

Emergency services at sports places in Rio de Janeiro: intervention of the sports management, activity and tourism

Serviços de emergência em locais esportivos no Rio de Janeiro: intervenção da gestão esportiva, atividade e turismo

Servicios de emergencia en lugares deportivos en Río de Janeiro: intervención de la gestión deportiva, actividad y turismo

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Abstract. Emergency services in sports environments are crucial to ensuring the safety of those participating. Although Rio de Janeiro boasts a large and varied number of sports facilities, little is known about the dynamics of care provided in these locations. The primary objective of this study was to analyze the emergency response data from sports environments attended by the Military Fire Brigade of the State of Rio de Janeiro (CBMERJ). Secondly, the study aimed to compare the factors associated with emergency care at sports facilities, identify the most common injury sites, infer the causes of these accidents, and observe the frequency of fatalities during sports activities. For this study, 615 data points from the first emergency rescue group (1GSE) of the Rio de Janeiro Military Fire Brigade were analyzed, divided into North (n = 215), South (n = 145), West (n = 214), and Central (n = 30) zones. The dependent variables were: gender, outcome types, care types, transport types, immobilization, care characterization, care strategy, death details, emergency occurrences, and injury distribution by region. The zones were compared using the Kruskal-Wallis test and Dunn's post hoc analysis, with a significance level of $p \leq 0.05$. Statistical analysis revealed differences between the zones when comparing outcomes, with the northern zone showing higher values (~75%) of treated and removed victims compared to the western zone (60%). There were also differences between the zones in the type of care provided, where the northern zone showed higher values (~35%) of intermediate care compared to the western (~20%), southern (~25%), and central (%) zones. The type of transport used varied between zones, with the southern zone showing higher usage of rapid response vehicles (ASE L) than the northern and central regions. The analysis further revealed a difference in immobilization conditions, with the central zone showing a lower frequency (~20%) of immobilization, that is, a higher proportion of "other" outcomes compared to the northern (~40%), western (%), and southern (~50%) zones.

Keywords: Emergency care; sports practices; injury; Fire Department.

Resumo. Os serviços de emergência em ambientes esportivos são fundamentais para garantir a segurança dos seus praticantes, apesar do Rio de Janeiro possuir um grande e variado número de espaços para prática esportiva, pouco se sabe como ocorre a dinâmica de atendimentos nesses locais. O objetivo geral deste estudo foi analisar os dados de atendimento em ambientes de prática esportiva realizados pelo Corpo de Bombeiros Militar do Estado do Rio de Janeiro (CBMERJ). Em segundo lugar, comparar os fatores associados ao atendimento de emergência em locais de prática esportiva e verificar os locais de lesões mais comuns, inferir as causas desses acidentes e observar a frequência de mortes durante a prática esportiva. Para este estudo, foram utilizados 615 dados do primeiro grupo de resgate de emergência (1GSE) do Corpo de Bombeiros Militar do Rio de Janeiro, separados em Norte (n = 215), Sul (n = 145), Oeste (n = 214) e Centro (n = 30). As variáveis dependentes foram: sexo, tipos de desfechos, tipos de atendimento, tipos de transporte, imobilização, caracterização do atendimento, estratégia de atendimento, detalhes da morte, ocorrências de emergência e distribuições de lesões por região. As zonas foram comparadas pelo teste de Kruskal-Wallis e Dunn's post hoc, $p \leq 0.05$. A análise estatística mostrou uma diferença entre as zonas quando comparadas ao desfecho, com a zona norte apresentando valores mais altos (~ 75%) em vítimas tratadas e removidas do que a zona oeste (60%). Houve diferença entre as zonas quando comparadas ao tipo de atendimento, onde a zona norte apresentou valores mais altos (~ 35%) de atendimento intermediário do que a zona oeste (~ 20%), sul (~ 25%) e central (%). O tipo de transporte utilizado foi diferente entre as zonas, e a zona sul apresentou valores mais altos de carro rápido (ASE L) do que a zona norte e região central. A análise também mostra uma diferença entre as zonas quando comparadas à condição de imobilização, a zona central apresentou uma menor frequência (~ 20%) de imobilização, ou seja, maior "outros" do que a norte (~ 40%), oeste (%) e sul (~ 50%).

Palavras-chave: Atendimento de emergência; práticas esportivas; lesão; Corpo de Bombeiros.

Resumen. Los servicios de emergencia en ambientes deportivos son esenciales para garantizar la seguridad de quienes practican deportes. Si bien Río de Janeiro cuenta con un gran y variado número de espacios para la práctica deportiva, poco se sabe sobre la dinámica de la atención en esos lugares. El objetivo general de este estudio fue analizar los datos de atención en entornos de práctica deportiva realizados por el Cuerpo de Bomberos Militar del Estado de Río de Janeiro (CBMERJ). En segundo lugar, comparar los factores asociados a la atención de emergencia en lugares de práctica deportiva y verificar los sitios de lesiones más comunes, inferir las causas de estos accidentes y observar la frecuencia de muertes durante la práctica deportiva. Para este estudio, se utilizaron 615 datos del primer grupo de rescate de emergencia (1GSE) del Cuerpo de Bomberos Militar de Río de Janeiro, separados en Norte (n = 215), Sur (n = 145), Oeste (n = 214) y Centro (n = 30). Las variables dependientes fueron: sexo, tipos de resultados, tipos de atención, tipos de transporte, inmovilización, caracterización de la atención, estrategia de atención, detalles de la muerte, ocurrencias de emergencia y distribuciones de lesiones por región. Las zonas se compararon mediante la prueba de Kruskal-Wallis y el post hoc de Dunn, $p \leq 0.05$. El análisis estadístico mostró una diferencia entre las zonas al compararlas con el resultado, con la zona norte mostrando valores más altos (~ 75%) en víctimas tratadas y removidas que la zona oeste (60%). Hubo diferencia entre las zonas al compararlas con el tipo de atención, donde la zona norte mostró valores más altos (~ 35%) de atención intermedia que la zona oeste (~ 20%), sur (~ 25%) y central (%). El tipo de transporte utilizado fue diferente entre las zonas, y la zona sur mostró valores más altos de coche rápido (ASE L) que la zona norte y la región central. El análisis también muestra una diferencia entre las zonas al compararlas con la condición de inmovilización, la zona central mostró una menor frecuencia (~ 20%) de inmovilización, es decir, mayor "otros" que el norte (~ 40%), oeste (%) y sur (~ 50%).

