


## Injuries and associated factors in practitioners of combat sports – Karate

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### ABSTRACT

**Introduction:** Karate is a martial art of Japanese origin that means "path of empty hands". As a Combat Sports Modality (MEC), it made its debut as an Olympic modality at the Tokyo Games in Japan in 2021. In its fighting essence, it mostly uses attack and defense techniques with hands, feet, elbows and knees. This fact, combined with the continuous contact and intensity of the training, among other aspects, favor the occurrence of injuries in its practice.

**Objective:** This study aimed to verify the association between sociodemographic factors and the practice of the modality with the occurrence of injuries in karate practitioners in the State of Maranhão, Brazil.

**Methods:** This was a quantitative study with a descriptive cross-sectional character. Data collection was carried out through the Questionnaire Injuries in Combat Sports Modalities (QLGS1), administered in person in the practice/teaching spaces of the modality and remotely through a link made available on Google Forms. Data were analyzed using descriptive statistics (mean, standard deviation and frequency distribution). The chi-square test was used to verify the association between the variables. Values of  $p \leq 0.05$  were considered significant. This study was approved by the Research Ethics Committee of the Federal University of Maranhão (CEP/UFMA) No. 4,711,629.

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Results: A total of 68 Karate practitioners from the state of Maranhão participated in this investigation, with a mean age of 31.53 years (SD=12.513), of both sexes (75.0% male), age group 30 years or older (47.1%), level of education – higher and graduate (75.0%) and monthly family income of up to three minimum wages (44.1%). Regarding the modality and its practice, 14 years was the average training time (SD=11.919), participate in competitions (29.4%), do not practice another MEC (80.9%), practice another sport/physical activity to improve performance in Karate (67.6%), have been injured (63.2%), Knees (46.51%) and Wrists/Hands (46.51%) were the regions of the body most affected by injuries and, Concussion (60.4%) and Dislocation (39.5%) were the types of injuries most mentioned by the participants. Participating or not in competitions, frequency of training/week and practicing another sport/physical activity to improve performance in Karate were the variables that showed statistically significant differences with the occurrence or not of injuries.

Conclusion: In this investigation, ECM – Karate – presented a high rate of injuries, with the Knees and Wrists/Hands being the most affected regions and Concussion and Dislocation being the most reported types. The occurrence of injuries was associated with some variables related to the practice of the modality, such as participation or not in competitions and weekly frequency of training. The relevance of interventions related to injury prevention for a healthier practice in the modality and a better quality of life of its practitioners is highlighted.

**Keywords:** Injuries, Quality of life, Karate, Combat sports modality.



## INTRODUCTION

An oriental martial art of Japanese origin, Karate became known as a combat modality when it spread around the world in the early twentieth century. However, his teaching and practice were restricted only to reserved spaces and moments, from master to disciple, given that the immigrants had other labor trades, such as working in the fields.

It was in the 1960s, in the state of São Paulo, that the first academy of the sport in Brazil was officially founded, a process that was later repeated in the states of Rio de Janeiro and Bahia (Oliveira; Grandson; Jordan; 2006). In Maranhão, it was at the end of the 1960s that the teaching of the modality took place for the first time, however, restricted to a few students. However, it was in the 1970s, with the arrival of a disciple of one of the pioneers of Karate in the northern region of Brazil that the modality gathered many fans and, later, with the training and arrival of other teachers, as well as with the emergence of several schools, the modality developed, popularized and expanded, currently encompassing a diversity of practitioners in its various styles throughout the state.

His practice and teaching are still permeated with strong traces of the philosophical, ethical and moral traditions of the Japanese oriental culture. However, like other martial arts, Karate, despite several tensions and resistance groups, has gone through the process of sportsmanship, with this, the modality was forced to comply with certain structural changes and adapt to moral, ethical and safety precepts to achieve the status of Olympic modality (Oliveira *et al.*, 2018). Its debut at the Olympic Games took place in Japan at the TOKYO 2020 Games, more precisely in the year 2021 due to the COVID-19 pandemic.

Karate is characterized by being a combat modality that, in general, does not require the use of weapons and uses body segments as structures of attack and defense (Simões; Pear tree; Figueiredo, 2019). It can be practiced by anyone, regardless of age, gender, and be initiated at any stage of life (Kanazawa, 2010), however, it must be practiced with due care considering the limitations of each age group and physical limitations, among others.

Studies have highlighted the growth in the number of practitioners in martial arts and Combat Sports (MEC) (Minghelli; Axe; Chapel, 2020; Almeida; Araújo, 2020), whether for self-defense, leisure, physical activity, or even as a competitive sport. In 2013, the former Ministry of Sports published the National Sports Diagnosis - DIESPORTE (Brasil, 2013) and showed that 6.9% of the 8,902 respondents of both sexes declared to practice some type of combat sport.

