Cogitare Enfermagem

ORIGINAL ARTICLE

Trauma scores and their outcomes: assessment of victims in a hospital and emergency room

HIGHLIGHTS

1. 71% of Black men over 40 years old completed high school.
2. 40.1% of traumas occurred in the afternoon, mainly in collisions between cars and motorcycles (41.9%).
3. In the Injury Severity Score (ISS), 98.4% were considered mild trauma.
4. 80.95% of patients were discharged from the hospital.

Sandy Caroline da Silva Andrade[1]
Ana Clara dos Santos Pinho[2]
Messias Froes da Silva Junior[3]
Gisele Torrente[1]

ABSTRACT

Objective: To determine the severity of trauma patients treated in an emergency room in the capital of Amazonas. **Method:** Quantitative, cross-sectional study, with prospective data collection from November 2023 to April 2024. A form was used with sociodemographic data, event data and three validated scores, which were organized in a spreadsheet and presented using descriptive statistics. **Results:** Among the sample of 272 patients, 71% were male and over 40 years old. 114 (41.9%) collisions between car and motorcycle were observed, with 109 (40%) occurring in the afternoon, and 179 (65.8%) patients received mobile pre-hospital care. Regarding the Revised Trauma Score, an average of 7.79 was obtained and in the Injury Severity Score, 268 (98.4%) presented mild injuries. In the Trauma and Injury Severity Score, 89% were blunt, with an average of 0.989. **Conclusion:** Car accidents persist as one of the main external causes of trauma, with low severity injuries and a high probability of survival.

DESCRIPTORS: Accidents, Traffic; Trauma Severity Indices; Wounds and Injuries; Injury Severity Score; Emergencies.

HOW TO REFERENCE THIS ARTICLE:
Andrade SCS, Pinho ACS, da Silva Junior MF, Torrente G. Trauma scores and their outcomes: assessment of victims in a hospital and emergency room. Cogitare Enferm [Internet]. 2026 [cited "insert year, month and day"];31:e102459en. Available from: https://doi.org/10.1590/ce.v31i0.102459en

[1]Universidade do Estado do Amazonas, Escola Superior de Ciências da Saúde, Departamento de Enfermagem, Manaus, AM, Brasil.
[2]Universidade do Estado do Amazonas, Escola Superior de Ciências da Saúde, Departamento de Medicina, Manaus, AM, Brasil.
[3]Universidade Federal do Amazonas, Faculdade de Medicina, Departamento de Medicina, Manaus, AM, Brasil.

INTRODUCTION

Trauma can be defined as an event, set of events, or circumstances that affect a person in a detrimental way, both physically and emotionally, and can even be fatal. It is considered one of the main health problems worldwide, contributing significantly to the increase in mortality and morbidity in the general population, and can be assessed by severity indices[1].

According to data from the Department of Informatics of the Unified Health System (DATASUS), in Brazil, traffic accidents or violence are responsible for approximately 130,000 deaths annually, and 450,000 people suffer sequelae, such as the inability to walk, dysarthria, learning problems, among other disabilities. Approximately 5.8 million people die each year due to trauma, representing 10% of all causes of death. Without proper interventions, it is predicted that this proportion will increase by 2023[2-3].

The main external causes of trauma are car accidents and assaults4. Technological and industrial development and urban growth have contributed to the increase in these occurrences, especially due to the increase in the number of vehicles and urban violence[4]. In this context, data from DATASUS showed that, in 2021, in Brazil, traffic accidents and assaults were responsible for 35,032 and 45,562 deaths, respectively, among a total of 149,322 deaths registered due to external causes[5].

In terms of healthcare, the economic impact on Brazilian coffers related to accidents and violence can be measured directly by the number of hospitalizations for each patient profile, by the healthcare costs in Intensive Care Units (ICUs), and by the overall length of stay. From a social point of view, the impact is verified by the 30% increase in the Potential Years of Life Lost (PYLL) index[6].

Trauma can be assessed using severity indices. These indices function as triage or prognostic assessment systems, based on physiological changes and/or anatomical injuries of the victim. They allow for the evaluation of mortality risk and prognosis, as well as enabling the comparison of results within a service or between different services, helping in the analysis of the quality of care provided.

Among these, the Revised Trauma Score (RTS) is used to assess the prognosis of trauma victims, being a useful tool for triage and initial estimation of severity, without the need for sophisticated medical devices[7].

