The World Health Organization declared the “pandemic” status in March 2020³.

On March 29, Mexican authorities announced implementing a hospital conversion model to coordinate and integrate hospitals’ response to the care of severe patients with COVID-19. The Hospital Infantil de México Federico Gómez would initially be the national health institute that would care for pediatric patients <18 years of age with severe COVID-19⁴.

In epidemics, mental health is often affected. Some common reactions include being afraid of getting sick or dying, having a beloved one who could be ill or die, uncertainty about the economic situation, boredom, loneliness, depression due to isolation, and the risk of physical or mental health deterioration in vulnerable people⁵.

When facing an unknown and potentially dangerous situation, it is normal to experience anxiety and decreased mood. The expectation is that these symptoms will not cause significant dysfunction and will improve. However, some people may develop more complex disorders and feel stressed, even when they are no longer in danger. In health emergencies, acute stress disorder (ASD) frequently occurs⁵. The following are the diagnostic criteria for this disorder:

- a. Exposure to death, serious injury, or sexual violence, whether actual or threatened, in one (or more) of the following:
 - Direct experience of the traumatic event(s)
 - Direct presence of the event(s) experienced by others
 - Learning that the traumatic event(s) has occurred to a close family member or friend
 - Repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., rescue workers collecting human remains; police officers repeatedly exposed to elements of child abuse).
- b. Presence of nine or more of the symptoms from one of the five categories: intrusion, negative mood, dissociation, avoidance, and alertness, which begin or worsen after the traumatic event(s):
 - Recurrence symptoms
 1. Recurrent, involuntary, and distressing intrusive memories of the traumatic event(s)
 2. Recurrent distressing dreams in which the content or difficulty sleeping is related to the event(s)

3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) is recurring. These reactions can occur continuously, and the most extreme expression is a complete loss of awareness of present surroundings
4. Intense or prolonged psychological distress or significant physiological reactions in response to internal or external factors that symbolize or resemble an aspect of the traumatic event(s).
- Negative mood
 1. Persistent inability to experience positive emotions (e.g., happiness, satisfaction, or loving feelings).
- Dissociative symptoms
 1. Altered sense of the reality of self-surroundings or oneself (e.g., seeing oneself from another’s perspective, being in a daze, and time slowing)
 2. Inability to remember an essential aspect of the traumatic event(s) (typically due to dissociative amnesia, not to other factors such as head injury, alcohol, or drugs).
- Avoidance symptoms
 1. Efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s)
 2. Efforts to avoid external reminders (people, places, conversations, activities, objects, and situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
- Arousal symptoms
 1. Sleep disturbance (e.g., difficulty falling or staying asleep, or restless sleep)
 2. Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects
 3. Hypervigilance
 4. Difficulty concentrating
 5. Exaggerated startle response.
- c. Duration of disturbance symptoms (in criterion B) ranges from 3 days to 1 month after trauma exposure
- d. Disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning
- e. Disturbances are not attributable to the physiological effects of substances (e.g., medication or alcohol) or other medical conditions (e.g., mild traumatic brain injury) and are not better explained by a brief psychotic disorder⁶.

In a review of the relationship between ASD and post-traumatic stress disorder (PTSD), it was concluded

Table 1. Sociodemographic characteristics of health care workers by profession

Sociodemographic characteristics	Resident physicians (n = 60) Frequency (%)	Attending physicians (n = 84) Frequency (%)	Nursing personnel (n = 62) Frequency (%)
Gender			
Female	45 (75)	53 (63.1)	60 (96.8)
Male	15 (25)	31 (36.9)	2 (3.2)
Age (mean \pm SD)	28.6 \pm 2	39.9 \pm 10.2	40.7 \pm 7.5
Schooling			
High school	0	0	0
Technical career	0	0	4 (6.4)
Bachelor's degree	13 (21.7)	0	26 (41.9)
Postgraduate	47 (78.3)	84 (100)	32 (51.6)
Monthly income (MXN)			
\$4000 a \$8999	10 (16.7)	0	23 (37.1)
\$9000 a \$29,999	50 (84.3)	25 (29.8)	38 (61.3)
\$30,000 a \$44,999	0	26 (31)	1 (1.6)
> \$45,000	0	33 (39.4)	0
Type of housing			
Self-owned house	5 (8.3)	39 (46.4)	27 (43.5)
Self-owned apartment	3 (5)	11 (13.1)	20 (32.3)
Rented house	0	8 (9.5)	3 (4.8)
Rented apartment	26 (43.3)	17 (20.2)	4 (6.5)
Shared house/apartment	20 (33.3)	9 (10.7)	8 (12.9)
Loaned/rented room	6 (10)	0	0

MXN: Mexican pesos; SD: standard deviation.

that 30-83% of people who were diagnosed with ASD subsequently developed PTSD⁷.

