

**Severidade dos traumatismos maxilofaciais e fatores associados em mulheres brasileiras
vítimas de violência doméstica**

**Severity of maxillofacial injuries and associated factors in brazilian women victims of
domestic violence**

**Gravedad de las lesiones maxilofaciales y factores asociados en mujeres brasileñas
víctimas de violencia doméstica**

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Resumo

Objetivo: O objetivo deste estudo foi determinar o perfil e a prevalência de traumatismo maxilofacial (TMF) e avaliar os fatores associados em mulheres vítimas de violência doméstica. Metodologia: Tratou-se de um estudo transversal e analítico que avaliou 514 prontuários de mulheres vítimas de violência doméstica diagnosticadas com TMF atendidas em um hospital de referência em trauma na região Nordeste do Brasil. As estatísticas descritivas e multivariáveis foram realizadas por meio da regressão de Poisson. Resultados: A prevalência de fraturas e lacerações faciais foi de 80,2% e 19,8%, respectivamente, a maioria

com baixa severidade (92,1%). Observaram-se associações entre a severidade do TMF e o consumo de álcool / drogas pelo agressor (RP = 0,251; IC_{95%} = 0,106-0,595; p = 0,002) e o turno da noite (RP = 4,675; IC_{95%} = 1,745-12,525; p = 0,002). Foram encontradas correlações entre a severidade do TMF e o tempo de internação (r = 0,148; p <0,01). Conclusões: A prevalência de fraturas foi considerada alta e a severidade do TMF foi associada a maior tempo de internação e consumo de álcool / drogas pelo agressor e pelo turno da noite. Estratégias precisam ser adotadas como a melhoria da qualidade da atenção à saúde das usuárias, maior investimento social em mulheres em situação de vulnerabilidade, fiscalização ostensiva pelos órgãos de segurança, bem como a implementação de programas educacionais voltados para a prevenção desse agravo.

Palavras-chave: Violência contra a mulher; Traumatismos maxilofaciais; Cirurgia bucal; Epidemiologia.

Abstract

Objective: The aim of this study was to determine the profile and prevalence of maxillofacial injury (MFI) and to assess associated factors in women victims of domestic violence. **Methodology:** This was a cross-sectional and analytical study that evaluated 514 records of women victims of domestic violence diagnosed with MFI attended at a public reference urgency and trauma hospital in Northeastern Brazil. Descriptive and multivariate statistics were performed using Poisson regression. **Results:** The prevalence of fractures and facial lacerations was 80.2% and 19.8%, respectively, the majority with low severity (92.1%). Associations were observed between MFI severity and alcohol / drug consumption by the perpetrator (PR=0.251; 95%CI=0.106-0.595; p=0.002) and the night shift (PR=4.675; 95%CI=1.745-12.525; p=0.002). Correlations were found between MFI severity and length of hospital stay (r=0.148; p<0.01). **Conclusions:** The prevalence of fractures was considered high and MFI severity was associated with longer hospital stay and alcohol / drug consumption by the perpetrator and the night shift. Strategies need to be adopted as improving the quality of health care for users, social investment in women in vulnerability, overt supervision by security agencies, as well as the implementation of educational programs focused on preventing this condition.

Keywords: Violence against women; Maxillofacial injuries; Oral surgery; Epidemiology.