Palabras clave: Atención de emergencia; prácticas deportivas; lesión; Departamento de Bomberos.

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Introduction

Since the 2000s, the regulation of emergency care has taken a central role in Brazil's federal health agenda (O'Dwyer et al., 2013). Rio de Janeiro, one of Brazil's most famous cities for tourism and leisure activities involving physical exercise (Pereira et al., 2019), attracts a large number of residents and visitors who engage in physical activities. However, despite this significant population engaging in physical exercise, no studies have investigated the occurrence of accidents resulting in injuries in places where sports and physical activities are practiced. Such information is crucial for authorities responsible for managing leisure and tourism activities in locations dedicated to physical and sports activities across the city.

By definition, an injury refers to damage caused to biological tissue, ranging from simple abrasions or cuts to more severe fractures, including amputations (Carder et al., 2020).

Sports activities are a leading cause of injuries resulting from accidents, making these environments more prone to emergency care incidents and even fatalities compared to domestic accidents, leisure activities, workplace injuries, or instances of violence (Post et al., 2020). In a study by Carder et al. (2020) on sports injuries involving 5736 participants, 2451 (42.7%) were identified as "samplers' sports specialists," 1628 (28.4%) as "sports specialists," and 1657 (28.9%) as "others," with the average age of all athletes being 14.6 years (range 7-18 years). This indicates that various factors, such as age and experience, are associated with sports participants. Despite the significant contributions of previous research, no study has yet examined accidents in sports venues that require emergency care. Therefore, such information could be invaluable in aiding accident prevention and response in sports venues, especially given the high number of fatalities among cyclists and runners (Young, 2002).

An earlier study by Schelp and Ekman (1990) suggested that 58% of accidents involving cyclists were the fault of the driver, whether due to driving in the wrong lane, excessive speed, or negligence. Despite this, little is known about the types of injuries or the number of fatalities occurring in sports venues, particularly in Rio de Janeiro, a city known for its focus on physical fitness, as evidenced by the abundance of gyms, sporting events, and public displays of physical prowess common in coastal cities (Carder et al., 2020; Enger et al., 2019; Mechem, Dickinson, Shofer, & Jaslow, 2002).

Moreover, the increase in recreational physical activities or sports participation has been linked to a rise in injuries, often due to the lack of appropriate professional supervision (De la Motte, Gribbin, Lisman, Murphy, & Deuster, 2017). Authors have noted that inadequate safety measures hinder the availability of physical activities, thereby increasing the risk of injury, especially in public spaces where natural phenomena or uncontrollable accidents may occur (Johnston,

Cahalan, O'Keeffe, O'Sullivan, & Comyns, 2018). Additionally, the population density in different regions might influence the absolute number of injuries, potentially leading to an increased number of emergency visits (IBGE, 2019).

One of the defining features of the modern world is population ageing (Hakman et al., 2024). According to the IBGE (2020), the population of Rio de Janeiro is estimated to be around 6.748 million people. The importance of studying emergency care in sports practice venues lies in the fact that there are numerous such environments in Rio de Janeiro, including gyms, studios, squares, clubs, beaches, courts/fields, swimming pools, and even the sea. Given this, a study that compares the number of emergency services across different areas of Rio de Janeiro could be highly beneficial in improving the qualifications of professionals working in accident prevention and treatment, as well as better managing the distribution of emergency services by municipality, ultimately reducing the demand for such services.

Therefore, the primary objective of this study was to analyze data from sports practice settings attended by the Military Fire Brigade of the City of Rio de Janeiro, Brazil. The secondary objective was to compare factors associated with emergency care in sports practice locations across different areas, identify the most common accidents, infer the causes of these accidents, and observe the frequency of fatalities during sports activities.

Methods

Study design

An ecological study was conducted, which can be better understood as an epidemiological study that utilises data from emergency care services as the unit of analysis to examine the injuries associated with these visits in locations where physical activities and sports are practised. Such an approach is useful for detecting associations between the exposure of professionals to injury occurrences in different areas of Rio de Janeiro, alongside epidemiological indicators and the occurrence of fatalities.

The study focused on the northern (87 neighbourhoods), southern (17 neighbourhoods), western (40 neighbourhoods), and central (17 neighbourhoods) areas of the municipality of Rio de Janeiro, including the eastern part of Guanabara Bay and the Metropolitan region. According to the IBGE (2019), the total population of these neighbourhoods was estimated at 6,688,927 inhabitants in 2018. The data for this study was sourced from secondary data provided by the Data Processing Centre of the Military Fire Brigade of the State of Rio de Janeiro, covering the period from 2016 to 2017.

A statistical difference was observed between the areas of the municipality when comparing injury data in locations (both private and public) where physical activities or sports were conducted (dependent variables). The following de-

pendent variables were analysed: gender, types of outcomes, types of care, types of transportation, immobilisation, characterisation of care, care strategy, details of fatalities, emergency cases, and the distribution of injuries by region.