The objective of this study was to examine the frequency of ASD symptoms in health-care personnel (resident physicians, attending physicians, and nursing personnel) who were in contact with COVID-19 patients during the pandemic in the Hospital Infantil de México Federico Gómez.

Methods

An observational, cross-sectional, prospective, and descriptive study was carried out employing a virtual questionnaire addressed to health-care personnel (resident physicians, attending physicians, and nursing personnel), which was distributed by email from April 23 to May 23, 2020. The questionnaire contained an informed consent form specifying that the information would be handled anonymously and confidentially. If at least nine symptoms of ASD were detected, an email address was solicited to provide information regarding treatment. The questionnaire was approximately 20 min long and consisted of multiple-choice questions in which sociodemographic factors were explored. The ASD scale is a screening test of 19 items scored on a Likert-type scale,

which describes symptoms regarding the criteria of recurrence, avoidance, arousal, and dissociative cognitive alterations. This test was also applied in the same format. Based on the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders)⁷, a cutoff point ≥ 27 on criterion B suggests a diagnosis of ASD. In contrast, a score > 56 indicates that the person is at greater risk of PTSD⁸.

Statistical analysis

A descriptive analysis was carried out for both socio-demographic and outcome variables. For qualitative variables, frequencies and percentages were used; for quantitative variables, mean and standard deviation were used. Inferential statistics were carried out with the χ^2 test to determine the differences in the outcome variables between groups.

Results

Sociodemographic data

We recruited 206 participants. The surveys were carried out from April 23 to May 23, mostly during the first 3 weeks of May 2020.

Table 2. ASD scale results of health care workers by profession

ASD scale	Resident physicians (n = 60) Frequency (%)	Attending physicians (n = 84) Frequency (%)	Nursing personnel (n = 62) Frequency (%)	p-value
No acute stress	13 (21.7)	22 (26.2)	14 (22.6)	0.96
Acute stress	39 (65)	52 (61.9)	41 (66.1)	
Acute stress and risk of PTSD	8 (13.3)	10 (11.9)	7 (11.3)	

ASD: Acute stress disorder; PTSD: Post-traumatic stress disorder.

*p-values calculated by χ^2 test.**Table 3.** Dissociative symptoms (ASD scale) by profession

Item	Resident physicians (n = 60) Frequency (%)	Attending physicians (n = 84) Frequency (%)	Nursing personnel (n = 62) Frequency (%)	p-value
Emotional distress or detachment	29 (48.3)	25 (29.8)	29 (46.8)	0.037
Being in a daze	25 (41.7)	24 (28.6)	19 (30.6)	0.23
Altered sense of the reality (like being in a dream)	12 (20)	15 (17.9)	14 (20.3)	0.88
Distance from oneself (as an outside observer)	8 (13.3)	7 (8.3)	11 (17.7)	0.23
Difficulty remembering things	8(13.3)	6 (7.1)	4 (6.5)	0.32

ASD: Acute stress disorder.

*p-values calculated by χ^2 test.

The population was divided into three groups: resident physicians, attending physicians, and nursing personnel. All participants were actively employed healthcare workers at the Hospital Infantil de México Federico Gómez. Sociodemographic characteristics of health care workers are described in [Table 1](#).

ASD scale results

Based on criterion B, 88% of the total population obtained scores that met the criteria for the diagnosis of ASD, of which 13.6% obtained a score indicating a significant risk of eventually developing PTSD ([Table 2](#)).

Scale results by type of symptoms

The following section describes the scale results by a subset of symptoms: dissociation, recurrence, avoidance, and arousal. Although no significant differences were found between groups, some important data were observed. The most frequently reported symptom by attending physicians and nurses was the feeling of being more alert to danger (alertness) (41.7% and

54.8%, respectively). In comparison, resident physicians' most frequent symptom was sleeping difficulty derived from anxiety (56.7%). In addition, resident physicians were the group that most frequently presented symptoms of each of the subsets.

Dissociative symptoms

The most frequently reported dissociative symptom was emotional detachment. A statistically significant difference was found between groups. The percentage of resident physicians that reported emotional distress was 48.3%, whereas 46.8% of the nursing personnel and 29.8% of attending physicians reported this symptom ($p = 0.037$) ([Table 3](#)).

Recurrence symptoms

The most frequently reported symptom of recurrence in all groups was experiencing anxiety when recalling the event. [Table 4](#) describes participants' frequency with positive answers for the items that assessed recurrence symptoms within the ASD scale.

