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ARTICLE REVIEW

Biological risks and accidents in dental practice at the Regional Autonomous University of the Andes

Riesgos y accidentes biológicos en la práctica odontológica en la Universidad Regional Autónoma de los Andes

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ABSTRACT

Introduction: work risks cause a significant impact on health, especially in dentists since they are prone to suffering any type of occupational accident.
Objective: to analyze the most frequent biological risks and accidents that occur with the handling of instruments during professional practice in dental teachers who practice at the Regional Autonomous University of the Andes "UNIANDES".
Methods: this research is observational, transversal, and descriptive. The chosen population corresponded to dentists who practice teaching, with an age ranging between 30 and 50 years and older, including all those who work in private practices with a total of 46 people. The data was collected through a survey carried.
Results: the type of accident that occurred most frequently corresponds to punctures 27,3 %, caused by the needle 18,2 %. 45,5 % of dentists do not sheath and remove sharp material with tweezers. 52,3 % correctly followed the biosafety protocol. And 61,4 % know what the complete doses are for each vaccine, giving a good analysis of the correct implementation of the vaccination schedule. In addition, it denoted significant associations between the type of specialty and the accidents suffered (p=0.005), with the highest trend being endodontics and oral rehabilitation.
Conclusions: It is essential to make all dental teachers aware of the risks involved in patient care if it is not carried out correctly and to promote health programs where biosafety protocols are reinforced.

Keywords: Accidents, Occupational; Sharp Objects; Biohazard Release.

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RESUMEN

Introducción: los riesgos de trabajo causan un impacto significativo para la salud, especialmente en los odontólogos puesto que son propensos a sufrir cualquier tipo de accidente ocupacional.
Objetivo: analizar los riesgos y accidentes biológicos más frecuentes ocurridos con el manejo de instrumental durante la práctica profesional en los docentes odontólogos que ejercen en la Universidad Regional Autónoma de los Andes "UNIANDES".
Métodos: la presente investigación es observacional, transversal, y descriptiva. La población elegida correspondió a odontólogos que ejercen la docencia, con una edad que varía entre los 30 y 50 años en adelante, incluidos todos los que trabajan en consultas privadas con un total de 46 personas. Los datos fueron recogidos mediante una encuesta realizada.
Resultados: el tipo de accidente ocurrido con mayor frecuencia corresponde a los pinchazos 27,3 %, causado por la aguja 18,2 %. El 45,5 % de los odontólogos no enfundan y retiran con pinzas el material cortopunzante. El 52,3 % hace un correcto seguimiento del protocolo de bioseguridad. Y el 61,4 % conoce cuales son las dosis completas para cada vacuna dando un buen análisis del correcto llevado del esquema de vacunación. Además de denotó asociaciones significativas entre el tipo de especialidad y los accidentes que sufren (p=0,005) siendo las de mayor tendencia la endodoncia y la rehabilitación oral.
Conclusiones: es fundamental concientizar a todos los docentes odontólogos de los riesgos que conlleva la atención a los pacientes si no se realiza de manera correcta y fomentar programas de salud donde se refuercen los protocolos de bioseguridad.

Palabras clave: Accidente Ocupacional; Objetos Punzantes; Accidentes Biológicos.

INTRODUCTION

The health professional is directly and continuously exposed to different microorganisms such as fungi, bacteria and even viruses that are found in the saliva and oral cavity, respiratory secretion or blood of patients when performing the dental consultation.[1]Dentists, like other health officials, are constantly at risk, because there are various types of occupational accidents due to biological factors, while they ensure the health of patients, which leads to temporary disability, permanent disability and even death.[2]

Therefore, an occupational risk in dentistry can be defined as a threat of increased risk of infection when some fluid is exposed in a sudden and harmful manner, causing damage to the eyes, skin and mucous membranes, during the course of patient care.[3]

Currently, reported cases of adverse events are low, possibly due to lack of understanding of the risks by health care workers, feelings of shame and sadness, fear of losing work, inherent difficulties in information systems, the lack of adequate worker health action and the denial of the importance of this type of work accidents.[4]

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Among the biological agents, the contagion of different types of viruses and diseases stands out, such as: human immunodeficiency virus (HIV), hepatitis B (HBV), hepatitis C (HCV), SARS-CoV-2 (Covid-19) and others. At the same time, wounds on the skin or mucosa lead to several dentists being infected with these diseases, even causing chronic hepatitis or cirrhosis.(6)

In the same way, there are several factors such as lack of vaccination or incomplete doses that influence the risk of contagion, therefore, the use of complete and appropriate equipment such as disposable gowns, glasses, face shields, gloves or other implements protect them almost entirely from imminent situations. risky in a considerable percentage in the event of an accident, this in addition to the correct following of biosafety regulations.(7) This is why in the place where the dental treatment will be carried out, only what is essential must be preserved in order to carry out the care successfully and carefully, managing not to unnecessarily contaminate any element present in the dental office. It is recommended that these elements be preserved with plastic.(8)

