



## INJURIES IN THE MAXILLOFACIAL COMPLEX AND ASSOCIATED FACTORS IN BRAZILIAN VICTIMS OF VIOLENCE: A CROSS-SECTIONAL STUDY

### ABSTRACT

**Objectives:** This cross-sectional study evaluated the prevalence of injuries in the maxillofacial complex of victims of violence attended by a Mobile Emergency Care Service in a municipality of Northeastern Brazil.

**Materials and Methods:** A total of 2,347 records were evaluated from February 2014 to December 2016, of which 337(14.3%) corresponded to victims of violence. Information related to sociodemographic profile, associated factors and violence was collected. Data were analyzed through descriptive and inferential statistics, with significance level of 5%.

**Results:** There was predominance of males (76.3%) and age group of 20-29 years (29.7%). Occurrences were more frequent at night (61.4%) and at the weekend (40.7%). Alcohol use was observed in 63.5% of victims and 16.0% reported illicit drug use, with predominance of crack (92.6%). The most prevalent type of aggression was physical violence (54.9%). The majority of victims presented a single lesion (72.7%) with predominance of laceration (80.4%). Cases of head and face injuries represented, respectively, 33.5% and 35.9% of aggressions. Face injuries showed association with gender ( $p=0.027$ ) and number of injuries ( $p=0.042$ ).

**Conclusions:** The main victims of violence are young men who have used alcohol and illicit drugs. Physical aggression is the most frequent type of violence, with high occurrence of head and face injuries. Face injuries showed association with gender and number of lesions, both being more frequent among women.

**Keywords:** Violence, physical abuse, maxillofacial injuries, facial injuries.

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## **INTRODUCTION**

Violence is an integral part of the human condition and shows its different aspects throughout the world.<sup>1</sup> The World Health Organization defines violence as: "the intentional use of physical force or power, threatened or actual against oneself, another person or against a group or community, which results in or is highly likely to cause injury, death and psychological harm".<sup>2</sup>

The global prevalence of self-inflicted and interpersonal violence in 2016 was approximately 230 million people.<sup>3</sup> More than 1.3 million people worldwide die each year as a result of violence in all its forms, accounting for 2.5% of global mortality.<sup>4</sup> In Brazil, the estimated mortality rate for all types of violence for the year 2016 was approximately 78,400 deaths.<sup>5</sup>

Recent studies have shown that interpersonal violence is one of the main etiological factors of maxillofacial lesions.<sup>6,7</sup> The maxillofacial region is the common target of injuries due to its more prominent, unprotected location and because it is a region that is easily reached upon aggression.<sup>8-11</sup> The epidemiological characteristics of maxillofacial lesions and their associated factors are influenced by demographic, socioeconomic, cultural and environmental variables.<sup>8-11</sup>

Maxillofacial injuries are often associated with morbidity and can cause functional deficiencies and / or deformities<sup>12</sup>, resulting in severe pressure on the health, social services and economic systems, since the administration of the community economy is highly affected by the absenteeism of labor force and loss of productivity.<sup>4</sup> In 2004, in Brazil, the direct medical cost of injuries due to violence accounted for about 0.4% of the total health budget, while the loss of productivity related to violence corresponded to 12% of total health expenditure and 1.2% of the Brazilian Gross Domestic Product.<sup>13</sup>

Patients affected by maxillofacial lesions present high risk of developing post-traumatic psychological effects due to functional and aesthetic deficiencies.<sup>14</sup> Maxillofacial lesions have been associated with social issues, such as alcoholism or illicit drug use.<sup>11</sup> These violence-

related injuries are often underreported and difficult to assess due to the common association with illegal activities (alcohol or drug abuse, firearms and acts of violence against women and children).<sup>10,11</sup>

Therefore, an in-depth knowledge of the characteristic pattern of victims of violence and the prevalence of maxillofacial injuries is essential both for the diagnosis and for the development of public health policies to assess the needs of health services and for the development of prevention programs in order to minimize the consequences of aggressions.<sup>10,11,15</sup>

In this context, this study aimed to characterize the profile, associated factors and to evaluate the prevalence of injuries in the maxillofacial complex of victims of violence attended by a Mobile Emergency Care Service (SAMU) in a municipality in Northeastern Brazil.

## **MATERIALS AND METHODS**

### ***Study Design***

This is a retrospective and cross-sectional study carried out in the municipality of Cajazeiras, Paraíba, Brazil. The municipality has an estimated population of 61.776 inhabitants, Human Development Index (HDI) of 0.67 and Gini Coefficient of 0.56.<sup>16</sup>

### ***Data Collection***

A total of 2.347 records were evaluated from February 2014 to December 2016 by the Mobile Emergency Care Service (SAMU). SAMU is a pre-hospital care service offered by the Brazilian Unified Health System (SUS) and provides care to victims of trauma of any etiology.

