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Post-traumatic stress disorder symptoms in community after massacre in kindergarten

Sintomas de transtorno de estresse pós-traumático em comunidade após massacre em jardim de infância

André Gabriel Gruber[1*], Anelize Keiko da Conceição Hamada[1], Rafaela Zumblick Machado[1], Valentina Fretta Zappelini Bittencourt[1], Betine Pinto Moehlecke Iser[2]

[1] Medical student, Universidade do Sul de Santa Catarina (UNISUL), Tubarão (SC), Brazil; [2]Professor at the Postgraduate Program in Heatlh Science, Universidade do Sul de Santa Catarina (UNISUL), Tubarão (SC), Brazil.

***Corresponding author**: André Gabriel Gruber – *Email*: andre.gruber@hotmail.com

ABSTRACT
To investigate the prevalence of symptoms related to Post Traumatic Stress Disorder and their impact on the mental health of the population, twelve months after a massacre at an Early Childhood Education Center in a city southern Brazil. Symptoms were assessed using a virtual questionnaire based at the Brazilian version of the Post-Traumatic Stress Disorder Checklist - Civilian Version (PCL-C). A total of 224 adults (median age 30 ± 5 Years, 62,5% women) participated in the study. The highest prevalences of PTSD symptoms were found among female residents (PR = 2.25 / p < 0.001), military firefighters (PR = 2.51 / p = 0.002) and students (PR = 2.72 / p < 0.001).

Keywords: Epidemiology. Mental Health. Stress Disorders, Post-Traumatic.

RESUMO
Investigar a prevalência de sintomas de Transtorno de Estresse Pós-Traumático (TEPT) e o impacto deles na saúde mental da população, doze meses após um massacre ocorrido no Centro de Educação Infantil de uma cidade do Sul do Brasil. Os sintomas foram estimados por meio da aplicação de um questionário virtual utilizando a versão brasileira do Checklist para Transtorno de Estresse Pós-Traumático - versão civil (PCL-C). Um total de 224 adultos (idade mediana 30 ± 5 anos, 62,5% mulheres) participaram do estudo. As maiores prevalências de sintomas de TEPT foram encontradas em residentes do sexo feminino (RP = 2,25 / p < 0,001), bombeiros militares (RP = 2,51 / p = 0,002) e estudantes (RP = 2,72 / p < 0,001).

Palavras-chave: Epidemiologia. Saúde Mental. Transtorno de Estresse Pós-Traumático.

INTRODUCTION

On May 4, 2021, a crime of serious proportions impacted Brazil and, more closely, the city of Saudades, located in the western region of the state of Santa Catarina. In an industrial neighborhood of the city, which has a population of 9,810 inhabitants, there were fourteen attempted homicides classified as triple-qualified and five completed homicides at the Early Childhood Education Center Pró-Infância Aquarela. The violent action resulted in the deaths of a teacher, an assistant, and three children under two years old[1-2]. The fact had several implications on the entire population residing in the municipality, causing sociopolitical, psychosocial and mental health repercussions on residents, family members, workers active in the event, education management and primary care teams of the Sistema Único de Saúde – SUS (Brazilian Health Care System).

This event can be defined as a traumatic event, as it involved death experiences, danger of death, significant injury, risk for the integrity of self or others, where the individual's response included intense fear, horror, despair, or a sense of helplessness[3]. Such characteristics are relevant for changing the socio-affective relationships of the community and have the potential to catalyze the development of psychopathological disorders in the medium or long term[4]. In this type of event, it is possible for people to develop Post Traumatic Stress Disorder (PTSD), a psychiatric illness which the diagnosis can only be made followed by a traumatizing process or a psychological stressor[3]. This pathology is characterized by three main symptoms: 1) Reliving the traumatic experience (Criterion B: recurrent nightmares, intrusive thoughts, flashbacks, feeling or acting as if the event was still happening, intense distress when exposed to related people, places or conversations with the event); 2) Avoidance and affective blunting (Criterion C: avoidance of trauma-related situations or people, decreased interest in most activities, feeling detached from others, and amnesia for parts of the trauma); and 3) Hyperexcitability (Criterion D: hypervigilance, sleep problems, irritability, anger, concentration difficulties, and alarm reaction)[5].

This situation, before becoming a violation of the law, is harmful to people and relationships[6]. The problem lies in the perspective of attributing blame and attempting to establish a punishment, disregarding the needs of those directly involved, especially the victims[7]. The victims, whose rights have been violated, are destined for reparation limited by metrics that is not always understood, and this can overshadow the complexity that permeates human relationships, leading, among other consequences, the naturalization and/or perpetuation of the process of victimization[8].

Taking into account the event, this project evaluated the prevalence of PTSD symptoms in members of the victimized community, at least 12 months after the event, in order to understand the social and mental impact generated in the present population.

METHODOLOGY

This was a cross-sectional study, quantitative, with a sample of adults (aged $\geq$ 18 years) residing in the city of Saudades, Santa Catarina, of both sexes, from May 2021 to September 2022.