The Injury Severity Score (ISS) describes the anatomical severity of victims and takes into account injuries present in various body segments. Each injury receives a score ranging from one to six. The ISS incorporates only the highest values in each of the three most severely injured body regions. Thus, the ISS can range from one to 75 points. An ISS of 16 is indicative of mortality and classifies the trauma as severe[8].

The Trauma and Injury Severity Score (TRISS) aims to estimate the chances of survival of a traumatized patient, through calculations of the RTS, ISS, victim's age and mechanism of trauma, which can be classified as blunt or penetrating[9].

Through the application of these scores, trauma records can provide useful information for improving victim care, as well as facilitate the implementation of measures and constitute data sources for scientific research in traumatology. Given the above, the objective of this study is to determine the severity of trauma patients treated in an emergency room in the capital of Amazonas.

METHOD

This is a cross-sectional study with a quantitative approach, with prospective data collection from trauma victims treated in a central emergency room in the capital of

Amazonas. The sample was random, calculated using OpenEpi with 95% confidence and a 5% margin of error, resulting in 272 patients. Patients over 18 years of age, treated in the polytrauma room, were selected, and records with incomplete or incomprehensible data were excluded.

Data collection was carried out from November 2023 to April 2024 on-site. The data were organized in a Microsoft Excel spreadsheet, containing the sociodemographic variables of gender, age, race, marital status, education level, and profession. Variables related to the event were also considered, such as the period within 24 hours, nature of the occurrence, mobile pre-hospital care, region of occurrence, and role of the victim; The clinical variables used in calculating trauma scores and the outcomes considered in this study were: hospital discharge, transfer, operating room, hospitalization, death, and observation.

The participants' clinical data were: area of injury (head and neck, face, chest, abdomen and pelvis, skeletal, external surface), type of trauma (blunt, penetrating, mixed), and outcome (discharge, operating room, hospitalization, death, observation, transfer). Finally, the RTS, ISS, and TRISS scores were evaluated.

The RTS score was based on the values of the Glasgow Coma Scale (GCS), Blood Pressure (SBP), and Respiratory Rate (RR) recorded in the patients' medical records, whose values ranged from 0 to 7.84. The ISS was classified as anatomical and took into account injuries present in various body segments. The ISS score ranged from 1 to 75. The ISS incorporated only the highest values in each of the three most severely injured ISS body regions. TRISS, on the other hand, aims to estimate the chances of survival of a trauma patient, through calculations of RTS, ISS, victim's age, and mechanism of trauma.

For the analysis, the data obtained from the assessment of patients admitted to the emergency room, with review of medical records, according to the proposed scales, were allocated to a database and subsequently organized into spreadsheets. To assist in the organization and understanding of the quantitative data, the JAMOVI software was used, with the presentation of the results in tables with absolute and percentage values.

This study respected all ethical precepts related to research involving human beings, according to Resolution No. 466/2012 of the Conselho Nacional de Saúde (CNS), and was approved by the Comitê de Ética em Pesquisa (CEP) of the Universidade do Estado do Amazonas (UEA) under opinion number 6.097.562.

RESULTS

Of the 272 trauma patients treated at the Hospital and Emergency Room in the city of Manaus, 192 (71%) were black men, 176 (65%) were single, 91 (33.5%) were over 40 years old, and 179 (66%) had completed high school, as shown in Table 1.

Table 1. Sociodemographic characteristics of trauma patients (N=272). Manaus, AM, Brazil, 2024

(continue)

Sociodemographic variables	n	%
Gender		
Female	80	29
Male	192	71

Table 1. Sociodemographic characteristics of trauma patients (N=272). Manaus, AM, Brazil, 2024

(conclusion)

Sociodemographic variables	n	%
Age		
18 - 20 years	26	9.6
21 - 30 years	88	32.3
31 – 40 years	67	24.6
Over 40 years old	91	33.5
Race/Color/Ethnicity		
Yellow	1	0.4
White	17	6.3
Indigenous	1	0.4
Brown	194	71
Black	59	22
Marital status		
Married	87	32
Divorced	3	1.1
Single	176	65
Widowed	6	2.2
Education level		
Elementary School Completed	1	0.4
Elementary School Incomplete	22	8.1
High School Completed	179	66
High School Incomplete	65	24
Bachelor's Degree Completed	5	1.8
Occupation		
Self-Employed	64	23.5
Unemployed	48	17.6
Ride-sharing Driver	55	20.2
Other	105	38.6

Source: The authors (2024).