If, on the one hand, we have an increasing number of practitioners of both sexes and different ages, on the other hand, we understand that the practice of a combat modality, and especially Karate, involves risks of injury, mainly because they are associated with the continuous body contact required, repetitive and exhaustive training, training time, poor orientation, absence or misuse of protective equipment; excessive competitions; modality-specific biomechanics, among other aspects.

Thus, this study aimed to verify the association between sociodemographic factors and the practice of the modality with the occurrence of injuries in Karate practitioners in the State of Maranhão, Brazil.

## **MATERIAL AND METHODS**

This study was carried out in the field of action (practice/teaching/competition) of the Combat Sports Modality – Karate in the state of Maranhão, Brazil, with an opinion approved by the Research Ethics Committee of the Federal University of Maranhão (CEP/UFMA) No. 4.711.629 and CAAE Project No. 44513121.6.0000.5087.

It was characterized as a quantitative study with a cross-sectional descriptive character with the objective of measuring and quantifying the frequency in which the investigated phenomenon occurs and its relationship with other factors, recording it after being observed (Reis, 2018), describing it and correlating the facts without manipulating them with the participation of different age groups selected to evaluate the effects (Thomas; Nelson; Silverman, 2012).

Participants were recruited through verbal dissemination, posters, social networks and visits to the practice and teaching spaces of the modality. The selection of the subjects was made by non-probabilistic sampling of volunteers practicing the modality. The following were included: individuals of both sexes; being 12 years of age or older; be active/practicing the modality for at least six (6) uninterrupted months and Brazilian individuals. Data were excluded from participants who did not sign the Free and Informed Consent Form (ICF) and/or Minor Consent Form (TALE) and participants who were minors whose respective guardians did not allow participation by signing the informed consent form.

As a data collection instrument, the Questionnaire on Injuries in the practice of LAMEC (Fighting, Martial Arts and Combat Sports) - QLGS1 - was used. The instrument contains 32 open and closed questions subdivided into three groups: a) sociodemographic data; b) information about the modality and, c) information about the injuries that occurred in the practice of the modality.

Regarding sociodemographic information, the instrument asked respondents for age, gender, monthly family income and level of education.

Regarding the participant's practice and experience with Karate, information was requested, such as: whether he/she participates in competitions, training/practice time in years; attendance of classes/training sessions per week; Average session/training time in minutes, among other information.

With regard to injuries, information was requested on the occurrence or not of injuries during the practice of the modality; the site(s) of the body where the injuries occurred; types of injuries; moment of practice in which the injuries occurred – the participants had the following response

options: class, training, competition, fight/game training and another moment. It was also questioned the recovery time for the return to training/classes and if they participate and/or participated in training/classes to prevent possible injuries.

Data collection took place between August 2021 and August 2022 in person at gyms/schools and at sporting events in the metropolitan region of São Luís/MA/BR and online through the electronic form (*Google Forms*).

Data were initially analyzed using descriptive statistics (mean, standard deviation and frequency distribution). Pearson's chi-square test was used to verify the significance of the association between sociodemographic variables, practice and experience in the modality with the occurrence of lesions (yes or no). The data were tabulated and analyzed using the statistical software *IBM SPSS Statistics V. 24* and values of  $p \leq 0.05$  were considered significant.

## RESULTS

Participants in this investigation were 68 practitioners of the Karate modality from the state of Maranhão, with a mean age of 31.53 years (SD=12.513), minimum 12 and maximum of 67 years of age, of both sexes, most of whom were male (75.0%), belonging to the age group of 30 years or older (47.1%), with higher education and post-graduation level (75.0%) and monthly family income of up to three minimum wages (44.1%).

Regarding the modality and its practice, 14 years was the average training time (SD=11.919) and 37.7% have practiced the modality for more than 16 years, 29.4% of the participants reported that they participate in sports competitions, 77.9% reported the frequency of training up to three times a week, 76.5% with class/training time  $\leq 60$  min, 80.9% of the participants did not practice another ECM and 67.6% reported practicing another sport/physical activity to improve their performance in the practice of Karate.

Regarding the occurrence of injuries and participation in specific training for injury prevention, the results showed that 63.2% of the participants had already been affected by injuries in the practice of the modality, this percentage is maintained when asked if they participate in any specific training for injury prevention (Table 1).

Table 1 – Information on lesions (n=68)

Variables	N (%)
<b>He suffered some type of injury as a result of the practice of the sport</b>	
Yes	43 (63,2)
No	25 (36,8)
<b>Participates in specific physical training for injury prevention</b>	
Yes	43 (63,2)
No	25 (36,8)

Source: Data obtained from the responses of the survey participants.