The researchers transformed the Brazilian version of the Post-traumatic Stress Disorder Checklist - Civilian Version (PCL-5), which is based on the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) for PTSD into an online form, and then contacted representatives of the Municipal Health Department and professionals in the field, who invited the population to participate in the study by reading a QR code located at strategic points according to their proximity to the community institutions involved: City Council, Early Childhood Education Center: Pró-Infância Aquarela, Fire Brigade, Education Management and Primary Health Care Services.

The form subdivided into two distinct parts. Part I characterizes the individuals biodemographically and socially, and identifies the event potentially causing PTSD if they were directly exposed to the traumatic event (present at the event) or indirectly (active community members during the event) (Criterion A for

diagnosis). Part II aims to characterize the symptoms associated with PTSD. For a PTSD diagnosis, an individual must present criterion A and one clinically significant symptom from criterion B, three from C, and two from D9.

Data were systematically compiled and classified using Microsoft Excel software, and data analysis was performed using SPSS 26.0. For quantitative variables, measures of central tendency and data dispersion were used (mean, standard deviation, maximum and minimum values, and interquartile range - IQR). For qualitative variables, frequency distribution tables were calculated, and z-test was used to compare column proportions using the Bonferroni method. The relationship between independent variables and the outcome was analyzed using the Chi-square or Fisher's exact test. Comparisons in the prevalence of PTSD symptoms according to interest variables were made using the prevalence ratio (PR) with a 95% confidence interval (CI). All calculations and tests of association between variables or groups of individuals were performed at a significance level of 5%.

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation. All study participants read the informed consent form at the beginning of the questionnaire, and only those who voluntarily agreed to participate in the study, after selecting the corresponding option, had access to the questionnaire to respond to specific questions. All procedures involving human subjects/patients were approved by the Universidade do Sul de Santa Catarina Ethics Committee (process: 5.464.945).

RESULTS

Among the 224 participants, 62.5% were female (n = 140). The median age of respondents was 30 years (minimum 18 years and maximum 55 years, IQR 15.75). Of those respondents, 55.4% had children (n = 124).

Residents were divided based on their proximity to the community institutions involved: City Council (5.4%), Early Childhood Education Center - Pró-Infância Aquarela (17.8%), Fire Brigade (7,1%), Education Management (1.1%), Primary Health Care Services (22.7%) and Others (45.9%).

All respondents claimed to be directly or indirectly related to the attack that occurred at Early Childhood Education Center: Pró-Infância Aquarela on May 4, 2021. Among the responses to the questionnaire, which intended to characterize the symptoms associated with PTSD, the three main symptoms were: 78.6% (n = 176) reported to relive the traumatic experience of the event, 48.2% (n = 108) claimed to have experienced avoidance and affective blunting and 42.9% (n = 96) claimed to feel in constant hyperexcitability. When the criteria were analyzed individually, significant symptoms of PTSD were found, as shown in Table 1. The overall prevalence of symptoms was 33.9%. There was no difference in prevalence according to the age of the respondents.

Table 1. Prevalence of PTSD symptoms among those involved with the event, according to diagnostic criteria. Saudades, 2022 (N = 224)

Relive the traumatic experience (Criterion B)	n	%
Memory, repetitive and disturbing thoughts and images referring to the event	124	55.4
Repetitive and disturbing dreams concerning the event	80	35.7
Suddenly acting or feeling like the event is live again (as if you were reliving it)	84	37.5
Feeling very upset or worried when something reminds you of the event	152	67.9
Experiencing physical symptoms (e.g., heart pounding, difficulty breathing, sweating) when something reminds you of the event	104	46.4
Avoidance and flattening of affect (Criterion C)	n	%
Avoiding thinking or talking about the event or having feelings related to the experience	144	64.3
Avoiding activities or situations because they remind you of the event	96	42.9
Difficulty remembering important parts of the event	52	23.2
Feeling distant or withdrawn from other people	96	42.9

Feeling emotionally numb or unable to have loving feelings for people close to you	76	33.9
Feeling like you don't have expectations for the future	112	50.0
Hyperexcitability (Criterion D)	n	%
Having trouble falling asleep or staying asleep	92	41.1
Feeling irritable or having angry outbursts	100	44.6
Having trouble concentrating	104	53.6
Being "superalert", vigilant or "on guard"	132	58.9
Feeling tense or easily startled	112	50.0

Source: Authors

As shown in Table 2, female residents had 2.25 times (95%CI 1.39-3.23) more PTSD symptoms when compared to males. The variables that consider the presence or absence of children, as well as their respective ages, were not statistically significant.