Sample

For this study, 615 data points were analysed, related to the assistance provided by vehicles of the First Emergency Relief Group (1^oGSE) of the Military Fire Brigade of the City of Rio de Janeiro, in relation to the total number of visits to physical activity locations, both public and private, during the period 2016-2017 in the municipality of Rio de Janeiro. The variables were compared between the North (n = 215), South (n = 145), West (n = 214), and Central (n = 30) zones.

Inclusion criteria: The data must be properly recorded in the Prehospital Care Registry (RAPH), which is composed of 103 elements, completed and signed by the military personnel of the CBMERJ health team, the head of the Garrison of the emergency rescue vehicle, and the officer responsible for the technical aspect of the assistance. All garrison chiefs undergo annual refresher training through the CBMERJ Professional Education Centre in Prehospital Care.

Exclusion criteria: Data that was not accurately recorded in the Prehospital Care Registry or that did not occur in a sports environment within the city of Rio de Janeiro were excluded.

To use secondary data from the Data Processing Centre of the Military Fire Brigade of the State of Rio de Janeiro, a duly signed letter of consent was obtained. Since this research involves only public domain data that does not identify the participants, or simply constitutes a bibliographic review without involving human subjects, it did not require approval from the CEP-CONEP System. Consequently, this investigation was exempt from CEP review.

Procedures

In the city of Rio de Janeiro, the management of SAMU (Mobile Emergency Service, 2016) falls under the responsibility of the Secretariat of Civil Defence, through the Military Fire Brigade of the State of Rio de Janeiro (CBMERJ).

When a call is made to the emergency number 192 (all calls are recorded), the Technician Assistant for Medical Regulation (TARM) logs the service details into the system using PRTG Network Monitor software. This includes information such as the address, reference points, contact telephone number, cause of the occurrence, and the number of victims. This information is displayed on the regulator's screen, who then assesses the severity of the case and determines the type of ambulance to be dispatched. The fleet operator identifies the nearest available ambulance and activates the vehicle.

For calls made to the emergency number 193 (all calls recorded), the operator, a member of the military personnel from the Fire Department Operations Centre (COCB),

collects details such as the exact location of the incident, the number of victims, the mechanism of injury (what happened?), risks at the scene, the caller's perception of the victim(s)' condition, and a confirmation phone number. The call is then forwarded to the nearest Military Firefighters Unit (UBM) via Sisgraph, a software that manages emergency calls and vehicle dispatch, monitoring the response from the initial alert to the conclusion of the emergency in real time. The (military) communicator then activates the appropriate vehicle for the required assistance.

According to the 2018 Standard Operating Procedure (POP 2018) for prehospital care, specifically in the context of accidents involving multiple victims, vehicles are classified according to predetermined protocols. There are three types of vehicles designated for prehospital care within CBMERJ: basic, intermediate, and advanced. These vehicles are deployed according to the relevant risk stratification for each type, with green events being the priority for basic units, yellow for intermediate vehicles, and red events for advanced units. As outlined by O'Dwyer et al. (2016), basic units consist of a driver and two nursing technicians. Intermediate units include a driver, a nurse, and a nursing technician. Advanced units are staffed by a driver, a doctor, and a nursing technician.

The risk stratification determines the urgency of the emergency dispatch. The classification is based on the anamnesis initiated during the phone call via telemarketing services. The symptoms identified during this initial assessment are then confirmed or refuted by the regulatory doctor.

The risk classification levels are as follows:

Red: Priority 0 - Absolute urgency requiring immediate attention.

Yellow: Priority 1 - Moderate urgency requiring prompt attention.

Green: Priority 2 - Low urgency, including priority groups such as the elderly, pregnant women, children, and others.

Blue: Priority 3 - Minimal urgency, typically involving acute or chronic conditions of low complexity.

The service operates 24 hours a day, seven days a week, and is provided free of charge through the Unified Health System (SUS).

According to the Federal Council of Medicine, in its CFM Resolution No. 1,451, dated 3 October 1995 (Medical Portal, 1995), the definitions are as follows:

Urgency: An unforeseen occurrence of health problems with or without potential life risk, requiring immediate medical assistance.

Emergency: A medical condition involving an imminent risk of death or intense suffering, requiring immediate medical treatment.

Extent

Associated statistical analyses were conducted using data from the Prehospital Care Record (RAPH), focusing on variables related to incidents occurring in sports or physical activity settings, specifically:

Table 1.
Output types

Result	Observations
Victim answered and eliminated (VAR)	The victim is treated by garrison and transferred to a reference hospital.
Victim served and liberated	The victim is treated and released with instructions in the act, through contact with a regulator
lost victim	When the victim is not attended to, for example, because he was not found
The victim rejection he services.	The victim did not request assistance or does not accept receive attendance.
The victim rejection transport.	The victim accepts to be treated, however, refuses to be transferred to a referral hospital (SUS), for example, because she has a health insurance.
Transferred to another vtr. Which?	The victim is treated and transferred to another vehicle due to some complication in the scene or during transport.
Others	Any result other than those mentioned
Does not apply	When, for example, it is a prevention event.

Source: adapted from Abbott and Gifford (1996).

Table 2.
Types of service: reasons for attendance: Registration of the main complaint of the victim assisted.