With respect to the contagion of the diseases mentioned above, it is determined that Hepatitis B in a person who is not with the adequate dose of vaccines, the risk that is exposed to blood infected with HBV due to a needle stick or a cut is increased. a range between 6 and 30 %. It is stipulated that approximately 95 % of Hepatitis B Virus infections can be detected 6 months after exposure. Now, Hepatitis C has a highly dangerous anti-HCV transmission impact; at the moment there are no prophylactic measures with medication or immunoglobulins for adequate post-exposure management.(9)

Such as, the Human Immunodeficiency Virus (HIV) in health professionals who acquire HIV infection in their occupational activities, in a range of 86 % have been exposed to blood fluids due to percutaneous injuries with a percentage of 88 %. This can occur after patient care in 41 %, during treatment in 35 % and in the elimination of infectious waste around 20 %.(10) Finally, there is SARS-CoV-2 (Covid-19), which is transmitted by microorganisms exposed to the air for long periods of time. Some patients may cough, sneeze or even when handling dental appliances inside the oral cavity during the consultation, causing infection through saliva, blood or other fluid that spreads to the surroundings.(11)

It is important to emphasize that the use of needles and drilling instruments, such as drills, are the most common in causing exposure, damage, trauma or wounds. Likewise, scraping or polishing procedures and the use of high-speed handpieces cause accidents related to eye injuries or damage resulting from microscopic pieces of stone being released or splashes of body fluids such as blood, saliva, etc. Various clinical manifestations regarding eye damage received by a dentist can include constant eye pain, tearing and blurred vision, even leading to loss of vision in more serious, but rare cases.(12)

For this reason, strict attention is necessary, and it is also essential to comply with infection prevention measures in dental practice, so that the transmission of viruses to dental professionals and patients who are being treated can be prevented. during the consultation.(13)For this reason, it should be considered a specific requirement to follow antibiotic therapy and correct monitoring of wound exposure whether the professional works in the public or private area.(14)

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METHODS

This research is observational, cross-sectional, retrospective and descriptive. The line of research corresponds to preventive and community dentistry; The study variables focus on dental risk in the population. The STROBE guide was followed,[15] which allows improving the quality of observational studies, which allowed having guidance for presentation, and facilitating their critical evaluation and interpretation.

The study was carried out through surveys, which were applied between the dates of December 6, 2022 and January 4, 2023, and were applied to dental teachers who belong to the Regional Autonomous University of the Andes "UNIANDES".

Selection criteria

The chosen population corresponded to dentists who practice teaching, with an age ranging between 30 and 50 years and older, including all those who work in private practices. Teachers who work in the Dentistry career, but practice another profession such as doctors, psychologists, among others, as well as professionals who do not practice the profession, were excluded.

Study variables

The following variables were measured: gender (man, woman), age (30 – 50 years), years of service (five–20 years), specialty (surgery, endodontics, dental surgery, periodontics, oral rehabilitation, without specialty, other) , work accidents (puncture, fluid splash, cut, none), causal object (needle, bur, explorer, scalpel, files, none, other), accident frequency (three months, six months, une year, never), moment of the accident (before, during and after), type of risk (high, medium, low, unknown), cause (tiredness, stress, overwork, attention time, other), other cause of accident, handling of sharp materials (sheath and remove by hand, sheath and remove with tweezers, do not sheath and remove with tweezers), attitude towards the problem (allow bleeding, wash with plenty of water, pharmaceutical administration, all), biosafety protocol (yes, no, partially) , protocol follow-up (yes, no, partially), full vaccination doses (yes, no, unknown), hepatitis dose (yes, no unknown), tetanus dose (yes, no unknown), yellow fever dose (yes, no, unknown), COVID-19 doses (First, second, third and fourth doses).

Sample size

To calculate the sample size, the teaching population of the UNIANDES Dentistry program was taken into consideration with a total of 46 people. Taking into account the study by Posenato L. & Guimarães V.,[16] where it was established that the prevalence of occupational accidents with the handling of instruments was 60 %, with a margin of error of 5 % and a confidence level of 95 %, 42 responses will be necessary. The UNIANDES community of dentists may not represent the community of dentists in Ecuador due to its small size.

Statistical methods

The data was collected through a survey carried out in MICROSOFT FORMS, which was sent through a link to different social networks such as email and Microsoft Teams. These questions were obtained from the studies of: Arrieta-Vergara et.,[2] alZarate de Gelfo et al,.[17] Once the information was obtained, it was processed in the statistical program SPSS version 23, for the development of descriptive statistics (absolute and relative frequencies in the form of percentages) and the analysis of statistical significance using the Chi square test to determine possible associations of certain variables. it was considered significant if $p < 0,05$.