Regarding the event data, it was observed that 109 (40.1%) occurred during the afternoon period and 114 (41.9%) received mobile pre-hospital care. The North and South zones were responsible for 59 (22%) and 58 (22%) of the cases, respectively. Regarding the victim's status, 120 (44.1%) were motorcycle drivers, as shown in Table 2.

Table 2. Characteristics of the event suffered by trauma victims (N= 272). Manaus, AM, Brazil, 2024

(continue)

Event variables	n	%
Period		
Morning	84	30.9
Afternoon	109	40.1
Evening	79	29

Table 2. Characteristics of the event suffered by trauma victims (N= 272). Manaus, AM, Brazil, 2024

(conclusion)

Event variables	n	%
Nature		
Car vs. motorcycle collision	114	41.9
Motorcycle vs. motorcycle collision	31	11.4
Car vs. car collision	11	4.0
Motorcycle vs. bus collision	7	2.6
Motorcycle vs. truck collision	3	1.1
Pedestrian accident	13	4.8
Physical assault	16	5.9
Weapon (FAB) - bladed weapon	18	6.6
Firearm (FAF) - firearm	7	2.6
Fall from own height	37	13.6
Crushing	3	1.1
Burns	11	4.0
Truck-to-truck collision	1	0.4
Mobile pre-hospital care		
Yes	179	65.8
No	93	34.2
Zone		
North	59	21.7
West	46	16.9
East	13	4.8
South	59	21.7
Central	1	0.4
South-Central	58	21.3
West-Central	24	8.8
Interior	11	4.0
Peri-urban	1	0.4
Victim Status		
Car Driver	4	1.4
Truck Driver	2	0.7
Motorcycle Driver	120	44.1
Car Passenger	7	2.6
Motorcycle Passenger	31	11.4
Pedestrian	5	1.8
Victim	103	37.9

Source: The authors (2024).

Regarding the area of injury, it was found that the skin and appendages corresponding to the external surface were affected in 138 (51%) cases, followed by deep injuries affecting the skeletal muscles in 105 (39%). As for the type of trauma, blunt mechanisms prevailed in 243 (89.3%) of the 272 patients, and penetrating mechanisms in 25 (9.2%). Regarding the outcome, 220 (80.9%) were discharged from the hospital and only one (0.4%) died.

With regard to the RTS, the values ranged from 0 to 7.84, with an average of 7.79. The majority, 268 (98.4%), had an RTS > 7, followed by RTS > 6 <7, with two (0.8%). As for the ISS, 268 (98.4%) were classified as mild injuries and only one (0.4%) as a severe

injury. Regarding the mechanism of trauma according to the TRISS system, 243 (89%) were blunt, with an average of 0.989.

Table 3. Trauma characteristics and scores of the 272 patients treated at the Hospital and Emergency Room. Manaus, AM, Brazil, 2024

Features	n	%
Injury area		
Head and neck	39	14
Face	24	8.8
Chest	55	20
Abdomen and pelvis	71	26
Skeletal	105	39
Outer surface	138	51
Type of trauma		
Blunt	243	89.3
Penetrating	25	9.2
Mixed	4	1.5
Outcome		
Discharge	220	80.9
Surgical Center	17	6.3
Admission	17	6.3
Death	1	0.4
Observation	12	4.4
Transfer	5	1.8
Trauma scores	**n**	**%**
***Revised Trauma Score* (RTS)**		
≥ 0 < 1	1	0.4
≥ 1 < 2	0	0
≥ 2 < 3	0	0
≥ 3 < 4	0	0
≥ 4 < 5	0	0
≥ 5 < 6	1	0.4
≥ 6 < 7	2	0.8
≥ 7 ≤ 7,84	268	98.4
Average	7.79	
***Injury Severity Score* (ISS)**		
Light (1 - 15)	268	98.4
Moderate (16 - 24)	3	1.2
Serius (>25)	1	0.4
***Trauma and Injury Severity Score* (TRISS)**		
Average	0.989	

Source: The authors (2024).

DISCUSSION

The results described in this study diverge from some of the literature regarding the age range of the victims, since the highest prevalence of trauma has been recorded among younger individuals. In this case, it was observed that the most affected age group was that of people over 40 years old, which contradicts the trend described in several epidemiological studies on the subject[1-4].