Reason for attendance	Observations
Dyspnoea	It is the sensation of difficulty breathing, reported by the patient.
Stroke	Abnormal muscle activity, associated with behavioral changes or unconsciousness caused by activity. brain cells abnormal
Headache	Technical term for headache.
Abdominal pain	Pain coming from inside the abdomen, which can have origin gastric, intestinal, uterine, hepatic, pancreatic, among others.
Pain in the chest	Pain from inside the chest, commonly called pain in the chest, which can be cardiac, respiratory, muscle, among others
Unconsciousness	Absence of any answer psychologically understandable to external stimuli or needs. internal bodies
Syncope	Temporary loss of conscience, too known as fainting. Have a sudden onset, short duration and complete and spontaneous recovery.
Paresis /paresthesia	Decrease of the strength / loss of sensitivity.
Agitation	Motion excessive and purposeless, ranging from mild restlessness to violent and aggressive actions. Can have origin, injuries in the head, poor blood oxygenation due to respiratory problems, hypoglycemia, shock, alcohol withdrawal, infections and drug use (alcohol, cocaine, and others.)
Discomfort	General feeling of discomfort
Back pain	Localized pain in the bottom of the column. Can occur due to obesity, inflammation /infections, herniated discs, physical inactivity, among others.
MS pain	Pain in the upper extremities
Pain MI	Pain in the lower extremities
Others	Any other major complaint not mentioned

Source: adapted from Abbott and Gifford (1996).

Table 3.
Main injuries

Main injuries	Observations
Excoriation	These are lesions of the superficial layer of the skin or mucous membranes that have a light bleeding, but usually They are extremely painful.
Hematoma	Closed wound resulting from impact or compression, can cause blood vessels to rupture, causing blood leaks
Laceration	edges damage tissue is irregular, produced by blunt force through blunt trauma in surfaces bone
Penetrating	They are injuries caused by drilling of the skin and fabrics underlying by an object. In this type of injury, a permanent cavity is produced by the passed of the object through the body. Example: gunshots and stab wounds.
Fracture	They are an interruption in the continuity of the bone. They are classified in closed and open.
Devastating	It's an injury common in accidents automobiles, landslides and accidents industrial. May cause injury. Open and close. There is damage extensive tissue structures underlying.
Amputation	Injuries where there is separation of one end of the body. They can be caused by sharp objects, crushing, or pulling force.
Burn	Skin lesions that can be thermal, electrical, chemical or radioactive. They are classified in 1st, 2nd and 3rd grade.
Hemorrhage	Blood loss due to the rupture of one or more blood vessels. Can sort out according to the type of vessel. Arterial and venous blood and bleeding location: external and internal

Source: adapted from Abbott and Gifford (1996).

Statistic analysis

After verifying the non-normality of the data using the Shapiro-Wilk test and checking the equality of variances with the Levene test, non-parametric statistical methods were applied to address each of the specific objectives. These objectives included: analyzing the care data from

sports practice settings provided by the Military Fire Brigade of the City of Rio de Janeiro (CBMERJ), comparing the factors associated with emergency care across different zones in sports facilities, identifying the most common accidents in these facilities, inferring the causes of these accidents, and observing the frequency of fatalities during sports activities.

For the presentation of the data in tables, the percentage of occurrences for each of the factors analysed by area was used. To compare the frequencies across different zones, the Kruskal-Wallis test was employed, followed by Dunn's post hoc test for the analysis of variance of the non-parametric variables. All analyses were performed using SPSS software version 20.0, with a statistical significance level set at 5% ($p \leq 0.05$). Graphs were created using Microsoft Excel 2010.

Results

There were no differences between the areas when comparing the frequencies of men ($p > 0.05$ for all comparisons) and women ($p > 0.05$ for all comparisons), with more than ¼ of the people in the central area that they did not report gender (Figure 1).

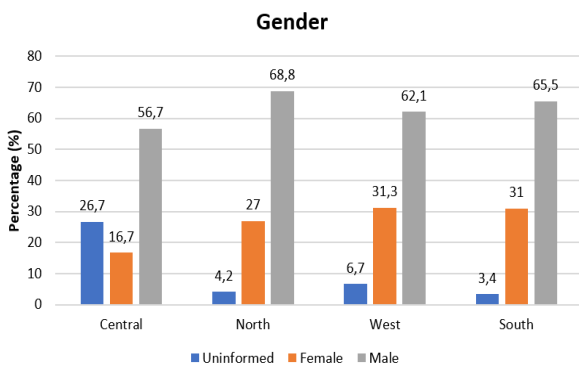


Figure 1. Histogram of attendance by area, separated by sex and shown in percentage relative to area. Source: author.

The statistical analysis shows a difference between the zones when the result is compared ($X^2 = 10.342$, $df = 3$, $p = 0.016$) the northern zone showed highest values in victims treated and removed than the west zone ($p = 0.046$) (Figure 2).

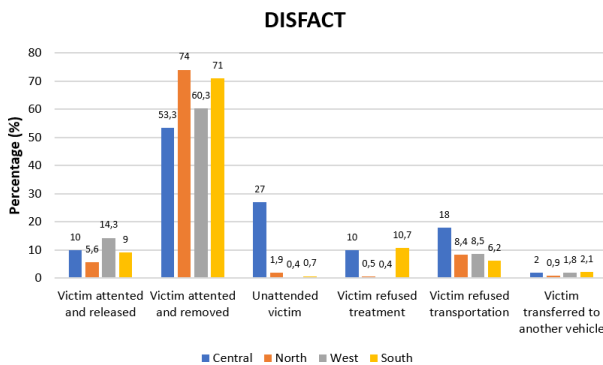


Figure 2. Histogram of attendance by zone, separated by type of result and shown in percentage relative to area.

* = significantly different from the west zone, $p < 0.05$.

Source: author.