Table 2. Prevalence of PTSD symptoms among those involved with the event in relation to characteristics of the participants. Saudades, 2022 (N = 224)

	n	%	PR (95% CI)	p-value
Sex				
Female (n = 140)	60	42.9%	2.25 (1.39-3.23)	p < 0.001*
Male (n = 84)	16	19.0%		
Had children				
Yes (n = 100)	32	32.0%	0.90 (0.62-1.30)	p = 0.584
No (n = 124)	44	35.5%		

* Values with statistical significance
PR = Prevalence Rates; CI = Confidence Interval
Source: Authors

The estimated prevalence of PTSD according to proximity to the community-involved institutions varies according to Table 3. When comparing the collection locations by which residents were grouped, there is a higher prevalence of symptoms in the fire department. Military firefighters had 2.51 times (95%CI 1.74-3.63) more PTSD symptoms compared to other occupations.

Table 3: Estimated prevalence of PTSD according to proximity to the community-involved institutions. Saudades, 2022 (N = 224)

Institution and occupation	n	%	PR (95% CI)	p-value
Fire Brigade				
Military firefighters (n = 10)	8	80.0	2.51 (1.74-3.63)	p = 0.002*
City Council				
Lawyers (n = 8)	4	50.0	1.50 (0.73-3.07)	p = 0.328
Early Childhood Education Center Pró-Infância Aquarela				
Teachers (n = 16)	6	37.5	1.11 (0.63-1.39)	p = 0.754
Students (n = 20)	16	80.0	2.72 (2.00-3.69)	p < 0.001*
Primary Health Care Services (n = 51)				
Nurses (n = 3)	2	66.7	1.99 (0.87-4.52)	p = 0.228
Health agents (n = 6)	4	66.7	2.01 (1.11-3.66)	p = 0.086
Physicians (n = 6)	2	33.3	0.98 (0.31-3.09)	p = 0.975

* Values with statistical significance
PR = Prevalence Rates; CI = Confidence Interval
Source: Authors

Among the residents who responded from the education management sector, students had a prevalence 2.72 times (95% CI 2.00-3.69) higher than teachers. The other occupations were not statistically significant.

DISCUSSION

The results of the present study revealed that female residents had more PTSD symptoms than males. This finding is consistent to researches which demonstrates that women are twice as likely to develop PTSD[10-11].This fact can be explained by the physiological differences between the sexes lead to different response capacities when faced with the same stress. Estrogen levels, for example, are higher in females, which can modulate vulnerability to developing PTSD, resulting in women with greater reactivity to stress[12].

Women tend to score higher than men in acute subjective responses, such as threat perception and peritraumatic dissociation, which are known predictors of PTSD. They handle stressful situations differently and have evolved specific mechanisms to support these distinct behaviors (instead of the commonly assumed fight-or-flight response, women often employ a tend-and-befriend response in stressful situations)[13].

When it comes to occupation, the result is aligned with the literature, which showed that the estimated rate of PTSD in firefighters is higher when compared to the general population, with a prevalence that reaches 57%[14]. This is due to the fact that these professionals deal with constant risk situations of unpredictable nature and life-threatening situations, in addition to having a job based on disciplinary rigidity and hierarchy, which exposes them to high levels of stress on a daily basis[15].

Ultimately, when considering the population related to education management, students exhibited a higher prevalence of PTSD symptoms compared to the teaching staff[15]. Recent studies have indicated that early exposure to trauma, particularly in childhood, can impair emotional regulation during development, thereby contributing to the emergence of affective disorders and the exacerbation of stress-related disorders[16-17]. Similarly, the Late Positive Potential, which serves as a neural marker for attention to emotional stimuli, can contribute to decreased attention when dysregulated. This decrease in attention may further contribute to psychopathology associated with late trauma symptoms, particularly among students, because PTSD significantly predicted poorer attention and processing speed, and predicted poorer learning and memory[18-19].

The importance of early identification of post-traumatic stress symptoms is highlighted as this disease is directly related to the future quality of life of the people involved and also to healthcare costs, mainly with regard to the inclusion of psychologists in the multidisciplinary team that makes up basic health care and their important role in reception and screening these patients[20].

Data from other mass-traumatic event that ocurred at the Stoneman Douglas High School shooting, in Florida, US, examined the effectiveness of two approaches, one usual care without triage, and other stepped care with triage. There were superiority of the second one in reducing PTSD prevalence after two years, and a incremental cost-effectiveness of $2718.49 per DALYs saved, and $0.47 per PTSD-free day[20].

It is important to cite the need for caution in the interpretation of the results, considering the cross-sectional design of the study and the period of analysis because symptoms of PTSD could appear earlier than 12 months post-event, or even later, suggesting continuous monitoring of this population.

CONCLUSION

From data analysis, there was a high prevalence of post-traumatic stress symptoms in the population, especially in females, as well as among military firefighters and students. Therefore, it was possible to measure the impact that an isolated traumatic event can have on a population, which addresses the need for early diagnosis and treatment to promote public policies and prevention by municipal and state management. Some actions to facilitate the care

and screening of the population by health agents could be strategic, likescreening symptomatic patients, facilitating pharmacological or non-pharmacological care and treatment (e.g., therapy focused on trauma), to improve quality of life and reduce the financial and medical burden of the disease.

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