

Evaluation of the occurrence of sharp instrument accidents in a clinical Dentistry School

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• Conflicts of interest: none declared.

ABSTRACT

Objective: to evaluate the occurrence of occupational accidents with undergraduate dentistry students from the 5th to 10th period of Centro Universitário Cesmac. **Material and Methods:** analysis of the notification forms of accidents with exposure to blood or other biological materials, between the years of 2011 to 2016, available on the Biosafety Committee of Centro Universitário Cesmac. **Results:** we observed that the highest number of accidents occurred in 2014 and that the most common instruments were the needle of the carpule syringe, followed by the periodontal curette. Most accidents occurred during the moment of care. **Conclusion:** the students were submitted to the experience of accidents with potential of biological contamination because of sharp instruments. Strengthening prophylactic measures is needed to reduce such circumstances that are detrimental to the health of those involved in the patient and student relationship.

Keywords: Prevention of accidents; Exposure to biological agents; Risk management.

Introduction

Occupational diseases are changes in the health of workers developed during the performance of the profession and in function of the execution of its service. Since health professionals are exposed to biological agents and in direct contact with vectors that transmit infectious diseases in their work environments, it is not uncommon for them to be affected by them.¹

Occupational accidents are explained as damages that occur during activities held in the work environment, causing functional alteration, with or without bodily injury to the worker.²

In general, labor activities expose workers to varying occupational risks. These risks of accidents include physical, chemical, ergonomic and biological agents.³ Dental teams are under constant risk of contamination by infectious agents due to their field of work and the instruments that are used.⁴

Accidents usually occur because of needles or cutting instruments; by direct contact of the ocular, nasal, oral mucosa and non-intact skin with contaminated blood or organic materials; thus, being potentially preventable.⁵

Given the field of work of dental surgeons and their assistants who have the oral cavity as a place of direct action, which presents small dimensions, difficult access and different colonizing microorganisms, the biological risk is essentially caused by contact with saliva, blood and other organic secretions.⁶

According to Sassamoto *et al.*,⁶ universal measures for interrupting the transmission chain of microorganisms are needed; thus, providing reduced occupational risk to the professional. For Glaber,⁷ biosecurity measures pre-

vent accidents and cross-contamination between the dental surgeon and the patient.

Such biosafety measures are universal standards aimed at reducing exposure to biological materials. They should be used when handling medical-hospital instruments and in the care of all patients, regardless of a confirmed or presumed diagnosis of infectious disease, such as HIV/AIDS, hepatitis B/C and others.⁵

Biosecurity measures in dentistry clinics begin with a thorough user's anamnesis, use of Personal Protective Equipment (PPE), correct and thorough washing of hands, use of surgical gloves depending on the procedure to be performed, preparation, disinfection and sterilization of the instruments, correct practice of ergonomics and appropriate disposal of organic waste, in addition to the vaccination of the entire oral health team.^{8,9}

Periodic training on biosafety standards makes professionals more committed to safety since these processes involve more responsibility, discipline, knowledge and organization of the individual, than complex reasoning and techniques that are difficult to perform.⁹

There are over 20 types of confirmed diseases that can be acquired through puncture-cutting contamination described in the literature; the most common and most important are hepatitis B, hepatitis C, and HIV due to their severity.⁸

Contamination accidents must be treated as medical emergencies, given that if it occurs, taking the prophylactic measures immediately after exposure is critical. These are summarized in: excessive washing of the place with soap and water, notification of the accident, collection of blood samples from the source patient and treatment ac-

ording to the diagnosis.¹⁰

Filling the form with the most complete information possible is fundamental when a professional is exposed to a risk. Thus, the protocol followed by the injured professional can be found and the risk of future problems can be minimized by conducting studies on the development of strategies focused on aiding students to become aware of the practices of risk of exposure to occupational infectious diseases.²

According to the World Health Organization (WHO), health professionals are three to six times more likely to contract hepatitis B when compared to the general population.¹¹ In addition to the use of PPE, immunization can also prevent contamination in the dental work environment. For example, hepatitis B and tetanus vaccines protect health professionals and students of the area from contracting such diseases from 90% to 95%.¹²

In Brazil, studies on occupational accidents and biosafety among health professionals are still scarce when compared to studies conducted in different countries,¹⁰ which justifies encouraging and performing studies on prophylactic measures and awareness-raising of dental teams. Although undergraduate Dentistry students being one of the most exposed groups to occupational accidents with biological material, there are very few studies on this topic, since most of are performed by nursing and surveillance teams. However, dentistry professionals and academics must know about the diseases, as well as their transmission routes so they can adequately protect themselves.