There was a difference between the zones when comparing the type of service ($X^2 = 22.051$, $df = 3$, $p \leq 0.001$), the northern zone showed higher values of intermediate attention than the western zone ($p = 0.003$), the southern zone ($p \leq 0.001$) and the central zone ($p = 0.025$) (Figure 3).

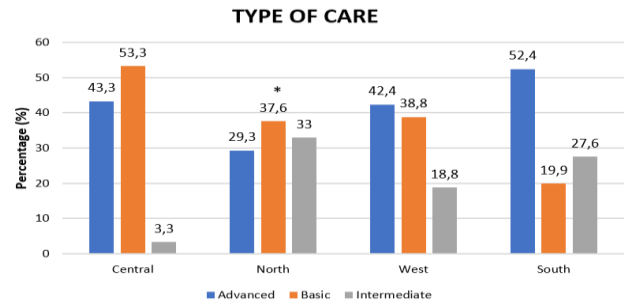


Figure 3. Histogram of the service by area, separated by vehicle type with relation to the service and shown in percentage relative to area. * = significantly different from all other areas, $p < 0.05$. Source: author.

The type of transport used was different between the zones ($X^2 = 17,160$, $df = 3$, $p \leq 0.001$) the southern zone showed higher values of fast car (ASE L) than the northern zone ($p = 0.002$) and the central region ($p = 0.010$) (Figure 4).

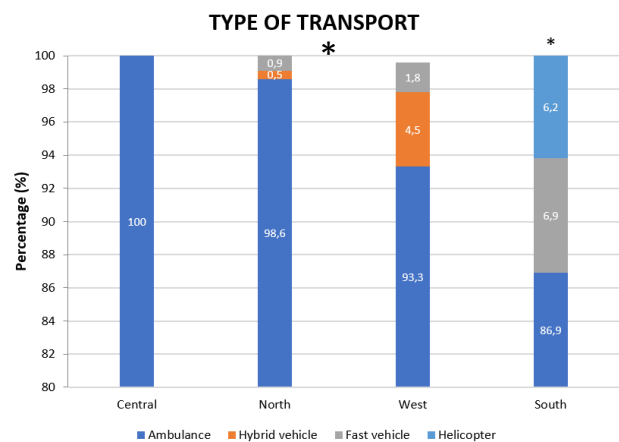


Figure 4. Service histogram by zone, separated by type of transport and shown as a percentage relative to area.

* = significantly different from northern and central areas, $p < 0.05$.

Source: author.

The analysis shows a difference between the areas when comparing the immobilization condition ($X^2 = 21.989$, $df = 3$, $p \leq 0.001$) the central zone showed a lower frequency of immobilization, that is, greater "other" than the north, west and south ($p \leq 0.001$ for all comparisons) (Figure 5).

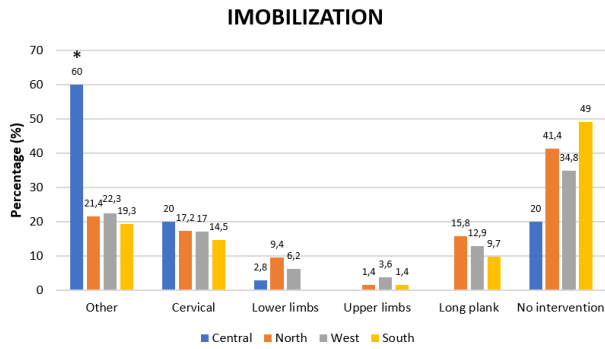


Figure 5. Service histogram by zone, separated by type of immobilization and displayed in percentage relative to area. * = significantly different from the north, west and south areas, $p < 0.05$. Source: author.

No statistical differences were observed when comparing the percentages of type of medical care by the absolute number of visits in the respective areas ($p > 0.05$ for all comparisons) (Figure 6).

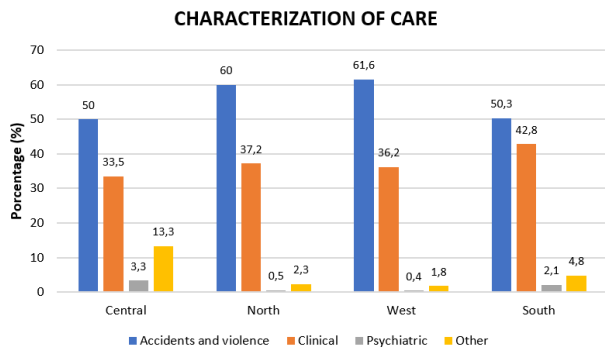


Figure 6. Histogram of care by area, separated by type of medical care and shown in percentage relative to area. Source: author.

No statistical differences were observed when comparing the stratification percentages of the risk by the absolute number of visits in the respective areas ($p > 0.05$ for all comparisons) (Figure 7).

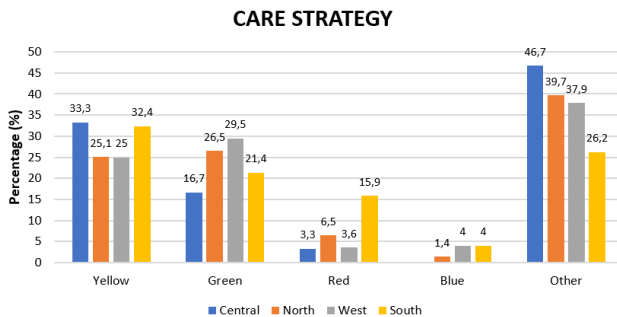


Figure 7. Service histogram by area, separated by risk stratification and shown as a percentage relative to area. Source: author.

No statistical differences were observed when comparing the percentages of death details by the absolute number of visits of the respective areas ($p > 0.05$ for all comparisons) (Figure 8).