On the other hand, the findings corroborate the widely documented evidence that males are more affected by traumatic events, possibly due to greater exposure to risky situations and work or behavioral activities associated with accidents. This observed age difference suggests the importance of broadening the focus to older age groups, which also present significant vulnerabilities to trauma mechanisms[10].

While the established literature has indicated that most accidents occur at night, this relationship was not present in this research. This divergence may be related to local mobility characteristics and the routine of the economically active population, which intensifies traffic flow at specific times, especially in the late afternoon.

In this context, the increased volume of vehicles associated with post-work fatigue, rushing, and reduced attention in traffic can contribute to the rise in the number of accidents at these times, corroborating the hypothesis that behavioral and environmental factors exert a significant influence on the occurrence of traumatic events[11].

The regions with the highest incidence observed in this research are in accordance with studies that indicate that the neighborhoods with the highest number of victims are located along the main roads that cross the city, forming a corridor. Most of the georeferenced accidents occur in the southern zone of the city, while outside this area, they are distributed along the arterial roads[12].

In the national context, Brazil recorded 26,138 traffic deaths last year. The Northern Region presented the highest percentage of deaths related to road accidents. Amazonas occupies the first position on this list, with a significant increase in the number of victims, going from 177 to 261 cases, a variation of 47.46%.

The nature of the most prevalent trauma coincides with that recorded in previous studies, with information identifying car collisions as one of the main causes of death from trauma in the world[13].

In the national and international literature, falls from one's own height are identified as the most frequently observed trauma mechanism. Among elderly patients, there is consensus that falls from one's own height are the main cause of a large proportion of spinal fractures[14]. In this study, a significant portion of these patients were admitted with RTS values above seven, indicating a good probability of survival and less severe injuries.

Regarding pre-hospital care, the role of the Mobile Emergency Care Service (SAMU) and Mobile Unit teams stands out, as they were the main means of access to hospital care for the patients included in the research. This aspect is reflected in the RTS values found, which indicate relatively mild severity in most cases, suggesting that the rapid and structured intervention of these teams may have contributed to the initial stabilization of patients.

Furthermore, these data reinforced the crucial role of pre-hospital care in the efficient management of traffic accidents, allowing for adequate triage, immediate intervention, and the reduction of serious complications, which positively influences hospital outcomes[15].

It is also important to highlight that pre-hospital care offers essential care before arrival at the hospital, and the quality of this care, especially in the first hours, is crucial for increasing survival rates and reducing possible sequelae[2].

The higher incidence of accidents among motorcycle riders is a finding that reflects the inherent vulnerability of motorcyclists, who are more exposed due to the absence of protective bodywork, greater instability, and lower visibility in traffic.

In addition, behavioral factors, such as high speed, risky overtaking, and the improper use of personal protective equipment, also contribute to this predominance. Consequently, in a traffic accident, motorcycle occupants are 26 times more likely to die than car drivers[16].

Thus, these data reinforce the need for public policies aimed at the safety of motorcyclists, including educational campaigns, rigorous enforcement, and encouragement of the correct use of helmets and protective clothing.

Regarding anatomical and physiological indices, similar data were found in other studies, in which most traumas were mild, most frequently on the external surface and in the skeletal region, and a 98% chance of survival. These data corroborate that injuries to the skeletal regions, mainly fractures, are currently the most common among motorcyclists, probably due to the lack of body protection compared to other motor vehicles[17].

Thus, it is observed that the regions most affected in traffic accidents are in line with the medical literature, which highlights the predominance of injuries to the lower limbs, especially the tibia, fibula, and femur bones. These types of injuries are among the main causes of prolonged hospital stays[18].

The reduction in the incidence and effects of traffic-related injuries may be related to the effectiveness of the use of protective equipment, such as seat belts and helmets, as well as improvements in pre-hospital response conditions. Furthermore, the increase in educational campaigns and traffic enforcement may have contributed to the reduction in the severity of trauma. However, even in the case of minor injuries, it is important to highlight that trauma, even of low complexity, imposes costs on the health system and can generate physical and psychological repercussions that deserve adequate follow-up[19].

