

Prevalence of Dental Traumas and Mouthguard use Among Contact Sports' Players in Kigali, Rwanda

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Abstract

Background

Dental traumas are widely prevalent in contact sports and are among the main public oral health concerns. They are attributed to nonuse and/or insufficient use of mouth guards, as protective means, for players in the game.

Objectives

The study aims to assess the prevalence of dental traumas among the contact sports and to determine the significance of using mouth guards in the prevention of such traumas.

Methodology

This was a cross sectional study conducted on the selected sports games in Kigali city, Rwanda. Data were collected using semi-structured questionnaires and analysed for any associations between independent variables and dependent variable with chi-square and logistic regression tests. Statistical Package for Social Sciences (SPSS) version 21 was used for the analysis.

Results

The prevalence of dental trauma was 58.9% among contact sports players in Kigali. Most respondents had information about mouth guards (94.7%) and many of them (62.2%) affirmed they could prevent dental traumas. This study has shown a significant association between dental traumas and mouth-guard use where players who did not use mouthguards were 5.8 times more likely to have dental traumas compared to those who used them regularly [OR=5.81;95% CI=2.44-13.82; p<0.001].

Conclusion

A high prevalence of dental traumas was observed among the players despite the proven protection of using mouthguards. Therefore, putting emphasis on regular use of mouthguards would result in a huge reduction of risk and keep those traumas to a minimum.

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Introduction

The increased popularity of attendance in sports activities has raised the risk of considerable orofacial and dental trauma cases.[1] Accidents from sports are one of the most common attributes of dental traumas where most injuries are often caused by physical interaction, through violent physical contact of players against each other, with the game intensity and the agility being the chief causes.[2] High impact contact, which is found in contact sports, makes players more vulnerable to contracting oral and dental traumas.[3] The incurrance of severe dental trauma necessitates extensive and costly therapy.[4] Furthermore, the significant sequelae may include functional and esthetic impairment; sometimes, a lifelong psychological distress can arise .[2,4]

Over 30% of dental incidents have been found to be sports-related with crown fractures being the most frequent dental injury and the upper front teeth the most prone to immediate trauma.[5] Specifically, most dental traumas are associated with the following contact sports: basketball, handball, rugby, karate, football, hockey, water polo, baseball, American football, taekwondo and kung-Fu.[1,6,7]

In developed countries, the problems of dental traumas still exist but are not too many among contact sports players due to the awareness of protective mouth guard. For instance, in Croatia, the prevalence of dental traumas was found to be 25.3% among contact sports players and the majority of the participants (93.7%) were aware of a mouth guard and its effectiveness in prevention of dental injuries, where about 41% used them.[1,3]

Furthermore, in the studies done in France, India and Australia dental traumas, especially in contact sports, were as prevalent as 24.7%, 20.4% and 41.9% respectively. Although mouthguards were over 90% known within all participants, their usage were various,

with only 3.0% in France, 41% in India and 76.9% in Australia[2,5,8] In contrast, the extent of injuries was reported to be higher (50.2%) in Spain, despite the excellent compliance to using mouthguards (91.3%). [9] Moreover, as custom-made mouthguards were considered relatively expensive, mouth-formed ('boil and bite') mouthguards were the mostly used, followed by custom-made and pre-fabricated came last.[2,8-11]

In Africa, like in the study done in South Africa, the prevalence of dental traumas reported was 10.2% among 1,804 players who participated.[12] While in Nigeria, the study done reported that the prevalence of dental injuries was 15.2%.[13] Conversely, the study conducted in East Africa, specifically in Kenya, revealed that dental traumas were 55.1% prevalent among contact sport players and among them 68.6% knew the function of the mouthguards, but only 20.6% actually used them.[14]

The reason for conducting this study is that in Rwanda there is limited knowledge on the prevalence of dental traumas, awareness and use of mouthguards. Anecdotal reports indicate that hospitals in Kigali receive many people who have lost their teeth due to their involvement in sport practices. This, raised a question if people especially players do really know whether mouth guards exist and that they can protect them from dental injuries.[15,16] Thus, this study assessed the prevalence of dental trauma and mouth-guard use among contact sports' players in Kigali-Rwanda. Research questions were the following:

What is the prevalence of dental traumas among contact sports' players in Kigali?

What proportion of contact sport players do use protective mouth guard when playing?

Is there a significant association between using mouthguards and protection from dental traumas among contact sports' players?

Methods

Study area and design

This study was a cross sectional design conducted among players of contact sports, namely: handball, basketball, rugby, karate and kung-fu teams that are based in Kigali city.

Study population

The study population comprised of both male and female players of the officially registered teams of Rwanda national legal sports' associations located in Kigali city. In the association there is 25 teams registered but among them the contact sport games were made by five teams. These were Handball players located at Kimisagara youth center, Basketball game players at Remera Amahoro Stadium, Rugby game players at Gatenga, kung-fu game players at Nyamirambo and karate game players at circle sportif, Rugunga. Players who were not available during the period of data collection, January 2022, and those not willing to participate in the study were excluded.