Resumen

Objetivo: El objetivo de este estudio fue determinar el perfil y la prevalencia del trauma maxilofacial (TMF) y evaluar los factores asociados en las mujeres víctimas de violencia doméstica. **Metodología:** Este fue un estudio transversal y analítico que evaluó 514 registros médicos de mujeres víctimas de violencia doméstica diagnosticadas con MPT tratadas en un hospital de trauma en el noreste de Brasil. Las estadísticas descriptivas y multivariantes se realizaron mediante regresión de Poisson. **Resultados:** La prevalencia de fracturas y laceraciones faciales fue del 80,2% y del 19,8%, respectivamente, la mayoría con baja gravedad (92,1%). Se observaron asociaciones entre la gravedad de TMF y el consumo de alcohol / drogas por el agresor (PR = 0.251; IC95% = 0.106-0.595; p = 0.002) y el turno de noche (PR = 4.675; IC95% = 1.745-12.525; p = 0,002). Se encontraron correlaciones entre la gravedad de la MPT y la duración de la estancia hospitalaria (r = 0.148; p <0.01). **Conclusiones:** La prevalencia de fracturas se consideró alta y la gravedad de la TMF se asoció con una hospitalización más prolongada y el consumo de alcohol / drogas por parte del agresor y el turno de noche. Deben adoptarse estrategias, como mejorar la calidad de la atención médica para las usuarias, una mayor inversión social en mujeres en situaciones de vulnerabilidad, supervisión abierta por parte de las agencias de seguridad, así como la implementación de programas educativos destinados a prevenir esta enfermedad.

Palabras clave: Violencia contra la mujer; Lesiones maxilofaciales; Cirugía oral; Epidemiología.

1. Introduction

Domestic violence against women is considered a public health problem, in addition being a fundamental violation of human rights. Around the world, around 30% of women have suffered physical and / or sexual violence by an intimate partner at some point of their lives (World Health Organization, 2020). In Brazil, according to the Information System for Notifiable Diseases (SINAN), in 2017, of the total number of violence notifications, 71.8% involved women (Brazil, 2020).

Intimate partner violence is associated with several negative outcomes for female health, such as abortion, low birth weight, premature birth (Sigalla, et al., 2017), use of alcohol and other drugs, depression, non-fatal injuries and death due to homicide (Stöckl, et al., 2013). Head, neck, and face are the most common sites of injuries related to intimate partner violence (Castro, et al, 2017; World Health Organization, 2020).

When aggression involves the facial region, victims suffer from physical and emotional consequences, which cause, among other consequences, low self-esteem, shame, humiliation, and severe psychological suffering (Rodrigues, et al., 2020). Aggressions in this region aim to disqualify the victim's identity, acting as a factor of intimidation (World Health Organization, 2020). In addition, the choice of the face as the site of aggression is due to the intention of injuring a part of the human body considered as a symbol of beauty, especially for women (Silva, et al., 2014).

Maxillofacial injury (MFI) causes high morbidity and socioeconomic losses (Ramalingam, 2015). In 2019, hospital procedures resulting from fractures of the skull and facial bones performed in Brazil and made available by the Hospital Information System (SIH) accounted for 30,055 hospitalizations, reaching a total amount of US\$ 9,144,169.55, 131,324 days of hospital stay and average of 4.4 days, with the Southeastern region concentrating 34.3% of total expenses, followed by the Northeastern region, with 27.9% (Brazil, 2020).

The scales for evaluating the MFI severity provide important information, as they allow the comprehensibility in communication among health professionals and can act as a prognostic tool for the patient and the management team (Garcez, et al., 2019). The Facial Injury Severity Scale (FISS) is an easily calculated scale predictive of facial trauma severity based on its relationship with hospital treatment expenses, being also an indicator of hospitalization time (Bagheri, et al., 2006).

The epidemiological knowledge of the profile of victims and patterns of facial trauma is of fundamental importance for the development of improvements in health services and for the establishment of preventive and safety measures (de Macedo Bernardino, et al., 2018). In this context, this study aimed to determine the profile and prevalence of MFI and to evaluate factors associated with facial trauma severity in women victims of domestic violence.

2. Methodology

Study Design and Location

This is a cross-sectional and analytical study that evaluated the medical records of women victims of domestic violence with facial injuries attended at a public reference urgency and trauma hospital in Northeastern Brazil.