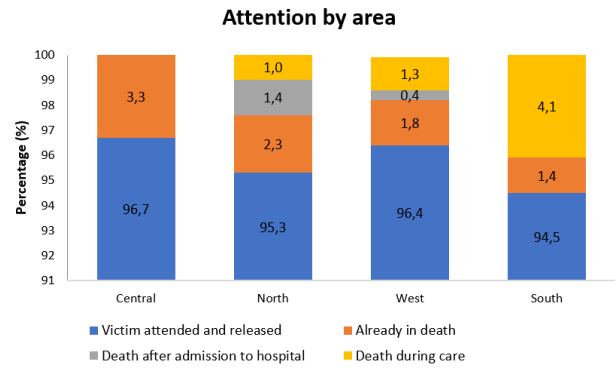


Figure 8. Histogram of attention by area, separated by death details and shown in percentage relative to area. Source: author.

No statistical differences were observed when comparing the trauma percentages by absolute number of visits in the respective areas ($p > 0.05$ for all comparisons) (Figure 9).

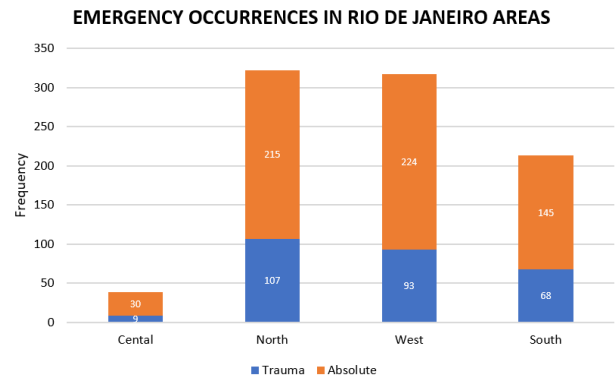


Figure 9. Histogram of attention by zone, separated by trauma versus absolute number and shown as a percentage relative to area. Source: author.

No statistical differences were observed when comparing the percentages of injuries by the absolute number of visits in the region ($p > 0.05$ for all comparisons) (Figure 10).

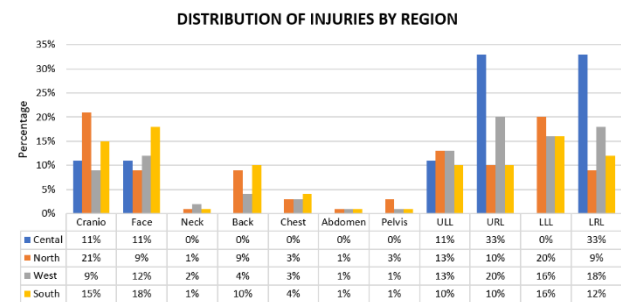


Figure 10. Histogram of trauma care by area, separated by distribution of the type of injury and shown in percentage relative to area. Source: author.

Discussion

This study conducted a statistical analysis of visits to sports practice settings attended by the CBMERJ. Specifici-

cally, the investigation identified the most common accidents in these sports practice areas, analysed the causes of these accidents, and verified the frequency of deaths as a percentage during sports practice. The analysis revealed a high number of deaths, ranging between 2% and 3% of visits in all areas. According to Carvalho and Freitas (2012), automobile accidents are more severe and fatal among cyclists, primarily affecting adults. The injuries with the greatest impact on mortality, accounting for 3.4% of deaths among cyclists, are head injuries (De la Motte et al., 2017), followed by chest injuries (McPherson, Nagai, Webster, & Hewett, 2019) due to road conditions and uncontrollable variables such as out-of-control vehicles and natural phenomena.

There was no difference between the areas when comparing the frequencies of male and female patients, with more than a quarter of individuals in the central area not reporting their gender. According to the IBGE's population projection for the municipality of Rio de Janeiro, in 2016, there were 8,097,888 men and 8,849,850 women, and in 2017, there were 8,149,121 men and 8,902,344 women, showing no significant numerical changes. Although the comparison by area did not show any significant impact, the notable difference across all zones between genders is evident: men accounted for approximately 35% more visits in all areas. This result reinforces previous findings in the Epidemiology of Injuries in Athletes Assisted by the Extension Project of the Community Physiotherapy Service (Sports Physiotherapy) in the CEFID/UDESC Prevention, Evaluation and Physical Rehabilitation Clinic, from January 2002 to July 2003, where approximately 60% of the athletes were men and only around 30% were women. This clearly highlights the need for preventive measures and treatments aimed primarily at men, along with a detailed ergonomic analysis of all procedures carried out to ensure greater safety and longevity for both professionals and athletes (McPherson et al., 2019).

The statistical analysis shows a difference between the areas when comparing the outcomes. The northern zone recorded higher values in terms of victims seen and removed compared to the western zone. This may indicate a higher incidence of severe cases in the northern zone, suggesting the need to remove or assign a doctor to the club or practice location. A previous study examined the structure of medical services in 20 clubs in São Paulo, Brazil, in relation to the incidence of sports injuries among young athletes practising basketball, indoor football, and volleyball. This was assessed using an injury questionnaire with 323 athletes and a structured interview with the responsible doctors: 343 sports injuries, or 1.7 injuries per athlete per year, were identified. Unfortunately, of the 20 clubs evaluated, only eight had specialised medical care within the institution (Arena and Carazzato, 2007). In the present study, there was also a difference between the zones when comparing the type of service; the northern zone showed higher values of intermediate care than the west, south, and central areas. This is possibly due to the number of facilities and vehicles

in the north (16), which is greater than in the other areas (West: 7, South: 7, and Centre: 4), and consequently, the number of such vehicles compared to other areas.