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RESULTS

Respondents in this study in terms of gender, 63,6 % (n=28) of the participants were female and 36,4 % (n=16) were male. The participants were in an age range that varied from under 30 years old to over 50 years old, with a majority percentage of dentists between 30 and 40 years old representing 75 % (n=33) of those surveyed. Followed by dentists who indicate that they are over 50 years old with 11.4 % (n=5), likewise dentists with an age range between 40 to 50 years with 9,1 % (n=4), and ending with dentists under 30 years of age by 4,5 % (n=2). According to the years they have been practicing the profession, 34,1 % (n=15) indicated that they have been practicing the dentistry profession for more than five years, as well as those who indicated that they have been practicing between 10 and 15 years with 27,3 % (n=12), 15,9 % (n=7) dentists who have been practicing for less than five years, and 13,6 % (n=6) who have been practicing for more than 20 years.

When describing the dental disciplinary area of the 44 respondents, a considerable percentage can be seen who indicated that they have a specialty in oral rehabilitation with 22,7 % (n=10). Likewise, the dentists indicated that they have the specialty of endodontics and surgery with 13,6 % (n=6) and 11,4 % (n=5) respectively.

When investigating the types of accidents, they have suffered, the majority of dentists indicate that they have suffered punctures with 27,3 % (n=12), followed by professionals who indicated that they have suffered cuts, punctures and fluid splashes adding up to 20,5 % (n=9) of the total number of respondents. In relation to the object causing these accidents, it was determined that the objects that cause the most accidents are the needle with 18,4 % (n=8), followed by strawberries with 11,4 % (n=5); In addition, there are dentists who have reported having accidents with an explorer and drills at the same time in 11,4 % (n=5).

It can be seen that 50 % (n=22) have suffered an accident in the last year, 25% (n=11) in the last six months and 15,2 % (n=7) in the last three months. ; It is imminent to suffer accidents in the clinical context and it can be seen that the accident rate does not change if it is considered that there is an accident rate of approximately two per month. (Table 1)

Table 1. Frequency of work accidents.

	Frecuency (n)	Porcentaje (%)
3 months	7	15,9
6 months	11	25,0
1 year	22	50,0
Never	4	9,1
Total	44	100,0

Table 2 shows other types of causes of accidents that were mentioned by the surveyed population, of which it is observed that 62,5 % (n=5) refer to a lack of care when dealing with these elements, In a smaller proportion and no less important are accidental events and punctures due to accidents when washing instruments, all at 12,5 % (n=1); of a total of eight professionals who will report these types of situations to you.

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Table 2. Other causes of accidents

	Frecuency (n)	Porcentaje (%)
Lack of care	5	62,5
Fortuitous.	1	12,5
I have not suffered accidents in consultation	1	12,5
Accidental punctures during instrument washing	1	12,5
Total	8	100,0

Regarding the handling of sharps material in dental offices, 45,5 % (n=20) of dentists do not sheath and remove sharps material with tweezers, while 40,9 % (n=18) of Dentists sheath and remove with tweezers. In table 3, the attitude of dentists can be examined at the time of suffering an injury. Among the most frequent criteria is washing hands with plenty of soap and water or with physiological saline with 43,2 % (n=19), followed by allowing abundant bleeding from the injury to eliminate foreign bodies with 27,3 % (n=12), among the main ones.

Table 3. Types of attitudes towards injuries

	Frecuency (n)	Porcentaje (%)
Permitir el sangrado abundante de la lesión para eliminar cuerpos extraños si existieran;	12	27,3
Allow abundant bleeding from the injury to eliminate foreign bodies if they exist;	19	43,2
Wash with plenty of soap and water or 0.9% saline solution;	2	4,5
Prophylactic pharmaceutical administration;	6	13,6
Allow abundant bleeding from the injury to eliminate foreign bodies if they exist; Wash with plenty of soap and water or 0.9% saline solution; Prophylactic pharmaceutical administration	5	11,4
None	44	100,0

When inquiring about knowledge of the biosafety protocol, it was stated that 56,8 % of the respondents did know the biosafety protocol (n=25) while 38,6 % (n=17) partially knew said protocol. Likewise, it is determined that 52,3 % (n=23) of dentists correctly follow the biosafety protocol, while 43,2 % (n=19) of dentists partially follow said protocol.