Data collection

This study evaluated 514 medical records from December 2011 to December 2018. The Strengthening Reporting of Observational Studies in Epidemiology (STROBE) (Vandenbroucke, et al., 2014) guidelines for observational studies was used to plan the research and report the results obtained.

All records in outpatient records and / or medical and hospital records of women victims of domestic violence diagnosed with facial lacerations or fractures were included. Exclusion criteria included incomplete or illegible records.

Data collection was performed by a trained oral and maxillofacial surgeon and information was recorded on a questionnaire. The following variables were collected: data on the victim (skin color; age group; schooling; monthly family income; marital status; place of residence), data on the perpetrator (relationship with the victim; if first assault / recurrence; alcohol / drug consumption), data on aggressions (etiology of aggression; shift of occurrence; day of the week) and data regarding MFI characteristics (type of MFI; type of fracture; associated injuries; location of MFI; length of hospital stay).

The next step consisted of filling out the Facial Injury Severity Scale - FISS scale to assess the severity of facial trauma. This scale represents a numerical value composed of the sum of individual fractures and fracture patterns in a patient (Bagheri, et al., 2006). The score system divides the face into three horizontal thirds (mandible, middle third and upper third) for bone injuries and includes facial lacerations over 10cm in length (Bagheri, et al., 2006).

Data analysis

Data were analyzed using the IBM SPSS for Windows software, version 22.0 (IBM Corp., Armonk, NY, USA).

The following variables were dichotomized for purposes of statistical analysis: age, dichotomized by the median – ≤ 18 years and > 18 years–; schooling – ≤ 8 years of study, > 8 years of study–; severity of facial trauma (FISS) – lower severity, for values of 1-2, and greater severity, for values ≥ 3 . The descriptive statistical analysis corresponded to the calculation of absolute and relative frequencies, for categorical variables, and measures of central tendency and variability, for quantitative variables. The Kolmogorov-Smirnov test was used to verify the normality of quantitative variables, and then the Pearson's Chi-square or Fisher's Exact test was used to identify possible associations between dependent and

independent variables. Variables with $p < 0.2$ were included in the Poisson regression analysis with robust variance and used to obtain gross and adjusted prevalence ratio (PR), with respective 95% confidence intervals (95%CI). Variables that did not significantly contribute to the explanation of variable severity of facial trauma were excluded from the model. As data distribution was non-parametric, the non-parametric Spearman correlation test was adopted. The significance level adopted was 5%.

Ethical Considerations

This study was approved by the hospital management and by the Human Research Ethics Committee (CAAE 3763318.8.0000.5188), according to guidelines contained in Resolution No. 466/12, of the National Health Council of Brazil and precepts of the Declaration of Helsinki.

3. Results

Of women victims of domestic violence with facial injuries ($n = 514$), 329 (64.0%) had fractures and facial lacerations, with mean age of 22.45 ± 11.09 years, median of 18 years, minimum age of 14 years and maximum of 77 years.

Table 1 shows the distribution of victims of violence according to sociodemographic data. There was predominance of Brown / Black women (59.3%), aged ≤ 18 years (52.9%), with schooling > 8 years of study (67.5%), who live with monthly family income above 1 Brazilian minimum wage - equivalent to US\$ 198 (60.2%), without partner (74.2%) and residents in the urban area (76.6%).

Table 2 shows the distribution of victims according to the characteristics of perpetrator and aggressions. The aggressor, in most cases, is the victim's partner / ex-partner (82.7%), in 85.7% of cases, was the first assault and in 65.7%, is an alcohol / drug user. The most prevalent type of aggression was physical violence (52.9%), practiced during the day shift (59.0%) and at the weekend / holiday (53.5%).

Table 3 shows the MFI characteristics. The prevalence of injuries was 80.2%, of the nasal type (44.7%) and with associated head / neck injuries (43.5%). MFI occurred more frequently in the middle third (59.6%), with minor injuries (92.1%). Regarding the treatment modality, most victims needed closed fracture reduction (67.4%).