The type of transportation used also varied between the areas. The southern zone recorded higher values for rapid response vehicles (ASE L) than the northern and central regions, likely due to the greater number of such vehicles in the southern zone. In summary, the statistical analysis shows a difference between the areas when comparing the outcomes. The northern zone recorded higher values in terms of victims seen and removed compared to the western zone, which may indicate a higher incidence of severe cases in the northern zone, necessitating the removal of victims. An investigation into the profile of urgent and emergency care requests in Ribeirão Preto, Brazil, provided important insights that could support future reorganisations of the primary mobile health care service. These insights aided the decisions of social actors involved in health promotion, prevention, recovery, and rehabilitation, including health councils, health managers, service providers, users, professional councils, educational organisations, social promotion, social security, transportation, and others (Neulander, Ginglen, & Mountfort, 2020).

In addition to this type of information, the present study found a difference between the areas when comparing the immobilisation condition. The central zone showed a lower frequency of immobilisation, suggesting a greater incidence of clinical care in this area, which implies less need for immobilisation and the deployment of appropriate equipment and materials to each service point.

It is important to note, as a limitation of the study, the unknown number of individuals with minor or severe injuries who did not seek emergency care via 192/193 and who managed both care and extraction by their own means. To ensure the internal validity of care through a validated protocol with well-established criteria, this study used care data from sports practice settings attended by the CBMERJ. In particular, the investigation identified the most common accidents in these sports practice areas, analysed the causes of these accidents, and verified the frequency of deaths as a percentage during sports practice.

To date, this appears to be the first study evaluating emergency services in sports venues in the city of Rio de Janeiro, Brazil; other studies have focused only on evaluating the prevalence of injuries in specific sports teams (Lima et al., 2020), or assessing first aid knowledge in educational settings or as part of educational training in various contexts (Luque López et al., 2024; Ruibal-Lista et al., 2024). This information opens up possibilities for better emergency service strategies in sports environments.

Final considerations

The general objective of this study was to analyse the data from visits to sports practice settings attended by the Military Fire Brigade of the City of Rio de Janeiro

(CBMERJ). Subsequently, the study aimed to compare factors associated with emergency care in these sports locations, identify the most common accidents, infer the causes of these accidents, and observe the frequency of deaths during sports practice.

The main findings highlighted differences between the areas, with the northern zone showing higher values in terms of victims seen and removed compared to the western zone. This suggests a greater severity of events in the northern zone, which often necessitates the removal of victims. This could be attributed to the economically disadvantaged population in the northern zone, who may not comply with health plans, relying instead on CBMERJ vehicles to transport victims to public hospitals. Furthermore, there was a difference between the areas when comparing the type of service provided, with the northern zone showing higher values of intermediate care compared to the western, southern, and central zones. This might indicate higher rates of yellow-coded emergencies; however, the risk classification is limited, as it is based on information relayed over the phone, which might not always accurately reflect the situation.

The study found a predominance of male victims, which may not necessarily be due to a specific biological factor but could be influenced by sociocultural patterns related to gender. This could be explained by the pioneering spirit and the predominance of men in sports, as well as the fact that men are more likely to engage in contact sports, extreme sports, and martial arts, although women are increasingly participating in these activities.

The analysis also revealed a high number of deaths, between 2% and 3% of visits in all areas, as well as a significant difference in the number of visits by gender, with men accounting for 35% more visits than women across all areas. Additionally, the study showed a higher incidence of events classified as accidents and violence compared to medical cases in all areas.

Based on these findings, there is a need for increased supervision by the Regional Physical Education Council (CREF-RJ) in sports environments within the municipality of Rio de Janeiro, particularly in the northern area, where the accident rate is higher. Furthermore, there is a requirement to update the BLS (Basic Life Support) Course for physical education professionals, which is already offered by this council. This would ensure immediate care for injured individuals, and if an ambulance is requested via 192/193, the professional's knowledge would help in dispatching the appropriate vehicle or even resolving the issue at the location. Qualified professionals should be present in all sports practice locations when students are participating; it is not advisable to leave them unsupervised.