Table 4. Recurrence symptoms (ASD scale) by profession

Item	Resident physicians (n = 60) Frequency (%)	Attending physicians (n = 84) Frequency (%)	Nursing personnel (n = 62) Frequency (%)	p-value
Intrusive memories and thoughts	15 (25)	12 (14.3)	14 (22.6)	0.23
Distressing dreams or nightmares	8 (13.3)	13 (15.5)	9 (14.5)	0.93
Feeling that the event can recur at any time	14 (23.3)	16 (19)	13 (21)	0.82
Feelings of distress on reminders of the pandemic	17 (28.3)	18 (21.4)	14 (22.6)	0.6

ASD: acute stress disorder.
*p-values calculated by χ^2 test.

Table 5. Avoidance symptoms (ASD scale) by profession

Item	Resident physicians (n = 60) Frequency (%)	Attending physicians (n = 84) Frequency (%)	Nursing personnel (n = 62) Frequency (%)	p-value
Avoidance of thoughts or memories of the pandemic	22 (36.7)	21 (25)	12 (19.4)	0.087
Avoiding conversations on the pandemic	24 (40)	17 (20.2)	14 (22.6)	0.021
Avoiding situations, places, or people that cause recall of the pandemic	17 (28.3)	15 (17.9)	17 (27.4)	0.25
Try not to feel distress or discomfort	24 (40)	27 (32.1)	20 (32.3)	0.56

ASD: Acute stress disorder.
*p-values calculated by χ^2 test.

Table 6. Arousal symptoms (ASD scale) by profession

Item	Resident physicians (n = 60) Frequency (%)	Attending physicians (n = 84) Frequency (%)	Nursing personnel (n = 62) Frequency (%)	p-value
Difficulty sleeping	34 (56.7)	32 (38.1)	30 (48.4)	0.084
Increased irritability	22 (36.7)	27 (32.1)	19 (30.6)	0.76
Difficulty concentrating	26 (43.3)	25 (29.8)	15 (24.2)	0.065
Increased danger alertness	27 (45)	35 (41.7)	34 (54.8)	0.27
Increased anxiety or startle response	28 (46.7)	31 (36.9)	23 (37.1)	0.43
Physical reactions when remembering the pandemic	8 (13.3)	9 (10.7)	11 (17.7)	0.47

ASD: Acute stress disorder.
*p-values calculated by χ^2 test.

Avoidance symptoms

The most frequently reported symptom of avoidance by the groups was avoiding emotions such as distress

or discomfort. A statistically significant difference was found between the groups in the item avoiding conversations on the subject, reported by 40% of resident physicians, 20.2% of attending physicians, and 22.6%

of nursing personnel ($p = 0.021$). Although no statistically significant difference was found, we observed a trend in the item of thought avoidance, reported by 36.7% of resident physicians followed by 25% of attending physicians and 19.4% of the nursing personnel ($p = 0.087$) (Table 5).

Arousal symptoms

The most frequently reported subset of symptoms in all the groups were arousal symptoms. Although no significant differences were detected, a trend was found in the item of difficulty in sleeping, reported by 56.7% of resident physicians, 38.1% of attending physicians, and 48.4% of nursing personnel ($p = 0.084$). Similarly, difficulty concentrating was reported by 43.3% of resident physicians, 29.5% of attending physicians, and 24.2% of nursing personnel ($p = 0.065$) (Table 6).

Discussion

This study found that 88.8% of health care workers met the criteria for suspected ASD. This result is slightly higher than the results of other studies. For example, in a systematic review conducted to understand the impact of epidemics on health care workers' mental health, a prevalence of ASD between 31% and 82% was reported⁹. In a study on stress-related disorders during the COVID-19 pandemic, 40% of health care workers met PTSD criteria, while 97.9% reported at least one symptom¹⁰.

Regarding the difference between the prevalence of ASD in health care workers compared to the general population in the context of COVID-19, a study in the Chinese population in Wuhan examined the symptoms of post-traumatic stress in the general population. The authors found that 7% of the participants presented post-traumatic stress symptoms, most of them associated with ASD¹¹. This figure is considerably lower than that found in studies of the prevalence of ASD in health care workers^{9,10}.

When comparing the ASD scale scores between groups, no statistically significant differences in the overall score were found in the present study. However, resident physicians showed the highest scores on each of the symptom subsets.

In Mexico, medical residents' training is a process that can be considered stressful on its own. Residents face long workdays combined with a heavy burden of caregiving and academic activities and decreased

sleep and recreational activities. The COVID-19 health emergency has increased the work demand and the need for updating for residents. Moreover, they may also face other stress factors, such as fear of infecting their beloved ones, being away from their families, economic problems, a stigma for dealing with COVID-19 patients, fear of getting infected, and the uncertainty of dealing with a new disease. In a study conducted in Shanghai, some psychopathological symptoms were recorded in 385 first year medical residents. Data collection began in October 2019 and ended in February 2020, when the pandemic peaked in China. Depression scores increased by 61%, while anxiety scores increased by 64%¹².