Biosafety education is essential for the correct training in Dentistry courses. Special attention to the routines of academics involved in dental health care and the administration of occupational accidents will provide strategies of care and review of non-operational systematic protocols in university and professional practice.¹³

Complex procedures that expose the team to varied risks are performed in dentistry practice. One of the main risks at work involves sharp instruments and biological material; thus, the dental surgeon and his or her auxiliary team must be prepared to deal with possible work accidents, notifying them and acting according to the protocol recommended by the Brazilian Ministry of Health.^{11,13}

The objective of this study was to evaluate the occurrence of occupational accidents with students of the undergraduate Dentistry course of Centro Universitário Cesmac. For such, it was necessary to determine the frequency of accidents with sharp instruments in the Dentistry Clinic, as well as to quantify the number of accidents and verify the circumstances in which they occurred.

Material and Methods

This research was previously submitted and approved by the Research Ethics Committee on human beings of Centro Universitário Cesmac, in accordance with Resolution 196/96 of the Brazilian National Health Council, CAAE: 55995716.7.0000.0039; Opinion 1,606,039.

This is a retrospective, observational and descriptive study. Data were obtained from the forms filed in the Comissão de Biossegurança (Biosecurity Commission – CBioss) of Centro Universitário Cesmac, from 2011 to 2016, filled when the accident had occurred. From these data it was possible to identify the instruments involved, the locations where the accidents occurred, and the main circumstances surrounding the occupational accident.

The study population consisted of students, from the 5th to 10th period, who were performing the practical disciplines of the dentistry course, in contact with biological material and the use of sharp instruments. Students are subject, at some point in their academic career, to undergo some kind of accident with sharp instruments.

Data were placed into a Microsoft Excel worksheet. The Statistical Package for Socials Science (SPSS) software, version 20.0 and Descriptive Statistics were used for the statistical analysis, including the calculation of means and standard deviations, distribution of simple and percentage frequencies and presentation of results through figures. Inferential Statistics was used to compare group means.

Results

Data of this research were obtained from accident notification forms caused by sharp instruments, filed at the Biosafety Commission (CBioss) of Centro Universitário Cesmac, from 2011 to 2016, filled at the time of the accident and corresponding only to reported accidents. We can thus suppose that the numbers found are a lower estimate than the lived reality, since occupational exposures to biological material are not always reported.

In the period from 2011 to 2016, n=89 accidents with sharp instruments were reported in the Dentistry Clinic, with n=5 in 2011, n=18 in 2012, n=11 in 2013, n=29 in 2014, n=16 in 2015 and n=10 in 2016. Data show in Figure 1 in percentage.

Of this number of accidents, victims were mostly women, n=67 (75.3%) in total, when compared to n=22 (24.7%) of men, as found in Figure 2.

According to the notification forms, among the 89 accidents that occurred, the hands were the main sites affected, n=77 (86.5%) in total, followed accidents in the arms, n=3 (3.4%). The affected sites were not reported in n=9 (10.1%) forms that registered accidents caused by sharp instruments, as seen in Figure 3.