References

- Arena, S. S., & Carazzato, J. G. (2007). Relation between medical clinical monitoring and the incidence of sports injuries in young athletes of São Paulo. *Revista Brasileira de Medicina do Esporte*, 13, 217-221.
- Carder, S. L., Giusti, N. E., Vopat, L. M., Tarakemeh, A., Baker, J., Vopat, B. G., & Mulcahey, M. K. (2020). The concept of sport sampling versus sport specialization: Preventing youth athlete injury: A systematic review and meta-analysis. *American Journal of Sports Medicine*, 48(3), 693-702. <https://doi.org/10.1177/0363546519899380>
- Carvalho, M. L. D., & Freitas, C. M. D. (2012). Cycling to achieve healthy and sustainable alternatives. *Ciência & Saúde Coletiva*, 17, 1617-1628. <https://doi.org/10.1590/S1413-81232012000600013>
- CFM Resolutions. (1995). *Medical Portal*. Available in: http://www.portalmedico.org.br/resolucoes/cfm/1995/1451_1995.htm. Accessed on: 06/03/2024.
- De la Motte, S. J., Gribbin, T. C., Lisman, P., Murphy, K., & Deuster, P. A. (2017). Systematic review of the association between physical fitness and musculoskeletal injury risk: Part 2-muscular endurance and muscular strength. *Journal of Strength and Conditioning Research*, 31(11), 3218-3234. <https://doi.org/10.1519/JSC.0000000000002174>
- Enger, M., Skjaker, S. A., Nordsletten, L., Pripp, A. H., Melhuus, K., Moosmayer, S., & Brox, J. I. (2019). Sports-related acute shoulder injuries in an urban population. *BMJ Open Sport & Exercise Medicine*, 5(1), e000551. <https://doi.org/10.1136/bmjsem-2019-000551>
- Fire Corporation Operations Center. (2018). CBMERJ. Available at: <http://www.cbmerj.rj.gov.br/226-cocb>. Accessed on: 06/03/2024.
- Hakman, A., Andrieieva, O., Balatska, L., Filak, F., Filak, Y., Tivelik, M., Bezverkhnia, H., Tsybul'ska, V., Koshura, A., Savchuk, S., & Medvid, A. (2024). The health impact of tourism on the psychophysical state of elderly individuals. *Journal of Sport and Health Research*, 16(Supl 1), 31-42. <https://doi.org/10.58727/jshr.103680>
- Johnston, R., Cahalan, R., O'Keefe, M., O'Sullivan, K., & Comyns, T. (2018). The associations between training load and baseline characteristics on musculoskeletal injury and pain in endurance sport populations: A systematic review. *Journal of Science and Medicine in Sport*, 21(9), 910-918. <https://doi.org/10.1016/j.jsams.2018.03.001>
- Lima, V. P., Vale, R. G. de S., Lima, B. L. P., Oliveira Filho, G. R. de, Castro, J. B. P. de, Novaes, J. D. S., & Nunes, R. D. A. M. (2020). Epidemiologia de lesões em jovens atletas de futebol das categorias sub-17 e 20 de um clube profissional de futebol do Rio de Janeiro. *Retos*, 39, 429-433. <https://doi.org/10.47197/retos.v0i39.79667>
- Luque López, L., García Pazo, P., & Molina-Mula, J. (2024). La formación en Soporte Vital Básico en la etapa escolar obligatoria. Estudio descriptivo (Training in Basic Life Support in the compulsory school stage. Descriptive study). *Retos*, 53, 122-129. <https://doi.org/10.47197/retos.v53.102231>
- McPherson, A. L., Nagai, T., Webster, K. E., & Hewett, T. E. (2019). Musculoskeletal injury risk after sport-related concussion: A systematic review and meta-analysis. *American Journal of Sports Medicine*, 47(7), 1754-1762. <https://doi.org/10.1177/0363546518785901>
- Mechem, C. C., Dickinson, E. T., Shofer, F. S., & Jaslow, D. (2002). Injuries from assaults on paramedics and firefighters in an urban emergency medical services system. *Prehospital Emergency Care*, 6(4), 396-401. <https://doi.org/10.1080/10903120290938012>
- Neulander, M. J., Gingles, J. G., & Mountfort, S. (2020). EMS, Lights And Sirens. In *StatPearls*. Treasure Island (FL): StatPearls Publishing.

- StatPearls Publishing.
- O'Dwyer, G., Konder, M. T., Machado, C. V., Alves, C. P., & Alves, R. P. (2013). The current scenario of emergency care policies in Brazil. *BMC Health Services Research*, *13*(1), 70. <https://doi.org/10.1186/1472-6963-13-70>
- O'Dwyer, G., Machado, C. V., Alves, R. P., & Salvador, F. G. (2016). Mobile prehospital emergency care: An analysis of implementation in the State of Rio de Janeiro, Brazil. *Ciência & Saúde Coletiva*, *21*(7), 2189-2200. <https://doi.org/10.1590/1413-81232015217.23652015>
- Overview of the Population of RJ. (2018). *IBGE*. Available in: <https://cidades.ibge.gov.br/brasil/rj/rio-de-janeiro/panorama>. Accessed on: 06/03/2024.
- Pereira, L. A., Limberger, P. F., Flores, L. C. D. S., & Pereira, M. D. L. (2018). An empirical investigation of destination branding: The case of the city of Rio de Janeiro, Brazil. *Sustainability*, *11*(1), 1-17. <https://doi.org/10.3390/su11010022>
- Post, E. G., Biese, K. M., Schaefer, D. A., Watson, A. M., McGuine, T. A., Brooks, M. A., & Bell, D. R. (2020). Sport-specific associations of specialization and sex with overuse injury in youth athletes. *Sports Health*, *12*(1), 36-42. <https://doi.org/10.1177/1941738119886855>
- Projection of the Population of Brazil and the Federal Units. (2019). *IBGE*. Available at: <https://www.ibge.gov.br/apps/populacao/projecao/index.html>. Accessed on: 06/03/2024.
- Ruibal-Lista, B., Díez-Fernández, P., Palacios-Aguilar, J., & López-García, S. (2024). Los primeros auxilios en los currículos de Educación Física en la Educación Secundaria Obligatoria: Comparativa entre comunidades autónomas (First Aid in Physical Education in the Compulsory Secondary Education Curriculum: A Comparative Analysis Among Autonomous Communities). *Retos*, *56*, 151-161. <https://doi.org/10.47197/retos.v56.102508>
- SAMU Implementation Project. (2016). *CIB-RJ*. Available at: <http://www.cib.rj.gov.br/arquivos-para-baixar/anexos/2163-anexo-da-del-3-706-projeto-samu-norte-rj-2016/file.html>. Accessed on: 06/03/2024.
- Schelp, L., & Ekman, R. (1990). Road traffic accidents in a Swedish municipality. *Public Health*, *104*(1), 55-64. [https://doi.org/10.1016/S0033-3506\(05\)80054-3](https://doi.org/10.1016/S0033-3506(05)80054-3)
- Young, C. C. (2002). Extreme sports: Injuries and medical coverage. *Current Sports Medicine Reports*, *1*(5), 306-311. <https://doi.org/10.1249/00149619-200210000-00009>

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