The categories for the different mechanisms of injury due to violence were extracted from Chapter XX - External Causes of Morbidity and Mortality (V01-Y98), International Classification of Diseases (ICD 10). The analysis was restricted to victims of aggression (X85-Y09) and to the following groups: aggression by firearm (X93), aggression by means of a sharp or penetrating object (X99), aggression by blunt object Y00) and aggression by means of body force (Y04).<sup>17</sup>

Data collection was performed by three researchers, recording information about the socio-demographic profile (gender and age group), shift (daytime - between 06:00 a.m. and 05:59 p.m. - and night - between 06:00 p.m. to 05:59 a.m.) and weekday (Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday), associated factors [use of alcohol and illicit drugs and type of drug (crack, cocaine, marijuana and other)] and variables related to violence [type (firearm, cold weapon and physical aggression); number of lesions (single and multiple); type of injury (laceration, abrasion, hematoma, and bone fracture); presence of head and face injury, and clinical outcome (released after care, refusal of care, death at the site / during care and referral to the hospital)].

### **Data Analysis**

Data were analyzed using IBM SPSS Statistics for Windows Software, version 20 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to calculate the absolute and relative frequencies, mean, median and standard deviation. Chi-square test was used to compare frequencies between the variables. The significance level was set at  $p < 0.05$ .

### **Ethical Aspects**

This research project was approved by the Ethics Research Committee of the State University of Paraíba (Protocol No. CAAE 69253617.0.0000.5187).

### **RESULTS**

The prevalence of violence was 14.3% ( $n = 337$ ), and the mean age of victims was  $33.4 \pm 15.0$  years, median age 31 years, minimum age 6 years and maximum age 94 years. Regarding the profile, there was predominance of male victims (76.3%), age between 20 and 29 years (29.7%), at night shift (61.4%) and at the weekend (40.7%). Alcohol use was observed in 63.5% of cases and 16.0% reported illicit drug use, with predominance of crack (92.6%) (Table 1). The male / female ratio was 3.2:1.

**Table 1.** Distribution of victims according to demographic and violence characteristics.

<b>Variables</b>	<b>N</b>	<b>%</b>
Gender		
Female	80	23.7
Male	257	76.3
Age Group (in years)		
6 to 19	55	16.3
20 to 29	100	29.7
30 to 39	98	29.1
40 to 49	44	13.0
50 to 59	15	4.4
60 or more	25	7.5
Period		
Daytime	130	38.6
Nighttime	207	61.4
Day of Week		
Sunday	82	24.3
Monday	41	12.2
Tuesday	40	11.9
Wednesday	36	10.7
Thursday	43	12.8
Friday	40	11.9
Saturday	55	16.3
Alcohol Abuse		
Yes	214	63.5
No	123	36.5
Illicit Drugs		
Yes	54	16.0
No	283	84.0
Type of Drug		
Crack	50	92.6
Cocaine	2	3.7
Marijuana	1	1.8
Other	1	1.8

The most prevalent type of violence was physical aggression (54.9%). Most victims presented a single injury (72.7%), with predominance of laceration (80.4%). The occurrence of head and face injuries was found in 33.5% and 35.9% of the sample, respectively, with the majority of victims being referred to the hospital (85.2%) (Table 2).

**Table 2.** Distribution of victims according to the type of violence and characteristics of injuries.

Variables	N	%
Type of Violence		
Firearm	46	13.6
Cold weapon	98	29.1
Physical aggression	185	54.9
Not Informed	8	2.4
Number of Injuries		
Single	245	72.7
Multiple	92	27.3
Laceration		
Yes	271	80.4
No	66	19.6
Abrasion		
Yes	8	2.4
No	329	97.6
Hematoma		
Yes	50	14.8
No	287	85.2
Bone Fracture		
Yes	16	4.7
No	321	95.3
Head Injury		
Yes	113	33.5
No	224	66.5
Face Injury		
Yes	121	35.9
No	216	64.1
Outcome		
Victim Released after Care	5	1.5
Refusal of Care	11	3.3
Death in the Site/ During Care	34	10.1
Referral to the Hospital	287	85.2

Table 3 shows the distribution of the occurrence of lesions in the maxillofacial complex according to variables related to the victim's gender, number of injuries and associated factors. Face

injuries showed association with gender ( $p=0.027$ ) and with the number of injuries ( $p=0.042$ ), both of which being more frequent in women.