The mean score of the FISS scale was 1.4 ± 1.09 , median of 1.00, minimum score of 1 and maximum of 6. The average length of hospital stay was 1.33 ± 1.76 days, median of 1 day, minimum of 0 days and maximum of 9 days.

Table 4 shows the distribution of trauma severity according to variables related to the victim's profile and characteristics of perpetrator and aggressions; in the bivariate analysis, significant association was found between MFI severity and the first assault / recurrence ($p=0.035$), alcohol / drug consumption ($p=0.001$) and the shift of occurrence ($p=0.001$).

Multiple regression model was used to assess associations of variables (Table 5). In the crude analysis, the severity of MFI was associated with alcohol / drug consumption by the perpetrator and the shift of occurrence; when adjusted, it maintained its significance; the prevalence of more severe trauma was 75% lower among perpetrators users of alcohol / drugs ($p=0.002$) and victims assaulted during the night shift were 4.67 times more likely of having more severe trauma ($p=0.002$).

Weak positive correlation was found between MFI severity and length of hospital stay ($r = 0.148$; $p < 0.01$) (data not shown).

4. Discussion

The occurrence of MFI resulting from domestic violence can be influenced by socioeconomic, cultural, circumstantial, geographical, and environmental factors (World Health Organization, 2020). Recent research has shown that men and women at different stages of life have different profiles of victims of violence and MFI (de Macedo Bernardino, et al., 2018). Although some studies have identified higher proportion of men as victims of MFI (de Macedo Bernardino, et al., 2018; Laureano, et al., 2019; Sousa, et al., 2016), there is a trend towards an increase in the number of female victims and reduction of male victims (Rodrigues, et al., 2020; Barbosa, et al., 2019).

The dental literature presents results with different MFI prevalence. While in Brazil, 56.3% of women victims of physical aggression had MFI (Garcez, et al., 2019), in England, it corresponded to 77.8% of cases (Boyes & Fan, 2019). In the present study, of women victims of domestic violence, 64.0% had facial fractures and lacerations. This result may still be underestimated, since many women do not seek health services to treat injuries caused by violence and, when they do they may be reluctant to declare the true cause of the injury (World Health Organization, 2020).

As for the age group of victims, the number of cases was higher among women aged \leq 18 years. In Brazil, in the period from 2010 to 2017, of the total violence notifications registered in SINAN ($n = 1,064,701$), 59.3% occurred among women aged 20-59 years, followed by 24.1% among women aged 10-19 years (Brazil, 2020). This finding, involving young adult women, corroborates previous studies carried out by researchers in Brazil (Silva, et al., 2014; Laureano, et al., 2019; Barbosa, et al., 2019) and in the United Kingdom (Boyes & Fan, 2019).

World Health Organization (2020) data reported that, worldwide, the prevalence of exposure to violence was high among young women aged 15-19 years, suggesting that violence starts early in women's relationships and progressively increases until reaching the highest frequency in the age group of 40-44 years. This result may mean that younger men tend to be more violent than older ones and that younger women have less favorable socioeconomic status than older women and are therefore more vulnerable (Castro, et al., 2017). In addition, boys suffer from society's demand for not expressing their feelings, not to take fragile postures and not to submit to other boys or girls, as there is also high exposure of children and young people to violent games that often help in the development of aggressiveness (World Health Organization, 2020).

The profile of victims showed predominance of women with higher schooling and socioeconomic levels. It is likely that women with higher schooling and better economic status have more access to information and, consequently, are aware of Brazilian measures to protect women victims of violence, such as the Maria da Penha Law, which is intended to prevent and criminalize aggressions (Brazil, 2006), the "Law of Femicídio", which qualifies Femicide as a heinous crime in Brazil, when practiced against women due to the condition of being female and the Women's Service Center - Call 180, which is a modality of telephone service of nationwide public utility, designed to provide free assistance to women in situations of violence throughout Brazil. These measures not only aim to protect women from assault and recurrence, but also seek to inhibit the aggressor with more severe punishments.