Regarding the possible association between the sociodemographic variables (gender, age group, level of education and monthly family income), the results did not show statistically significant differences in relation to the occurrence or not of lesions (Table 2).

Table 2 - Sociodemographic variables according to the occurrence of lesions (n=68)

Variables	Suffered injury			p
	No	Yes	Total	
	N (%)	N (%)	N (%)	
<b>Gender</b>				
Female	8 (32,0)	9 (20,9)	17 (25,0)	0,309
Male	17 (68,0)	34 (79,1)	51 (75,0)	
<b>Age group</b>				
Up to 19 years old	4 (16,0)	4 (9,3)	8 (11,8)	0,578
20 to 29 years old	11 (44,0)	17 (39,5)	28 (41,2)	
30 years or older	10 (40,0)	22 (51,2)	32 (47,1)	
<b>Educational level</b>				
Fundamental (Incomplete / Complete)	2 (8,0)	1 (2,3)	3 (4,4)	0,749
Medium (Incomplete / Complete)	5 (20,0)	9 (20,9)	14 (20,6)	
Superior (Incomplete / Complete)	9 (36,0)	16 (37,2)	25 (36,8)	
Post-graduation (Incomplete/Complete)	9 (36,0)	17 (39,5)	26 (38,2)	
<b>Monthly household income*</b>				
Up to 1 minimum wage (up to R\$ 1,100.00)	3 (12,0)	7 (16,3)	10 (14,7)	0,653
From 1 to 3 minimum wages (from R\$ 1,100.00 to R\$ 3,300.00)	7 (28,0)	13 (30,2)	20 (29,4)	
From 3 to 6 minimum wages (from R\$ 3,300.00 to R\$ 6,600.00)	10 (40,0)	10 (23,3)	20 (29,4)	
From 6 to 9 minimum wages (from R\$ 6,600.00 to R\$ 9,900.00)	2 (8,0)	4 (9,3)	6 (8,8)	
From 9 to 12 minimum wages (from R\$ 9,900.00 to R\$ 13,200.00)	2 (8,0)	3 (7,0)	5 (7,4)	
More than 15 minimum wages (more than R\$ 16,500.00)	1 (4,0)	6 (14,0)	7 (10,3)	

Subtitles: p= Significance

Source: Data obtained from the responses of the survey participants.

\*Sum of the participant's income with the income of people living together / 2021 minimum wage

Regarding the possible association between the variables related to the practice of Karate and the occurrence or not of injuries, the results showed that the variables Status of the participant (being

a teacher of the modality or just a practitioner), Time of training (years of practice), Time/duration of the class and training, if the participant practices another MEC and if he participates in any specific training for injury prevention did not present statistically significant differences. On the other hand, the variables Participates in competitions, Frequency of training per week, and Practice in another sport and/or physical activity to improve performance in the fight were associated with the occurrence or absence of injuries, as shown in Table 3.

Table 3 - Variables about the practice of the modality and prevention of injuries according to the occurrence of injuries (n=68)