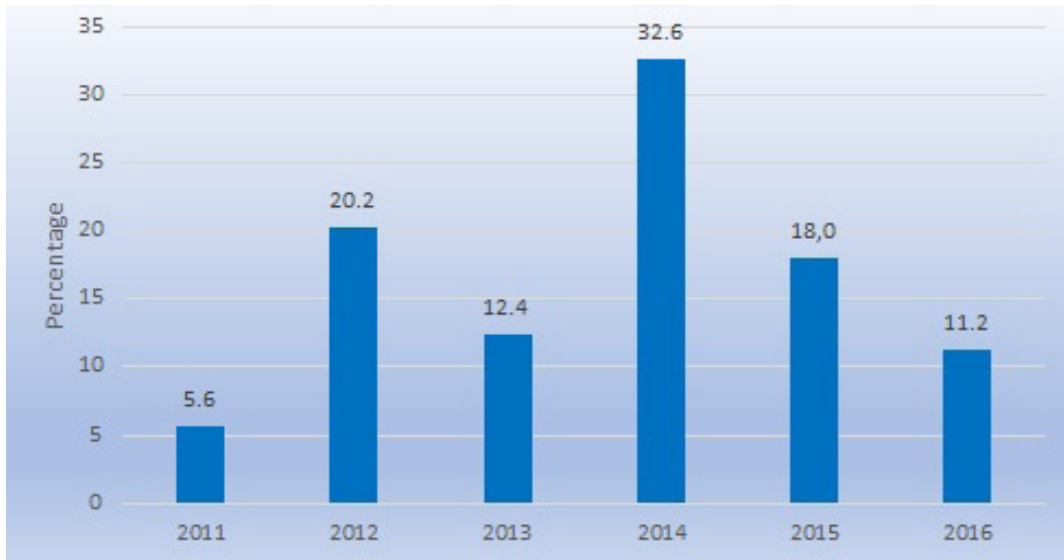


Figure 1. Distribution of accidents in the period from 2011 to 2016. Source: research data

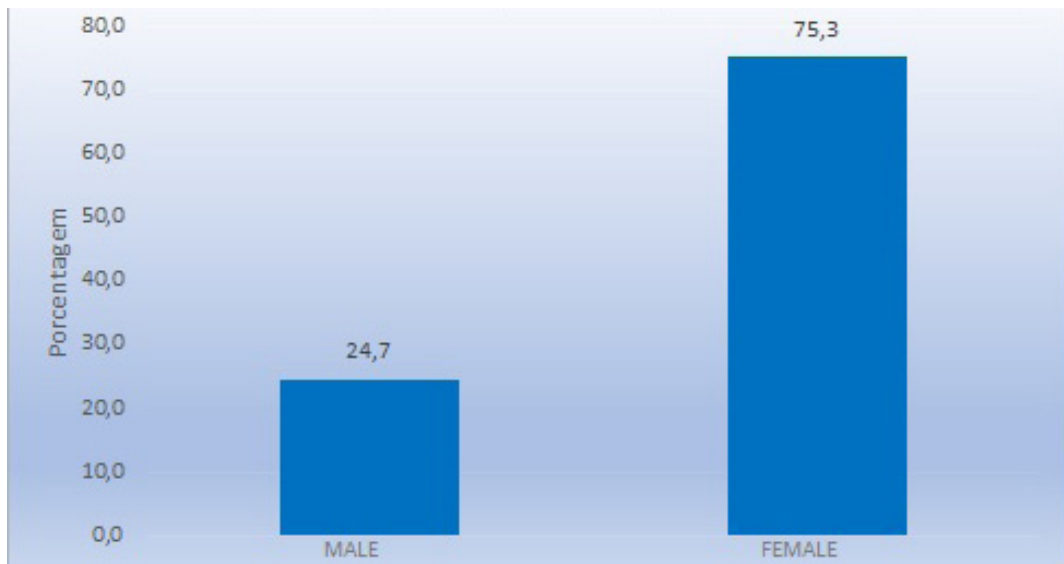


Figure 2. Distribution of accidents according to the student's gender from 2011 to 2016. Source: research data

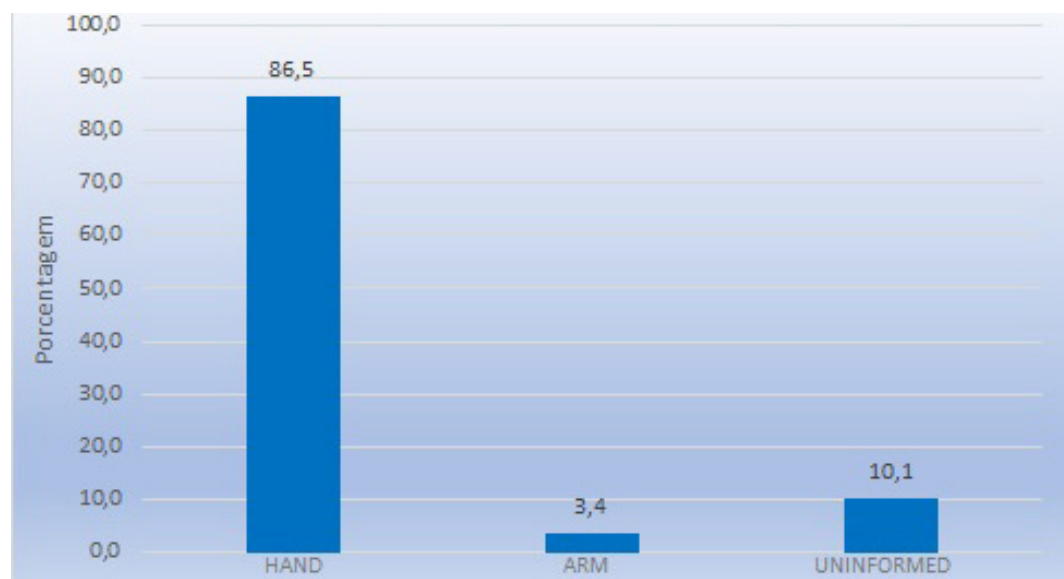


Figure 3. Distribution of accidents according to the affected area from 2011 to 2016. Source: research data