Sample Size

The sample size for this study was 290 players drawn from the five selected contact sports games where each group was supposed to be represented by 58 prayers. The sample size was calculated in reference with the same study done in Kenya where they found that almost 21% among contact sports players used protective mouthguards. [14]The desired sample size was determined using Cochran's formula.[17]

$$n = Z^2PQ/e^2$$

$$n = (1.96)^2 0.21 \times 0.79 / (0.05)^2$$

$$n = 260 \text{ players and by adding } 10\% \text{ non-response} = 290 \text{ players}$$

Given:

n: Sample size.

Z: The abscissa of the normal curve at 95% (equals to 1.96).

P: Estimated proportion of players using the mouthguards

Q: 1-P

e: Level of the statistical significance/ acceptable error (equals to 0.05).

Sampling strategy

In order to get a truly representative sample from our population of interest, the researchers used stratified random sampling. We selected the 58 participants from each of the games disproportionately, so that approximately equal respondents represented each game. By seeing different games as sampling domains or strata, it facilitated an easy access to a sampling frame, as all of the respondents could be at a defined playground in a week period, the time within which we collected data.

Procedures of data collection

After getting permission, the researchers started collecting data using semi structured questionnaire based interview. The questionnaire used was adopted from another study done in Croatia.[1] The information obtained included sociodemographic characteristic such as gender, age, level of education and social category; dental trauma cases and mouth-guard use among contact sport players.

Analysis

Data was analysed using Statistical Product for Service Solutions (SPSS) version 21) computer programme. After that, we made frequency distribution tables, showing proportions and percentages. Chi-square and logistic regression tests were used to determine the association between dental traumas and mouthguard use.

Ethical consideration

UR-CMHS Institutional Review Board approved the study and granted ethical clearance. Information sheet was given to study participants who then signed the informed consent. All information collected in this study was kept with confidentiality without revealing the identity of the participants in the publications and reports. In addition, the data were secured by means of a computer password and were accessible only by authorized persons.

Results

Demographic characteristics of the participants

Of the 290 calculated sample size of players only 246 (84.8%) were available for interview. Males were 208 (84.6%) males and 38 (15.4%) were females.

Their age ranged between 17-30 (74%) and 31-40 (26%). Almost all of them had received formal education 241 (98%) and the vast majority, 193 (78.5%), belonged to third social category, followed by second and first category with 19.9% and 1.6% respectively (Table 1).

Table 1. Demographic characteristics of the participants

Subject	Frequency	Percentage (%)
Age (Years)		
17-30	182	74
30-40	64	26
Total	246	100
Gender		
Male	208	84.6
Female	38	15.4
Total	246	100
Level of education		
Educated (Formal education)	241	98
Non-educated	5	2
Total	246	100
Social category		
First category	4	1.6
Second category	49	19.9
Third category	193	78.5
Total	246	100

Prevalence of dental traumas according to demographic characteristics among contact sports' players

Dental traumas occurrence was found in 145 (58.9%) of the study participants, who had experienced these traumas at least once throughout their careers. Based on gender, prevalence was more in males (62.5%) than in females (39.4%). Considering age of the participants, the highest prevalence of dental traumas was found in 31-40 age group (75%) than in 17-30 age group (53.2%).

Among all the contact sports, (68%) and handball (64%) were leading for the cases of dental traumas, and were followed by basketball (58%), karate (56.5%) and lastly rugby (48%), Table 2.

Table 2. Prevalence of dental traumas among study participants

Demographic characteristics		Dental traumas		P Value
		Yes	No	
Gender	Male	130 (62.5%)	78 (37.5%)	0.008
	Female	15 (39.4%)	23 (60.6%)	
Age	17-30	97 (53.2%)	85 (46.8%)	0.002
	31-40	48 (75%)	16 (25%)	
Level of education	Educated	141 (58.5%)	100 (41.5%)	0.334
	Non-educated	4 (80%)	1 (20%)	
	First category	1 (25%)	3 (75%)	
Social Economic category	Second category	29 (59.1%)	20 (40.9%)	0.379
	Third category	115 (59.5%)	78 (40.5%)	
	Kung-Fu	34 (68%)	16 (22%)	
Type of sport game	Handball	32 (64%)	18 (36%)	0.306
	Basketball	29 (58%)	21 (42%)	
	Karate	26 (56.5%)	20 (43.5%)	
	Rugby	24 (48%)	26 (52%)	

Awareness and use of mouthguards among contact sports players

The majority, 233 (94.7%), were aware of what a mouthguard is. However, only a little more than a half, 153 (65.6%), said they knew it could really prevent dental traumas. Among them, only 42.8% used mouthguards. Some of the reasons presented as to why the players did not use mouthguards were that they did not know their function (42.7%), and did not think they were necessary, (27.1%). The rest of the reasons presented were, low availability, discomfort, expensiveness in cost, breathing difficulty and barrier to communication, as shown in the Table 3.