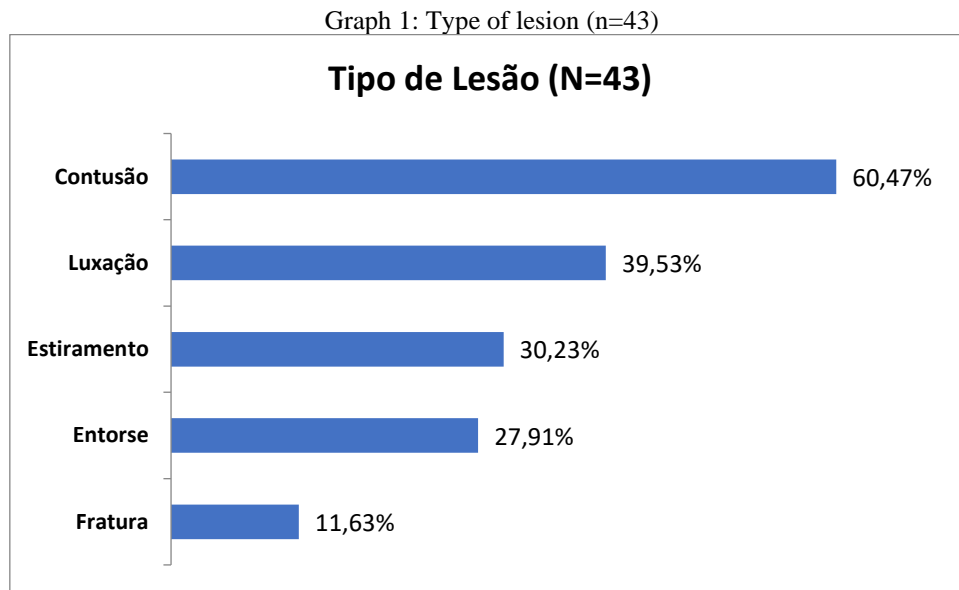
Variables	Suffered injury			P
	No N (%)	Yes N (%)	Total N (%)	
<b>Status in the Modality</b>				
Practitioner / Student	20 (80,0)	29 (67,4)	49 (72,1)	0,266
Teacher/Master	5 (20,0)	14 (32,6)	19 (27,9)	
<b>Do you participate in Competitions?</b>				
No	13 (52,0)	10 (23,3)	23 (33,8)	<b>0,038</b>
Not currently	8 (32,0)	17 (39,5)	25 (36,8)	
Yes	4 (16,0)	16 (37,2)	20 (29,4)	
<b>Training time (n=61)</b>				
Up to 3 years	5 (23,8)	6 (15,0)	11 (18,0)	0,677
4 to 10 years	7 (33,3)	13 (32,5)	20 (32,8)	
11 to 15 years	3 (14,3)	4 (10,0)	7 (11,5)	
16 years or older	6 (28,6)	17 (42,5)	23 (37,7)	
<b>Training frequency/week</b>				
Up to 3 x/week	23 (92,0)	30 (69,8)	53 (77,9)	<b>0,033</b>
More than 3 x/week	2 (8,0)	13 (30,2)	15 (22,1)	
<b>Class/Workout Time</b>				
≤ 60 min	19 (76,0)	33 (76,7)	52 (76,5)	0,924
90 min	5 (20,0)	9 (20,9)	14 (20,6)	
≥ 120 min	1 (4,0)	1 (2,3)	2 (2,9)	
<b>Practice another LAMEC</b>				
No	22 (88,0)	33 (76,7)	55 (80,9)	0,255
Yes	3 (12,0)	10 (23,3)	13 (19,1)	
<b>Participates in specific physical training for injury prevention</b>				
No	12 (48,0)	13 (30,2)	25 (36,8)	0,143
Yes	13 (52,0)	30 (69,8)	43 (63,2)	
<b>Practice another sport/physical activity to improve performance in the fight</b>				
No	12 (48,0)	10 (23,3)	22 (32,4)	<b>0.035</b>
Yes	13 (52,0)	33 (76,7)	46 (67,6)	

Subtitles: p= Significance

Source: Data obtained from the responses of the survey participants.

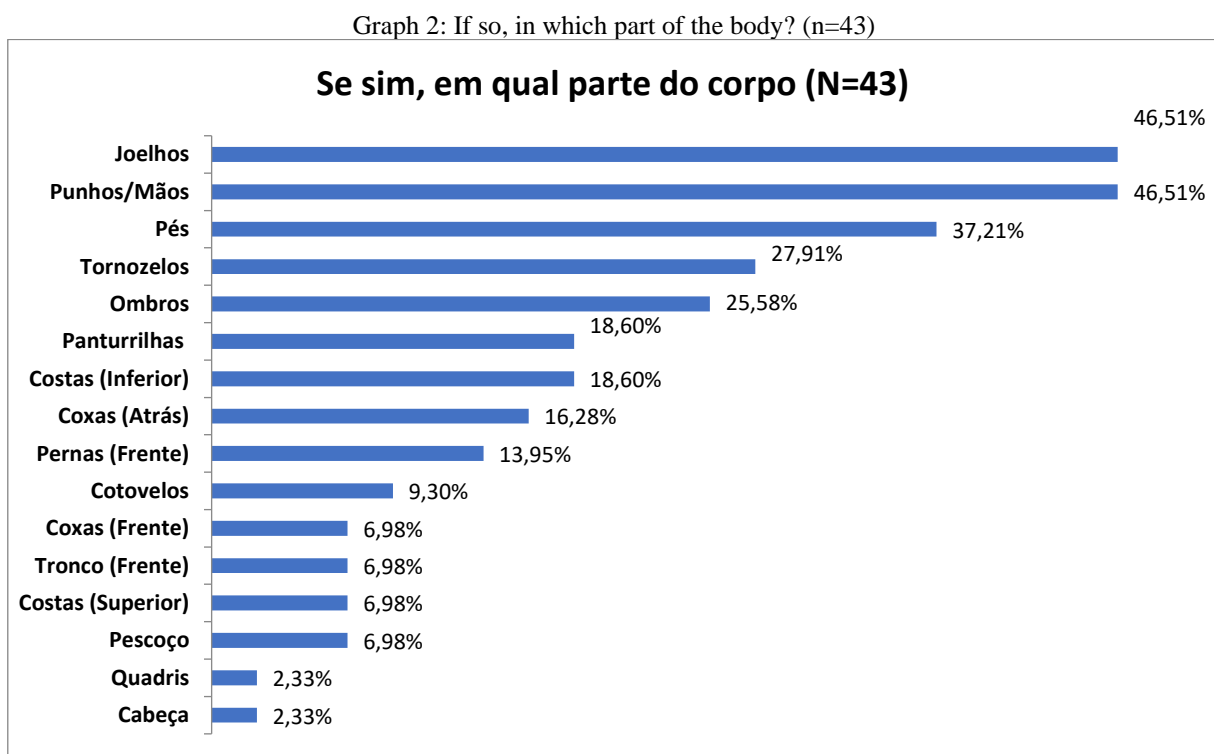
Regarding the involvement of injuries, 63.24% (43) of the 68 participants in the investigation indicated that they had already suffered some type of injury in the practice of Karate. The most