The main instruments that caused injuries were needles n=25 (28.1%), periodontal curette n=22 (24.7%) and exploratory probes n=15 (16.9%), followed by other instruments such as drills, endodontic files and surgical instruments, as shown in Figure 4.

In 2011 and 2012, the most common instrument were needles, found n=3 accidents in 2011 and n=5 in 2012; In

2013 and 2014, the most common instrument were the periodontal curettes, reported in n=4 accidents in 2013 and n=9 accidents in 2014, followed by n=8 with anesthesia needle; in 2015, accidents with the exploratory catheter and anesthesia needle showed equal values, n=4 accidents; and, in 2016, it was verified that the main instrument was the exploratory probe, n=3 accidents, as shown in Figure 5.

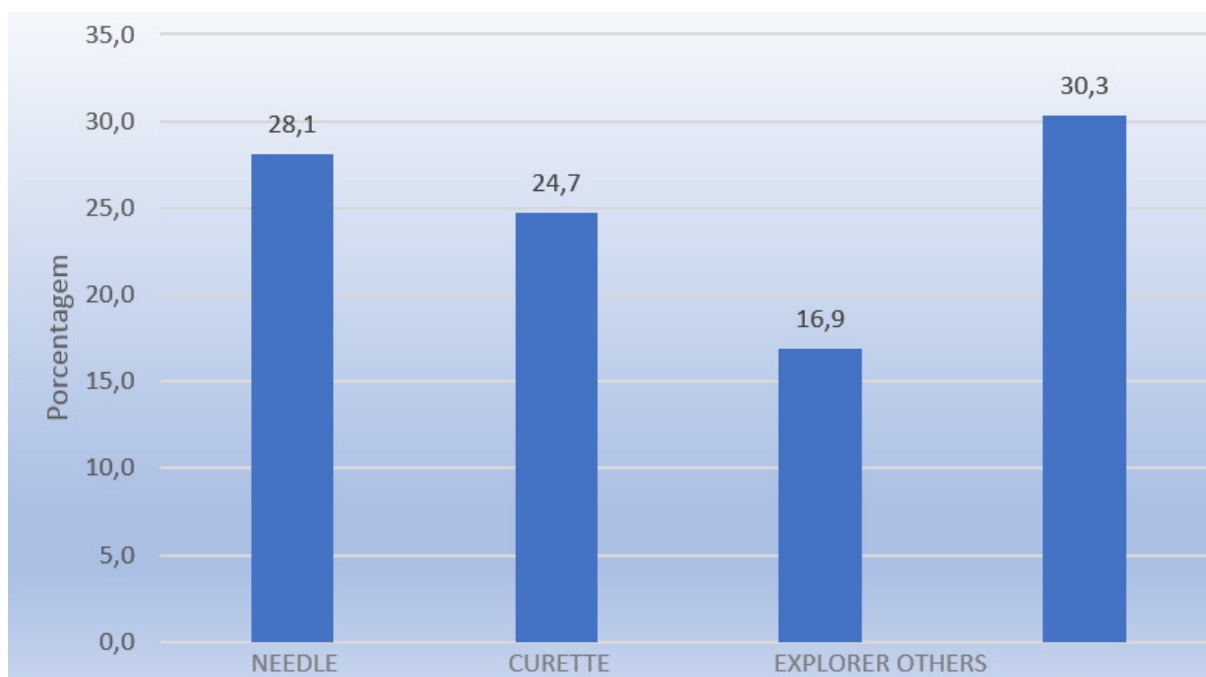


Figure 4. Distribution of accidents according to the instruments used from 2011 to 2016. Source: research data