## DISCUSSION

Violence is recognized as a major and growing public health problem for which no country, no city and no community are immune.<sup>18</sup> Several authors have shown that there is an increasing tendency of maxillofacial injuries to be related to violence.<sup>1,6,7,9,11,19</sup>

In the present study, men were the main victims of violence, confirming results obtained in studies conducted in Brazil<sup>7,10,15,20-23</sup>, Italy<sup>1</sup>, Greece<sup>6</sup>, India<sup>8,14</sup>, New Zealand<sup>9</sup>, the United Arab Emirates<sup>11</sup>, Australia<sup>24,25</sup> and Nigeria.<sup>26</sup> Among the factors that may explain these findings are the fact that men are exposed to risk factors, such as participation in events of violent nature (fights)<sup>21</sup>, alcohol consumption<sup>9,24-27</sup> and drugs.<sup>28</sup> In contrast, some authors have found an increase in the incidence of aggression-related injuries among women.<sup>29</sup> A possible explanation for this increase is the fact that in the past, some women referred to health services may not have revealed the actual cause of the injury, such as aggression or domestic violence, and reported falls or traffic accidents as the cause of injury.<sup>30</sup>

The occurrence of aggressions was greater in individuals in the third and fourth decades of life. This finding, involving young adults, corroborates other studies conducted in Brazil<sup>7,15,21,22</sup>, Australia<sup>24,25</sup>, Nigeria<sup>26</sup> and India.<sup>30</sup> Individuals in this age group are regular visitors of bars and parties, have greater social interaction and are more likely to suffer aggression due to their physical vigor.<sup>15,21,25</sup> Other factors that may contribute to the occurrence of aggressions in young people include social, economic and emotional conflicts.<sup>6,11,31</sup>

In this study, the frequency of violence in individuals aged 60 years and over was only 7.5%. However, other studies have found that the

**Table 3.** Distribution of the occurrence of head and face injuries according to the gender of the victim, number of injuries and use of alcohol and drugs.

Variables	Head		Body Region			
	Yes	No	p-value	Yes	No	p-value
	N (%)	N (%)		N (%)	N (%)	
Gender						
Male	88 (34.2)	169 (65.8)	0.621	84 (32.7)	173 (67.3)	0.027*
Female	25 (31.2)	55 (68.8)		37 (46.2)	43 (53.8)	
Number of Injuries						
Single	77 (31.4)	168 (68.6)	0.182	80 (32.6)	165 (67.4)	0.042*
Multiple	36 (39.1)	56 (60.9)		41 (44.6)	51 (55.4)	
Alcohol Use						
Yes	75 (35.0)	139 (65.0)	0.437	82 (38.3)	132 (61.7)	0.223
No	38 (30.9)	85 (69.1)		39 (31.7)	84 (68.3)	
Illicit Drugs						
Yes	14 (25.9)	40 (74.1)	0.196	19 (35.2)	35 (64.8)	0.904
No	99 (35.0)	184 (65.0)		102 (36.0)	181 (64.0)	

proportion of maxillofacial injuries due to violence against older adults is increasing.<sup>23,27</sup> Therefore, it should be considered that the reduced number of cases of violence against older adults may be related to their greater difficulty in making a formal complaint or notification due to their debilitating physical and/or psychological conditions<sup>23,27</sup>, thus increasing underreported cases.

Regarding the distribution of victims according to the day shift and weekday, the nocturnal period and the concentration of occurrences on Sunday corroborate other findings.<sup>1,21,31</sup> Research developed in Brazil has shown that violent crimes committed against men are associated with night time and weekends.<sup>22</sup> This can probably be explained by the fact that during this time, individuals often go to places in search of fun and leisure, with large concentrations of people and frequent exposure to alcohol and drugs.<sup>9,22</sup>

Alcohol use among victims was high, corresponding to almost two-thirds of the sample. This finding corroborates previous studies that found that injuries in the maxillofacial complex are frequently associated with alcohol intoxication.<sup>24-26</sup> Recent studies in Australia have found that facial fractures occurred in 17.6%<sup>24</sup> and 7.9%<sup>25</sup> of individuals who consumed alcohol. Underreporting regarding alcohol consumption is possible because patients may not reveal their actual state of intoxication at the time of care.<sup>25</sup>