pointed types were contusion (60.47%), dislocation (39.53%) and stretching (30.23%), as shown in Graph 1.



Source: data obtained from the responses of the survey participants.

The regions of the body most affected by the injuries, according to the participants, were the knees and wrists/hands (both with 46.51%), feet (37.21%) and ankles (27.91%). Shoulders and ankles also presented a significant number of injured patients, accounting for 25.58% and 27.91% of the responses, respectively (Graph 2).

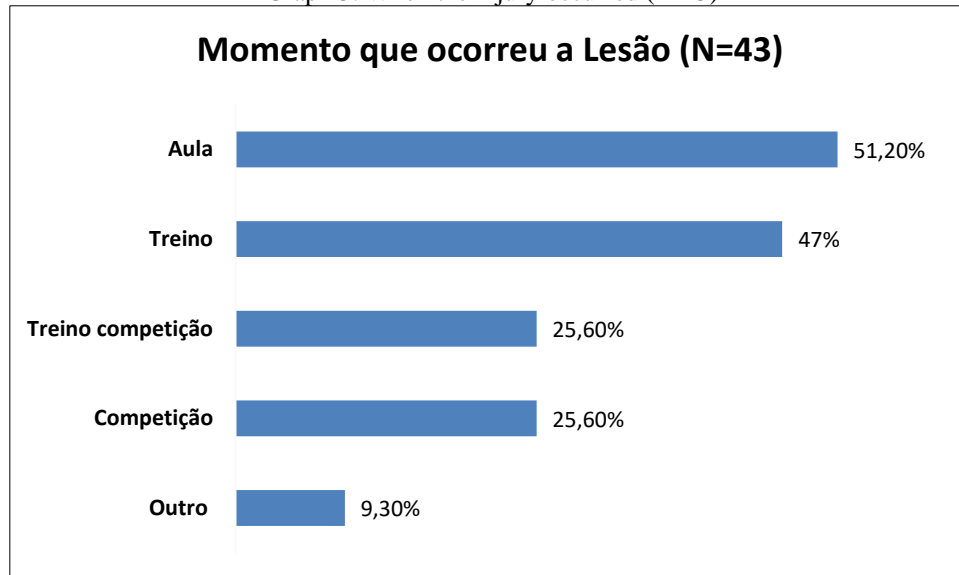


Source: data obtained from the responses of the survey participants.



The moments in which injuries occurred most frequently were: class (51.2%) and training (47%), but it is worth mentioning that specific training for competitions and the moment of competition also proved to be favorable moments for injuries, both with 25.6% (Graph 3).

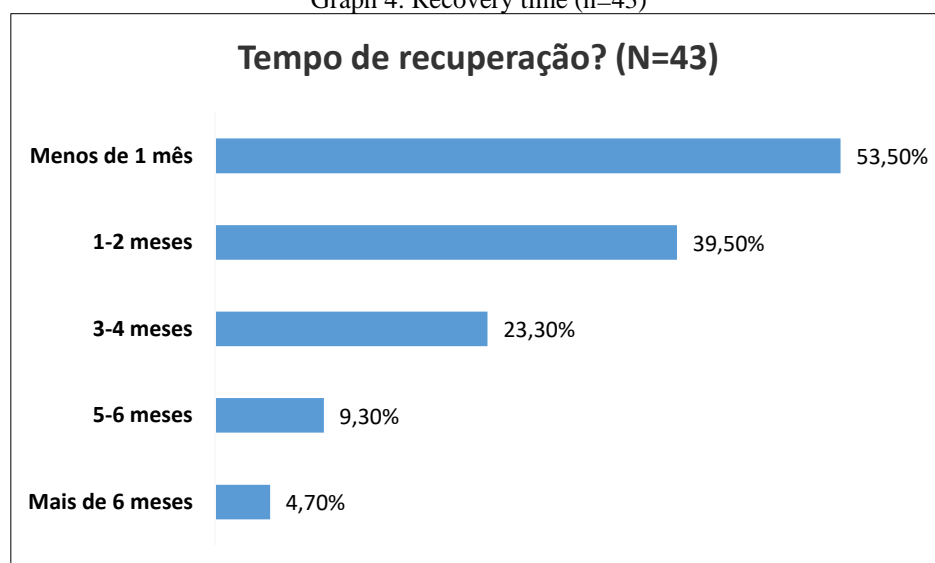
Graph 3: When the injury occurred (n=43)