The family income socioeconomic indicator is a factor that may be associated with variations in violence rates (Sousa, et al., 2016). In a study conducted in another municipality in Northeastern Brazil, the authors identified that worse economic condition may play a significant role in interpersonal violence and, particularly, in domestic violence (Rodrigues, et al., 2020). Communities with high poverty concentration tend to have instability, difficulties in establishing values and social control. Disorganization combined with socioeconomic

inequalities creates conditions for high levels of violence and social marginalization, which impact physical and mental health (Ramalingam, 2015).

In this research, most aggressors were the victim's partner / ex-partner. This predominance is in agreement with previous studies that indicated higher risk of aggression to women by close people, such as partners and ex-partners (Silva, et al., 2014; Boyes & Fan, 2019; Castro, et al., 2017, Barufaldi, et al., 2017). Due to the proximity between victim and aggressor, domestic aggressions carried out by partners tend to become incidents (Sigalla, et al., 2017), causing greater negative impact on the health of victims (Silva, et al., 2014). Thus, responsibility for detecting violence becomes essential (Silva, et al., 2014).

The frequency of the first assault was high in the sample studied; however, it has been reported that episodes of violence are repetitive and tend to become more severe (Ramalingam, 2015). Study conducted in Brazil using data from the Mortality Information System (SIM), found that 15.9% of female deaths involved repeated violence (Barufaldi, et al., 2017) and this recurrence reflects the fragility of the women protection network in situations of violence in the country (Barufaldi, et al., 2017). Notifications of violence against women increased 730.3% from 2009 to 2017 (Brazil, 2020), even after the creation of the “Maria da Penha Law” (Brasil, 2006). This increase in the number of cases may indicate that the law has not been sufficient to reduce aggressions, raising the possibility of failure in the punishment of aggressors (World Health Organization, 2020).

The occurrence of MFI in victims of violence was higher among those in which aggressors were alcohol / drug users and this finding corroborates previous studies that found that MFI is frequently associated with alcohol intoxication (O'Meara, et al., 2012). Alcohol and illicit drugs consumption lead to reduced inhibition, triggers impulsive behaviors and increases aggressive behaviors (de Macedo Bernardino, et al., 2018; Yamamoto, et al., 2019).

The most common etiology of aggression was physical contact, which agrees with other studies (de Macedo Bernardino, et al., 2018; Boyes & Fan, 2019; Castro, et al., 2017). The high occurrence of aggression by physical contact against women can be explained by the unintended nature of violence (de Macedo Bernardino, et al., 2018; Castro, et al., 2017). With regard to the distribution of victims according to the shift of occurrence, the day of the week and the MFI characteristics, the daytime period, the concentration of hospital treatments performed at the weekend / holiday, fractures, with associated head / neck injuries, affecting the middle third of the face were predominant. In the study by Macedo Bernardino, et al. (2018) the second profile of victims of violence with MFI comprised women, with crimes

associated with working days, the day shift, which resulted in soft tissue trauma, affecting mainly the lower third of the face or more than one region, simultaneously.

According to our results, occurrences on weekends / holidays may be related to the longer time the aggressor and the victim spend together (Castro, et al., 2017), and during this period, exposure to alcohol and drugs is also common (de Macedo Bernardino, et al., 2018). In this research, the high prevalence of fractures that involved search in medical records of a reference hospital for urgency and trauma could be explained when considering that victims of more severe trauma seek specialized care in hospitals (Barbosa, et al., 2019). It is also recognized that head, neck and face are the most common sites of injuries related to partner violence (Castro, et al., 2017). MFI in the middle third may be more common in female victims, possibly because men are generally taller than women, making the middle third an easy target for assaults (Rodrigues, et al., 2020).