Thus, it is still necessary to implement specific actions, such as awareness campaigns about the risks of reckless driving, whether due to speeds above the permitted limit on roads or the effect of alcohol and other drugs, seeking to progressively reduce the number of victims and the impacts of traffic accidents.

Because it is a referral hospital for trauma with major burns, as directed by senior management, neurocritical patients were referred to another service, influencing the profile of the victims in this study. Limitations related to incomplete medical records and gaps in patient follow-up until hospital discharge should also be considered, the latter aspect being a recommendation for future studies with more extensive analyses.

CONCLUSION

Some sociodemographic variables are evident in the trauma patients treated in the investigated setting. The injuries suffered were not significant for hospitalization and other hospital interventions. This information is corroborated by the score data and the patients' outcomes. It should be noted that the investigated hospital is not a referral center for the care of neurocritical patients, considered more severe in the literature.

The knowledge obtained from this study makes it possible to assist in the management of the service, in health education, and in traffic education as protective factors for life and against sequelae in young people, adults, and Black people in Amazonas.

FUNDING

Amazonas State Research Support Foundation, grant 024/2023 – GR/UEA.

REFERENCES

1. Trigo I, Coelho MAA, Ribeiro OP. Gravidade do trauma em vítimas de acidente de viação admitidas no serviço de urgência. Servir [Internet]. 2022 [cited 2024 Aug 12];2(2):e25997. Available from: https://doi.org/10.48492/servir0202.25997

2. Maia AS, da Silva FQ, França IL, do Nascimento EM, de Carvalho TP, de Sousa CG. The prevalence of trauma in victims of traffic accidents. Enferm Foco [Internet]. 2024 [cited 2026 Mar 17];15 e-202493. Available from: https://dx.doi.org/10.21675/2357-707X.2024.v15.e-202493

3. Silveira ES, O'Dwyer G. Trauma Center: alternative model of trauma care in the state of Rio de Janeiro. Saúde Debate [Internet]. 2017 [cited 2024 Mar 5];41(112):243-53. Available from: https://doi.org/10.1590/0103-1104201711220

4. Alves LLR, da Costa Neto VB. Perfil clínico-epidemiológico de vítimas de trauma abdominal contuso: uma revisão de literatura. RCientTo [Internet]. 2022 [cited 2024 Aug 12];2(2):1-10. Available from: https://itpacporto.emnuvens.com.br/revista/article/view/73

5. Brasil. Ministério da Saúde. Ministério da Justiça e Segurança Pública. Mortes por causas externas: qualificação dos registros inespecíficos [Internet]. Brasília: Ministério da Saúde; 2024 [cited 2024 Aug 7]. 115 p. Available from: https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/svsa/vigilancia/mortes-por-causas-externas-qualificacao-dos-registros-inespecificos/view

6. Iunes RF. III - Impacto econômico das causas externas no Brasil: um esforço de mensuração. Rev Saúde Pública [Internet]. 1997 [cited 2024 Aug 13];31(Suppl 40):38-46. Available from: https://doi.org/10.1590/S0034-89101997000500004

7. Jeong JH, Park YJ, Kim DH, Kim TY, Kang C, Lee SH, et al. The new trauma score (NTS): a modification of the revised trauma score for better trauma mortality prediction. BMC Surg [Internet]. 2017 [cited 2024 Aug 13];17:77. Available from: https://doi.org/10.1186/s12893-017-0272-4

8. Javali RH, Krishnamoorthy, Patil A, Srinivasarangan M, Suraj, Sriharsha. Comparison of injury severity score, new injury severity score, revised trauma score and trauma and injury severity score for mortality prediction in elderly trauma patients. Indian J Crit Care Med [Internet]. 2019 [cited 2024 Aug 18];23(2):73-7. Available from: https://doi.org/10.1186/s12893-017-0272-4

9. Domingues CA, de Sousa RMC, Nogueira LS, Poggetti RS, Fontes B, Muñoz D. The role of the new trauma and injury severity score (NTRISS) for survival prediction. Rev Esc Enferm USP [Internet]. 2011 [cited 2024 Aug. 18];45(6):1353-8. Available from: https://doi.org/10.1590/S0080-62342011000600011

10. Batista DVA, Cassiano C, Oberg LMCQ, Gianvecchio DM, de Sousa RMC, Nogueira LS. Factors associated to the time of death of trauma victims: A retrospective cohort study. Revista de Enfermagem da UFSM [Internet]. 2021 [cited 2024 Aug 18];11:e29. Available from: https://doi.org/10.5902/2179769247475