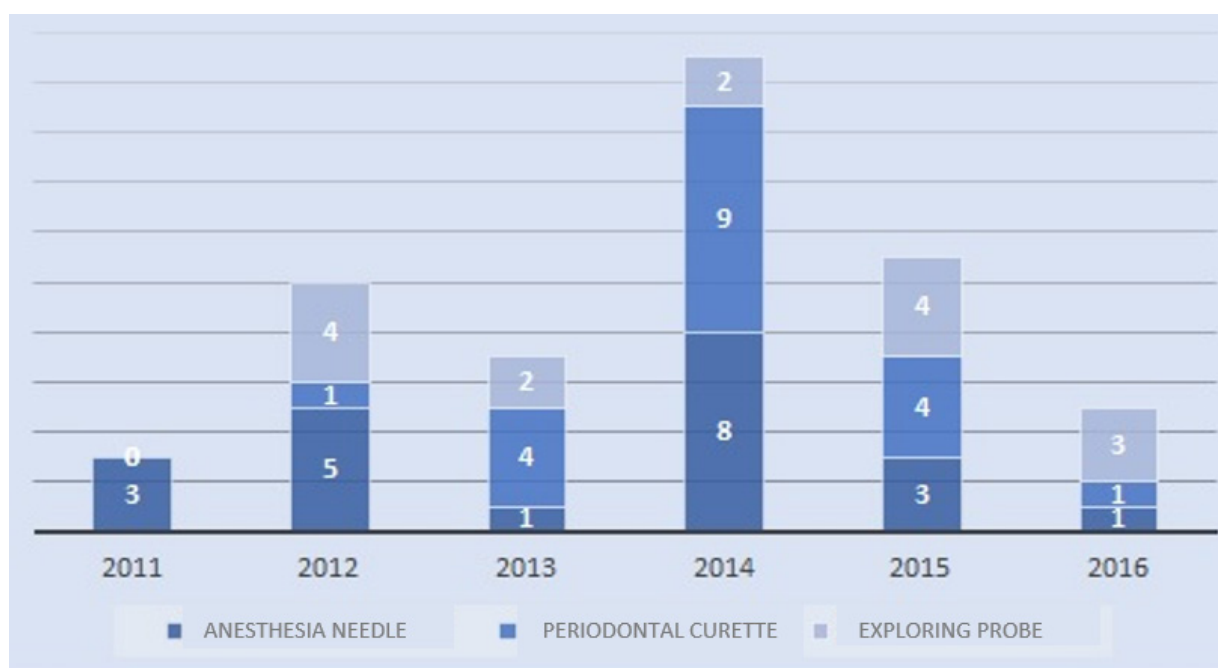


Figure 5. Distribution of sharp instruments that caused accidents from 2011 to 2016. Source: research data

In this study, most reports of accidents caused by sharp objects occurred during dental procedures, corresponding to 65 accidents (73.0%), when performing: anesthesia, scraping, suturing, surgical procedures, cleaning and moving in the room. In other circumstances, such as a staying in the purge environment, n=22 accidents were observed (24.7%). During material packaging, n=2 accidents (2.25%) were reported, as shown in Figure 6.