Regarding dissociative symptoms, a statistically significant difference was found in the item of emotional distancing, which was more frequently reported within the groups of resident physicians and nursing personnel. Dissociative symptoms correspond to defense mechanisms that can occur in traumatic situations, which are presented as isolating or separating oneself from the traumatic event to experience less anxiety. Emotional distancing is also present in the *burnout* syndrome. This syndrome is characterized by emotional exhaustion, depersonalization, and low self-realization in individuals who work for the care or helping others. In medical or paramedical personnel, this syndrome can be more severe since many accidents or iatrogenic events can occur due to the profession's nature. Furthermore, the patients may be treated with less quality and warmth than they deserve, which affects the healing process¹³. It would be worthwhile to investigate the prevalence of *burnout* in this population, particularly concerning the pandemic's work situation.

Particularly, throughout their training, health care workers are taught that maintaining a certain emotional distance may be necessary to avoid becoming paralyzed by stress, to be functional and objective in a moment of crisis, and to be able to help patients. Furthermore, sometimes, the expression of emotions in medical practice can be perceived as unprofessional, so many health workers learn to suppress and ignore these emotions. Persistent avoidance of emotions can prevent health-care providers from genuinely engaging with patients and their feelings, which is the basis for empathy¹⁴.

A statistically significant difference was found in the item avoiding conversations on the event; a trend was also found in the item avoiding thinking about the topic. Both items showed a higher frequency in resident physicians. The avoidance symptoms correspond to

defense mechanisms that keep the traumatic event out of conscious thinking to diminish the anxiety presented when remembering or thinking about them. It has been described that avoidance predicts stress and depression in the future. This coping strategy is most often seen in individuals less acquainted with the proper handling of adversity. In a study of 112 pediatric residents at a tertiary level care pediatric hospital in Mexico, 71.4% were found to use avoidance strategies¹⁵.

This study also stands out that arousal symptoms were the most frequently reported symptoms in all the groups. A trend was found in the difficulty of sleep and difficulty concentrating; both symptoms were presented more often in resident physicians. The arousal symptoms refer to a constant feeling of having to be in "fight, flight, paralysis" mode, which is typically part of the healthy response to a threat, while in the case of ASD, this feeling persists even when there is no threat. The manifestations include an exaggerated startle response to minimal stimuli, irritability, sleep disturbances, decreased concentration, or a hypervigilance state. One of the factors that can contribute to these symptoms is that COVID-19 is a new disease. The continuous discoveries on this disease radically change care protocols and cause a sense of uncertainty and the constant expectation of being in front of the unknown¹⁶.

This article has several strengths and limitations. This study is the first in our country specifically focused on exploring acute stress symptoms in health care workers during the COVID-19 pandemic context. In this sense, one of the study limitations is that most of the responses were obtained during May's 1st week. That is when the pandemic was not yet at its peak in our country, and the Hospital Infantil de México Federico Gómez was not receiving a significant number of cases yet. It would be worthwhile to conduct repeated measurements in this population at different points during the pandemic to have a better point of comparison, then apply an ASD scale and determine how often people who presented ASD developed posttraumatic stress during the COVID-19 pandemic.

Another limitation of the study is that the ASD scale only provides information about whether the participants meet criterion B for diagnosis. Therefore, we cannot assume that people who tested positive on this scale have the disorder's diagnosis. Criterion A is met since the population is directly exposed to a traumatic event (in this case, treating patients with COVID-19); criterion C indicates that the disorder's duration (symptoms of criterion B) should be from 3 days to 1 month after exposure to the event. Considering that the answers were

obtained within this period, we believe that this criterion can be met. However, it is not possible to determine if criterion D was met, which tells us that the disturbance causes clinically significant discomfort or impairment in social, occupational, or other important areas of functioning since this factor was not explicitly examined. It is also not possible to determine whether criterion E was met. In this item, the disturbance cannot be attributed to a substance or other medical condition's physiological effects and is not better explained by a brief psychotic disorder. This information could be completed by the follow-up of participants who met criterion B.

Due to the high risk of contagion, another limitation is that the information was obtained from a virtual questionnaire, so there could be various biases. In contrast, answering the virtual questionnaire was easier without exposing people to contagion.

Multiple factors could be related to the frequency of acute stress in these groups. Therefore, it is necessary to investigate the importance of risk and protective factors present in this population and explore other psychopathologies such as depression or substance abuse.

More than half of the health care workers at a tertiary level pediatric hospital experienced ASD during the COVID-19 National Safe Distance Strategy. There are different factors related to the type of work that health care workers perform, which can be associated with acute stress symptoms. Further research should be conducted on this population to develop strategies to reduce the risk of ASD within and outside the pandemic context.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on patient data publication.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author has this document. This study was authorized by the Bioethics Committee (registration HIM-2020-006).

Conflicts of interest

The authors declare no conflicts of interest.

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