Source: data obtained from the responses of the survey participants.

Regarding the recovery time for the injuries (Graph 4), the results showed a rapid recovery, between less than 1 month (53.50%) and 1 to 2 months (39.50%), which indicates that the injuries affected were not mostly more severe and did not require prolonged treatments. Injuries, supposedly more severe and requiring more than six months of recovery, occurred less frequently (4.70%).

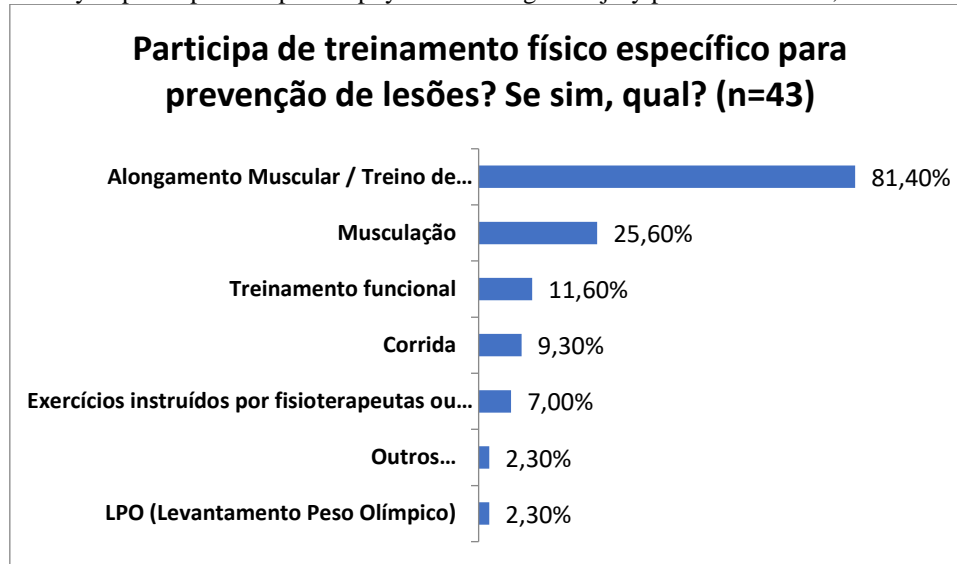
Graph 4: Recovery time (n=43)



Source: data obtained from the responses of the survey participants.

When asked if they had any specific training for injury prevention, 63.2% (43) of the participants answered positively to the question (Table 1). These indicated that the most performed training was the practice of stretching and flexibility training (81.4%), followed by bodybuilding (25.6%) and functional training (11.6%) as preventive actions for injuries in the practice of karate (Graph 5).

Graph 5: Do you participate in specific physical training for injury prevention? If so, which one? (n=43)



Source: data obtained from the responses of the survey participants.

Finally, the results also showed that 67.6% of the participants surveyed practice another sport and/or physical activity (PA) as a strategy to improve performance in fighting. The main sports/PA mentioned were Weight Training (54.4%), followed by Stretching and Flexibility Training (26.1%) and Running (13.0%) (Graph 6).

Graph 6: Do you participate in another sport and/or physical activity to improve your performance in fighting? If so, which one? (n=46)



Source: data obtained from the responses of the survey participants.

## DISCUSSION OF RESULTS

This study aimed to verify the association between sociodemographic factors and the practice of the modality with the occurrence of injuries in karate practitioners in the state of Maranhão, Brazil.

The results showed that the sociodemographic variables were not associated with the occurrence of injuries in the practitioners investigated in the practice of the modality. However, it is worth noting that in relation to gender, the results showed a greater emphasis on male practitioners for those who suffered injuries to the detriment of those who did not. These results are in line with the research carried out with athletes aged 16 to 20 participating in four world championships of the modality where the results showed that the injury rate was lower for female athletes (Cierna *et al.*, 2018), as well as with the results of the research carried out with athletes participating in Swiss tournaments of the modality that showed that older male athletes had a higher risk of injury than women in the same age group (Rosso *et al.*, 2023).