Table 3. Awareness and usage of mouthguards among contact sports players

Mouthguard awareness	Frequency	Percentage (%)
No	13	5.3
Yes	233	94.7
Total	246	100.0
Mouth-guard use		
No	147	59.8
Yes	99	40.2
Total	246	100
Reasons for not using mouthguards		
I did not know its function	85	42.7
I cannot get it	13	6.5
I did not think it is necessary	54	27.1
It is uncomfortable	21	10.6
It is too expensive	5	2.5
Breathing difficulty	5	2.5
Barrier to communication	16	8.0
Total	199	100.0

The association between dental traumas and mouthguard use

Table 4, gives the details about the association between dental traumas and mouthguards use among contact sports' players in Kigali- Rwanda. The study found that players who did not use mouthguards were 5.8 times of having dental traumas compared to those who used them regularly [OR=5.81;95% CI=2.44-13.82; p<0.001].

Table 4. The association between dental traumas and mouth guard use among contact sports' players

Mouth-guard use	P- Value	Odds ratio	95% CI
Yes		1	
No	<0.001	5.81	2.44-13.82

Discussion

This study aimed to assess the prevalence of dental trauma and mouth-guard use among contact sports' players in Kigali-Rwanda. Out of 246 (100%) contact sport prayers, 145 (58.9%) had contact sports' related dental traumas. These results are similar to what was found in other studies showed that most of dental traumas were related to contact sports activities.[18,19]This current study prevalence was high compared to what was found in other studies elsewhere, such as in Kenya dental injuries were 55.1% [14], in Spain 50.2%.[9] Moreover, in Croatia, France and Brazil they found 13.5%, 24.7% and 18.6% respectively.[1,2,20]

The current study indicated that among all participants, nearly all (94.7%) knew mouthguards and most affirmed they could prevent dental traumas during contact sports practice. Nevertheless, surprisingly only few players (40.2.1%) could use mouthguards to prevent those injuries from ever happening, corroborating the findings of mouthguards (20.6%) of the study done in Kenya, and in France (3%).[2,14] This suggests that only a small number of players could use mouthguards regularly despite its proven function of preventing the

incurrence of dental traumas during sports activities. This is an indication that an intensive education and policy are needed to encourage the players to start using these protective devices so that they can more safely engage in contact sports.[16,21,22]

The main reasons given by players in the current study regarding not using mouthguards were that they had no knowledge about mouthguards and did not know their function; and they did not think mouthguards were necessary. Similar reasons were also presented in related studies such as one done in Croatia. [1] In addition, respondents also said that they could not get mouthguards, the mouthguards were uncomfortable, and also that they were expensive.

The results of this study have been consistent and affirmed that mouthguards could act as effective protection to both teeth and surrounding structures during contact sports practice. The same view was also held in Turkey, India and USA. [10,23,24] Dental traumas were found to be 5.8 higher among the players who did not use mouthguards, with p<0.001, than players who used mouthguards regularly. The very similar results were found in a research conducted in Central India where players who used protective mouth guards had low prevalence of dental traumas compared to their colleagues who did not use mouth guards.[8] The thing was that a huge number of athletes declared to have knowledge about mouthguards and yet could hardly use them, which was also found in the previous studies.[1,8]

It was speculated that the majority of the players, who used mouthguards always and still sustained dental traumas, admitted that they had had traumas before they started to use mouthguards, just as it happened in Croatia.[1] In other words, they used mouthguards as decision for protection against further traumas. For the sometimes-users, most of them had traumas before instituting mouthguards as well, but some had traumas just the moment they

had skipped using mouthguards. However, there were some players who did not use mouthguards at all and had no traumas, who declared mouthguards to be unnecessary.

Conclusion

This study showed that dental traumas were highly prevalent among contact sport players, whereas mouthguards use was low among the players. The high risk of developing dental traumas was associated with non-use of mouthguards among contact sport players in Kigali. Therefore, putting emphasis on regular use of mouthguards should significantly reduce the risk and keep such traumas to the minimum.

Limitations

As some participants could not remember whether they had experienced traumas and/or what was the cause, it was considered a limitation of the present study. Even so, these results are relevant enough to reveal that dental traumas are highly prevalent in contact sports and can be significantly reduced by using mouthguards.

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Conflict of interest

The authors hereby assert that no conflict of interest will arise in connection with presentation of this manuscript.

Authors' contribution

All authors contributed to the design and implementation of the study. They all participated in the development of first draft and approved together the final draft of the manuscript.

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