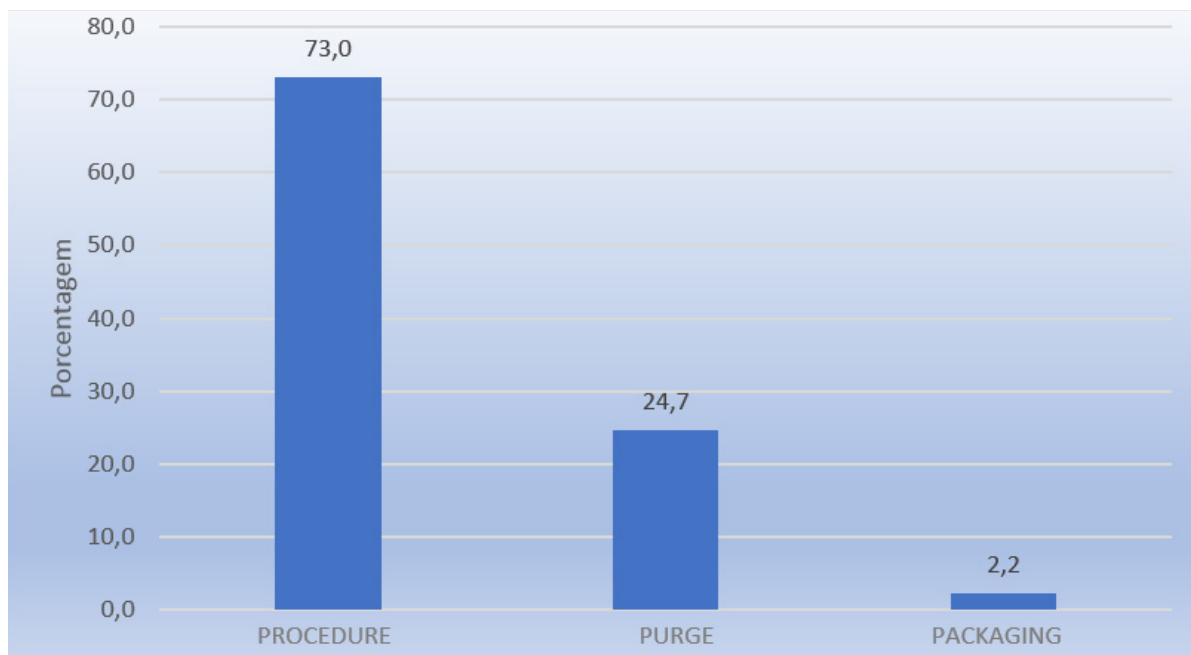


Figure 6. Distribution of accidents according to the procedure performed. Source: research data

Discussion

When comparing the number of accidents from 2011 to 2016, 2014 had the highest number of reports of occupational accidents among undergraduate dentistry students. There is no explanation for the increase in notifications in 2014, since the filled forms do not provide full information about the accident.

However, we must highlight the preparation of the *Manual de Biossegurança do curso de Odontologia do Centro Universitário Cesmac* (Biosafety Manual for the undergraduate Dentistry course of Centro Universitário Cesmac) in 2015, which regulates and standardize the internal activities of clinics and laboratories with the objective of standardizing, guiding and offering practicality regarding the required and mandatory Biosafety procedures in dentistry, based on scientific research and guidelines of appropriate Brazilian and international bodies.⁵ This could possibly be a reason for the reduction of accidents in the following years.

Regarding gender, a similar result was observed in the study by Sassamoto *et al.*,⁶ who attributed the fact to the greater number of women in the profession, and disagreeing

with Andrade *et al.*,⁴ whom obtained a greater number of occurrences for men.

Regarding the site of the accidents, the result found is quite similar to other studies, corroborating the study by Nascimento *et al.*¹⁴ and Lima *et al.*¹² which cite the hands as a whole as the most affected region observed in accidents, which is easily justified by the type of activity developed in dental practice due to having the oral cavity as a direct field

of work, with small dimensions, difficult access and colonizing microorganisms,⁶ confirming the professional risk of the dental surgeon during intra and extraoral procedures.

No ocular accidents were found in this research, unlike what was found in Ribeiro *et al.*,¹⁵ in which the most affected body region were the eyes (53.3%). Possibly, this type of accident occurs due to lack of use of protective goggles, a practice still little incorporated in routine Dentistry activities.

Regarding the instruments that caused injuries, our results are similar to the study by Artuzi *et al.*,¹⁶ in which the most common instrument was the periodontal curette (28%) and anesthetic needles (26%). In the study by Andrade *et al.*,⁴ the exploratory probe was the instrument with the highest number of lesions (54.2%), followed by needle (45.8%), drill (29.2%) and endodontic file (20.8%).

According to Lima *et al.*,¹³ it can be assumed that the student's relationship with the patient generates anxiety and nervousness, being related to the greater number of occurrences when performing care procedures, followed by washing and drying of the instruments, and these last two moments may be associated with haste.

According to the literature, 55% of the accidents occur during at the post-care period, with 57% occurring during the washing of the instruments, in which the lack of attention was the main reason for the evaluated cases.¹³ However, data of this research corroborate with the results found in Orestes-Cardoso *et al.*,¹⁰ when analyzing the moment when these accidents occurred, we can observe that during clinical care students were more susceptible to exposure, with 18.0% occurrence, when compared to 14% of accidents occurred after this activity.

According to Orestes-Cardoso *et al.*,¹⁰ some studies on exposure to potentially contaminated biological material

among dentistry students indicate that the lack of clinical experience is an aggravating factor, in addition to the certain characteristics of the course such as nervousness, anxiety and constant supervision of professors as evaluators, factors that increase the risk of accidents among students.

Conclusion

The presented results indicate the need for the continued education on biosafety control during undergraduate clinical training to reduce situations detrimental to the health of those who are involved in the relationship between the patient and the student.

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