Practitioners aged 30 years or older also showed greater emphasis on injury involvement. This fact is probably related to the time of training and to the age itself in the face of the arduous training of the modality and are in line with the studies carried out by Almeida; Araújo (2020) with elite karate athletes who showed a higher prevalence of injuries in experienced athletes over inexperienced ones and by Rosso *et al.* (2023) found that older athletes of both sexes had a higher rate of injuries than younger participants in Swiss karate tournaments.

Regarding the possible association between the variables related to the practice of the modality with the occurrence or not of injuries, the results showed that there was no association with the fact that the investigated were in the role of teacher/master or practitioner/student, as well as the



variables time of training and experience in the modality, time of the class / training, practice of another LAMEC and whether the respondent participates in any type of specific injury prevention training.

However, it is noted that participants who reported practicing another fighting modality and participating in preventive training had a greater emphasis on injury involvement than those who did not suffer injuries in the practice of the modality. This result draws attention to the importance of well-planned practices and training programs aimed at the prevention of sports injuries, especially in combat sports modalities.

If, on the one hand, there are more and more strategies that seek to reduce the incidence of injuries and concern for the physical integrity of LAMEC practitioners, such as changing sports rules, using protective equipment, more weight divisions, use of technologies, greater training of the refereeing team, among others (Štyriak *et al.*, 2023). In the literature, there is an advocacy for training programs such as weight training for the prevention of injuries in fighting modalities (Delavier; Gundill, 2015), as well as, although controversial, the use of stretching for the prevention of injuries in sports (Alencar *et al.*, 2010). It is noteworthy that approximately 81% of the participants in this study pointed out stretching and flexibility training and then weight training (26%) as the main injury prevention practices in their routines.

In this investigation, the results showed an association between the occurrence of injuries with participation in competitions, the weekly frequency of training and the practice of another sport/physical activity to improve fight performance.

Karate currently has a significant number of competitions at regional, national and international levels. Its practice with competitive objectives requires a greater commitment of the athlete in more focused and exhaustive training, a greater load of training frequency, participation in competitions that, consequently, combined with other aspects, favor the possibility of occurrence of injuries in the athletes' routine.

The results of this investigation showed that practitioners who participate in competitions and have a frequency of training of more than three workouts/week had a higher prevalence of injuries in the practice of the modality. A recent systematic review on ECM injuries found that injuries occurred more frequently in competitions, with the exception of athletes under 18 years of age, who occurred more frequently in training (Živković *et al.*, 2024).

The practice of the modality, even if it is only recreational and non-competitive, still involves the routine of classes and training with physical contact. This investigation showed that the moments of Class and Training were the most pointed out by the participants as the moments that most injuries occurred, followed by the specific training for competition and the Competition itself. Moura; Silva; Alonso (2011) in research with elite karate athletes found a predominance of injuries that occurred in



training in relation to competitions, results that are in line with an investigation carried out with practitioners of the sport in Portugal that found that 83% of injuries happened during training (Vencesbrito *et al.*, 2016).

The fact is that for competitive purposes or not, due to the martial principles of the modality, the routine of classes and training become strenuous moments that require time and energy from the practitioner that, combined with other aspects, can be associated with the occurrence of injuries.

The involvement of injuries is always a relevant topic to be investigated, considering that it can impact the practitioner's participation in the modality, such as the time away from the modality for recovery, their performance and, essentially, in their life routine and well-being, among other aspects.

The results of this research showed that approximately 64% of the participants surveyed have already been involved in the practice of Karate. These results are similar to the research with Portuguese athletes who evidenced the involvement of one or more injuries in 53% of the respondents (Vencesbrito *et al.*, 2016). On the other hand, a study carried out with Brazilian Shotokan Karate athletes showed that approximately 89% had already presented some type of injury, similar to the results of Ambrozy *et al.* (2015) and Peeri *et al.* (2011) which, respectively, showed an injury prevalence of approximately 92% with Polish athletes and 83% with Iranian male athletes. There is a discrepancy between the results of the prevalence of injuries that may arise from data collection procedures, interpretations, as well as important variables such as athletes and/or recreational practitioners, among other aspects.

Regarding the main types of injuries suffered, contusion and dislocation were the types most reported by the participants in this investigation. Concussion was also the most reported type of injury in two Systematic Reviews conducted on the theme of injuries in the modality in question (Thomas; Ornstein, 2018; Lystad; Augustovičová; Harris, 2020) and in research with athletes participating in four world championships (Cierna *et al.*, 2018). It is noteworthy that the practice of Karate requires continuous and direct contact through blows and blocks and, as much as the use of protective equipment is increasingly required in competitions, probably, the format of the score in competitions stimulates the application of blows with a lot of energy that, sometimes, makes it possible to affect injuries due to injury.