11. Rios PAA, Mota ELA, Ferreira LN, Cardoso JP, Santos GJ, Rodrigues TB. Traffic acidentes among drivers: incidence and differencs between motorcyclists and car drivers in population-based study. Rev Bras Epidemiol [Internet]. 2019 [cited 2024 Aug 27];22:e190054. Available from: https://doi.org/10.1590/1980-549720190054

12. Melo WA de, Mendonça RR. Caracterização e distribuição especial dos acidentes de trânsito não fatais. Cad saúde colet [Internet]. 2021 [cited 2024 Aug 29];29(1):1-12. Available from: https://doi.org/10.1590/1414-462X202129010364

13. Santos MM, de Oliveira AJCN, Rodrigues JMS. Lesões e padrão das vítimas de acidentes de trânsito com motocicletas atendidas em uma unidade regional de emergência. Rev Fac Ciênc Méd Sorocaba [Internet]. 2022 [cited 2024 Aug 27];22(4):151-5. Available from: https://doi.org/10.23925/1984-4840.2020v22i4a4

14. Moreno CCL, de Oliveira KS, Cesar AEM, de Souza RC, Oliveira WHA, Motter BV, et al. Traumatic thoracolumbar fracture in a public hospital in São Paulo: epidemiological study. Coluna/Columna [Internet]. 2024 [cited 2024 Sep 4];23:e284829. Available from: https://doi.org/10.1590/S1808-185120242303284829

15. Ibiapino MK, Couto VBM, Sampaio BP, de Souza RAR, Padoin FA, Salomão IS. Serviço de atendimento móvel de urgência: epidemiologia do trauma no atendimento pré-hospitalar. Rev Fac Ciênc Méd Sorocaba [Internet]. 2017 [cited 2024 Aug 30];19(2):72-5. Available from: https://adamo.pucsp.br/index.php/RFCMS/article/view/30805

16. Tan Chor Lip H, Tan JH, Mohamad Y, Ariffin AC, Imran R, Azmah Tuan Mat TN. Clinical characteristics of 1653 injured motorcyclists and factors that predict mortality from motorcycle crashes in Malaysia. Chin J Traumatol [Internet]. 2019 [cited 2026 Aug 29];22(2):69-74. Available from: https://doi.org/10.1016/j.cjtee.2018.11.001

17. Bittar CK, Cliquet Junior A, da Costa VSDAD, Pacheco ACF, Ricci RL. Epidemiological profile of motorcycle accident victims in university hospital. Acta Ortop Bras [Internet]. 2020 [cited 2024 Aug 30];28(2):97-9. Available from: https://doi.org/10.1590/1413-785220202802230035

18. Rocha AC, Valente BG, Figueiredo HCES, Jorge GDO, de Mattos CAD, Bittar CK. The impact of motorcycle accidents in a reference hospital during the covid-19 pandemic. Acta Ortop Bras [Internet]. 2022 [cited 2024 Sep 4];30(5):e255862. Available from: https://doi.org/10.1590/1413-785220223005e255862

19. Aguiar YPS. Vida após o trauma no trânsito: perfil das vítimas, internações e fatores associados às incapacidades. [Thesis on the Internet]. Rio de Janeiro: Escola Nacional de Saúde Pública Sergio Arouca; 2021 [cited 2024 Sep 1]. 116 p. Available from: https://www.arca.fiocruz.br/handle/icict/61817

Received: 09/12/2025
Approved: 20/08/2026
Associate editor: Dr. Gilberto Tadeu Reis da Silva

Corresponding author:
Sandy Caroline da Silva Andrade
Universidade do Estado do Amazonas
Av. Djalma Batista, 3758 – Flores, CEP 69050-010
E-mail: sandy.caroline_@hotmail.com

Role of Authors:
Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - **Andrade SCS, Pinho ACS, da Silva Junior MF, Torrente G.** Drafting the work or revising it critically for important intellectual content - **Andrade SCS, Pinho ACS, Torrente G.** Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - **Andrade SCS, Torrente G.** All authors approved the final version of the text.

Conflicts of interest:
The authors have no conflicts of interest to declare.

Data availability:
The authors declare that all data are fully available within the article.

ISSN 2176-9133

This work is licensed under a *Creative Commons Attribution 4.0 International License*.