In this research, the use of illicit drugs was high. The involvement of individuals with illicit

drugs can increase the risk of being a victim and / or aggressor, while violence may increase the risk of consuming illicit drugs<sup>32</sup>, and as a consequence, in both cases, they can increase the number of maxillofacial injuries. Approximately 9.3% of the Brazilian population was victims of at least one form of urban violence in 2012, but this proportion increases to 19.7% among cocaine users and to 18.1% among individuals who consume alcohol.<sup>33</sup> The consumption of alcohol and illicit drugs can lead to reduction of inhibitions, impulsive and aggressive behaviors.<sup>21</sup> These effects are amplified by the combination of these two substances, which commonly occurs among users.<sup>28</sup>

The most common type of aggression was physical violence, with the majority of victims presenting a single lesion and involvement of soft tissues (lesions of a mild nature), which is in agreement with other studies.<sup>1,7,11,22,31</sup> Previous study revealed that bruises were higher among females, while fractures and injuries predominated among males.<sup>7</sup> The literature shows that in relation to maxillofacial trauma, men are associated with aggressions that result in severe trauma, facial bone fracture or dentoalveolar fracture.<sup>22</sup> Minor injuries in women may possibly go unnoticed by persons close to the victims.<sup>34</sup> Thus, when traces of aggression are reduced, they allow violent acts to remain hidden, which make perpetuation of aggressions possible.<sup>34</sup> Cases of head and face injury were high, accounting for more than one third of victims. The face is the most singular area of the body of individuals and

represents their identity, so that aggressions in this region aim to disqualify the victim's identity, acting as a factor of intimidation.<sup>34,35,36</sup>

This study has some limitations. Due to its cross-sectional design, the findings only demonstrate associations and not causality. One of the difficulties of working with secondary data lies in the fact that, in many situations, the incomplete recording of information prevents the faithful transcription of findings.<sup>26,37,38</sup> This condition was observed in this study, since some records were not properly filled.

## CONCLUSION

The main victims of violence are young men who have used alcohol and illicit drugs. Physical aggression is the most frequent type of violence, with high occurrence of head and face injuries. Face injuries showed association with gender and number of lesions, both being more frequent among women.

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## CONFLICTS OF INTEREST

No competing financial interests exist.

### *Brezilyalı Şiddet Mağdurlarında Orofasial Yaralanmalar ve İlişkili Faktörler: Kesitsel Çalışma*

#### ÖZ

**Amaç:** Bu kesitsel çalışma, Kuzeydoğu Brezilya'da bir belediyede Mobil Acil Bakım Servisine başvuran şiddet mağdurlarının orofasiyal bölgede meydana gelen yaralanmaların yaygınlığını değerlendirdi. **Gereç ve Yöntemler:** Şubat 2014'ten Aralık 2016'ya kadar toplam 2.347 kayıt değerlendirildi. Bunların 337'si (%14,3) şiddet mağduru olduğu bulundu. Sosyodemografik profil, ilişkili faktörler ve şiddet ile ilgili bilgiler toplanmıştır. Veriler, %5'lik anlamlılık düzeyinde, tanımlayıcı ve çıkarımsal istatistikler yoluyla analiz edilmiştir. **Bulgular:** Erkeklerin ağırlık yüzdesi (%76,3) ve yaş grubu 20-29 (%29,7) idi. Olaylar gece (%61,4) ve haftasonu (%40,7) daha sıkı. Alkol kullanımı, mağdurların %63,5'inde, %16,0'ında ise yasa dışı uyuşturucu kullanımı, %92,6'sında çatlak hakimiyeti gözlenmiştir. En sık görülen saldırganlık türü fiziksel şiddet (%54,9) idi. Kurbanların çoğunluğu, laserasyonun baskın

olduğu (%80,4) tek bir lezyon (%72,7) sundular. Kafa ve yüz yaralanması vakaları sırasıyla %33,5 ve %35,9 oranında saldırganlık göstermektedir. Yüz yaralanmaları cinsiyetle ilişki ( $p=0,027$ ) ve yaralanma sayısı ( $p=0,042$ ) gösterdi. **Sonuçlar:** Şiddetin ana mağdurları, alkol ve yasadışı uyuşturucu kullanan genç erkeklerdir. Fiziksel saldırganlık, en sık görülen tipte şiddet ve kafa ve yüz yaralanmalarıdır. Yüz yaralanmalarının, her ikisi de kadınlarda daha sık görülmekle beraber, cinsiyet ve lezyon sayısı ile ilişkili olduğunu göstermiştir. **Anahtar Kelimeler:** Şiddet, fiziksel suistimal, maksillofasiyal yaralanmalar, yüz yaralanmaları.

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