Combat Sports are characterized by the diversity of the way in which they employ their attack and defense movements. Specific motor gestures can characterize the types of lesions as previously seen, as well as discriminate the anatomical regions of the body most affected by the lesions in their practitioners. In its martial essence, Karate uses punches, kicks and blocks as attack and defense techniques in which it aims at combat and self-defense only using one's own body. In its sporting dimension, in a nutshell, the modality defines two different styles: Kata and Kumite (Costa, 2023).



Kata is characterized by non-direct physical contact and the athlete (s) performs sequences of attack and defense movements in a harmonious way with technique and agility, also receiving the designation of "imaginary fight". Kumite is characterized by combat itself and requires direct contact between opponents using attack and defense techniques.

Regarding the regions of the body most affected by injuries, this research found that Knees and Wrists/Hands and feet were the most pointed out by the participants surveyed. These results are partially similar to the investigation carried out with athletes participating in the 2014 World Championships, which showed the knees as the region most affected by Kata and Kumite style competitors, followed by the shoulders (Kata) and ankles for Kumite style competitors (Tischer *et al.*, 2016). The knees and ankles were also the regions most pointed out by Portuguese athletes in a study carried out by Vencesbrito *et al.* (2016) and Hands/Fingers and Fists with Brazilian Shotokan Karate athletes (Souza *et al.*, 2011).

However, other research carried out on the topic (Rosso *et al.*, 2023; Lystad; Augustovičová; Harris, 2020; Cierna *et al.*, 2018; Thomas; Ornstein, 2018) pointed to the head as the region most affected by injuries. According to Lystad; Augustovičová; Harris (2020) It is no surprise that the head is the region most affected by injuries, considering that the head is the place where the most points are scored in the sports dimension of the modality, essentially in Kumite-style competitors.

In this investigation, the majority (53.5%) of the participants surveyed reported that the injuries had a recovery time of up to 30 days, which leads us to the understanding of less serious injuries, implying a shorter recovery time and return to the practice of the modality. These results are consistent with the studies by Vencesbrito *et al.* (2016) with Portuguese athletes who had an interruption in practice due to injuries of 8 to 21 days.

Also from this perspective, Rosso *et al.* (2023) despite the high incidence of injuries with athletes participating in competitions in Switzerland, found that injuries in all age groups were less severe, as well as the Lystad investigation; Augustovičová; Harris (2020) with athletes of the Olympic-style Karate modality that evidenced that most of the injuries were of the lighter category, also indicating that, in his investigation, the systems for categorizing the severity of injuries were based on the time lost from participation after the injury, nature, type and injury or need for referral to the hospital, or some combination of the above.

This investigation contains some limitations, such as the transversality of the nature of the study, i.e., it does not allow the delimitation of cause and effect between the variables. Another aspect is that the lesions and types pointed out by the participants were collected via perception and retrospectively, that is, they were not objectively evaluated. However, the originality factor of the investigation with practitioners of Combat Sports Modalities and, in particular, Karate, in the state of Maranhão, Brazil, is highlighted.



## CONCLUSIONS

The results of this investigation pointed to a considerable prevalence of injuries in Karate practitioners, data that are in line with the literature on the subject in Combat Sports Modalities.

There was no evidence of an association between the occurrence or not of injuries and sociodemographic variables such as gender, age group, level of education and monthly family income, as well as in variables related to the practice of the modality, status in the modality, time of experience/training in the modality, time of class/training, practice of another MEC and participation in some specific training for the prevention of injuries.

On the other hand, there was an association between the occurrence of injuries and participation in competitions, the weekly frequency of training/classes and whether the practitioner participates in another sport/physical activity to improve the performance of the fight. These results draw attention to the importance of load, frequency and intensity of training with competitive objectives in the prevention of possible injuries.

Concussion and dislocation were the most frequently reported types, and knees – wrists/hands were the most affected regions of the body by injuries. Despite the rate pointed out in this investigation, the injuries were less severe, implying a shorter recovery and rehabilitation time and return to the practice of the modality.

It is important to carry out further research on this topic, including the use of other instruments and objective data to expand knowledge and evidence in order to prevent and minimize the involvement of injuries and, consequently, a healthier and longer-lasting practice of the modality.

## CONFLICT OF INTEREST

All authors declare that they have no conflict of interest, be it financial, intellectual, collaboration, participation, or of any kind.



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