In the present sample, the mean score on the FISS scale was 1.4 ± 1.09 , with median of 1.00, corresponding to less severe facial trauma, a result lower than the median of 2.00 in the southern region of Brazil (Aita, et al., 2018). Studies in other countries revealed higher average scores of 4.4 ± 2.70 (maximum score of 13) in the United States (Bagheri, et al., 2006) and 4.40 ± 3.17 (maximum score of 14) in India (Ramalingam, 2015).

As for the length of hospital stay, the findings differ from previous studies, average number of days in hospital of 4.12 ± 1.5 days (Ramalingam, 2015); and average number of days in hospital of 8.14 ± 6.02 days (Aita, et al., 2018). The variation in the scale scores regarding the number of days of hospital may be a result of the comprehensive etiology of facial trauma in these studies (Bagheri, et al., 2006; Aita, et al., 2018; Ramalingam, 2015), which probably involved agents that caused greater impact and, consequently, more serious trauma, with consequent longer hospitalization time.

MFI severity was associated with alcohol / drug consumption and the shift of occurrence; when adjusted, they maintained their significance. While significant association was obtained in this research, with prevalence of trauma of greater severity being 75% lower among perpetrators users of alcohol / drugs, it is recognized that alcohol consumption results in significantly higher score for the severity of facial trauma when compared to situation with no consumption of alcoholic beverages (O'Meara, et al., 2012). Regarding association with the night shift, this result should be interpreted with caution since the confidence interval obtained was wide. However, during this period, individuals are possibly exposed to alcoholic beverages and drugs (Laureano, et al., 2019).

Weak positive correlation was found between MFI severity and length of hospital stay. Patients with higher FISS have longer hospital stay (Bagheri, et al., 2006), results that were statistically significant. Ramalingam (2015) found statistically significant correlations between FISS values and hospitalization cost and duration. In Brazil, the authors found that patients with $FISS > 5$ required surgical intervention in the operating room (Aita, et al., 2018).

Health professionals should be alert to cases of domestic violence, since Brazilian law establishes the mandatory notification of cases of violence against women treated in both public and private health services (Brazil, 2006). This notification is for epidemiological purposes and cannot be used in police or legal investigations, representing a fundamental measure for dimensioning the phenomenon of violence against women.

Additional measures to prevent MFI due to domestic violence are necessary, for example, in the long term, better distribution of jobs and income and greater investment in education in order to reduce social inequality and consequently violence, and in the medium and short term, more overt supervision by security agencies, especially on weekends and holidays, during the day. The presence or proximity of the police force can inhibit the aggressor and even frustrate an ongoing aggression.

On the other hand, educational campaigns in poorer neighborhoods, schools, communities with guidance and incentives for anyone to use the Women's Service Center - Call 180, not necessarily the victim, becoming a "law enforcement officer" can also contribute for the prevention of MFI from domestic violence.

Some limitations can be observed in this study, such as the impossibility of investigating the cause and effect relationship of independent variables on severity of facial trauma due to the cross-sectional design; the possibility of violence victims having concealed aggressions and declaring other etiological agents as the reason for trauma and the possible occurrence of errors in medical records. On the other hand, the generalization of results for the target population, the use of a widely used scale and the fact that this research provides relevant epidemiological data for the design of further longitudinal studies, which can generate clinical protocols for the management of MFI, are strengths.

The results of this research can be subsidies for health management agencies and public security to formulate public policies for prevention and better targeting of resources to serve the population, specifically in the construction of preventive and reporting campaigns and better inspection with greater punishment for aggressors.

5. Conclusion

The prevalence of fractures was considered high and MFI severity was associated with longer hospital stay and alcohol / drug consumption by the perpetrator and the night shift. Strategies can be adopted to understand factors associated with MFI, as well as improving the quality of health care for users, such as social investment in women in vulnerability, overt supervision by security agencies, as well as the implementation of educational programs focused on preventing this injury.

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