Regarding the accidents that have been registered by the specialty, it can be seen that in terms of specialties, the one that has suffered the most accident events corresponds to the area of oral rehabilitation with 22,7 % (n=10), followed by endodontics with 15 % (n=6), a significant frequency of professionals without a specialty is also detected, showing a total of 40,9 % (n=18); which would indicate that experience is an important factor within clinical practice. (Table 4)

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Table 4. Accidents by specialty

Specialty	Accident				Total	
	Has not had any accidents		has had accidents			
	No.	%	No.	%	No.	%
Surgery	0	0	5	12,50	5	11,40
Endodontics	0	0	6	15	6	13,60
Dental Surgery	1	25	0	0	1	2,30
Periodontics	0	0	4	10	4	9,10
Oral Rehabilitation	3	75	7	17	10	22,70
No specialty	0	0	4	10	4	9,10
Other	0	0	14	35	14	31,80
Total	4	100	40	100	44	100

To determine possible associations, tests of association or relationship of qualitative variables (Chi-square) were established, establishing the possible associations between the main study variables as shown in Table 5.

Table 5. Association or relationship tests (Chi-square)

Variables	Chi square test	Gl	P
Specialty vs Accidents	18,59	6	0,005*
Years of profession vs Accidents	2.45	4	0,652
Sex vs Accidents	2,51	1	0,151
Cause of accident vs Material handling	0,364	2	0,834
Age vs Accidents	2,51	1	0,529
Cause of accident vs Specialty	0,21	1	0,448
Cause of accident vs Years of profession	3,41	4	0,490
*p<0.05 denotes statistical significance			

From the above, it was found that regardless of the specialty, it has a statistically significant association with respect to the accidents that have been reported in clinical practice (p=0,005), meaning that there are certain specialties that, due to their characteristics, generate certain incidents to cause accidents such as endodontics or oral rehabilitation; Neither years of experience in the profession, nor sex, handling of material, age, or causes of the accident are associated or related to the accidents caused.

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DISCUSSION

At the Regional Autonomous University of the Andes, dental teachers who teach the dentistry degree, and at the same time work in private offices, must know how exposed they are to occupational risks since 90 % of the population surveyed have probably suffered a work accident. due to inadequate handling of dental instruments or materials, this leads to the premise that the biosafety standards that are taught in a class that few teachers master, but that updates its rules and care, should be encouraged and promoted more. Students must be taught and instructed so that they minimize the risk of suffering such accidents and can prevent any injury that could cause serious injury or even death as a result of some transmission.

In the present study, a population of 44 dentists was considered; Based on the findings of the research, it is evident that 62,5 % of dentists explain that among other causes that cause accidents is lack of care, this value is comparable with the results of Garus A's, research. and cabbage,[14] in which he studied a sample of 192 Polish dentists, the same ones who explained that their injuries were caused by lack of care in 52,1 %. This is probably due to possible changes due to lack of tactile sensitivity and reuse after washing and disinfection or lack of compliance with the post-exposure protocol due to the fact that a first aid unit is not available in the event of an accident according to Bellissimo-Rodrigues W et al.[18]

In Shimoji S's studio,[19] analyzed 32 injuries to professionals, of which 23 were caused by splashes, 18,8 % of which probably involved contamination with blood or other infectious fluid expelled from the patient. Likewise, examining the data of the study carried out, the splash of fluid influences with a percentage of 15,9 %, there being a similarity between both articles, where dentists mostly suffer injury from splash, therefore there is the possibility of suffering some type of injury. infectious disease that spreads to the eyes, nose or mouth. According to Pavičin I et al,[20] The danger of these injuries increases with the lack of education regarding biosafety protocols and the years that the dentist has been practicing; 15 % of dentists have never used protective equipment.

For their part, Soares R et al.,[4] determined that needle sticks are the main object causing percutaneous injuries in dentists, which recommends complete hepatitis vaccination, and the use of safety barriers as a precautionary measure. In relation to the data analysis, Uniandes dentists point to the needle as the main object causing accidents and the majority of these have completed the hepatitis B vaccination dose, determining that both articles coincide.

Likewise, in the article by Barros Lima MA et al.,[21] they detail that the largest population of Brazilian dentists surveyed has completed the Hepatitis B vaccination by 91,4 %, while in other countries such as Germany 74 % and Thailand 68 %, in South Africa 90 % and in the United Kingdom 99,0 % and finally the United Kingdom 99,0 %, reflecting awareness among professionals and the importance of carrying out good prevention. On the other hand, in the Uniandes dentists, there is a percentage of 72,7 % with respect to the vaccination dose, having a relationship with Germany in similar percentages, determining that the majority of dental teachers have the complete regimen against hepatitis B, thus being an efficient method to reduce the risk of acquiring HBV during dental care.

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CONCLUSIONS

Biosafety protocols must be encouraged, trained and trained not only in the private consultations of each dentist, but also in the clinic where they impart their knowledge in order to collaborate in the prevention of accidents to the teachers themselves and also to their students to whom They teach their classes emphasizing the handling of sharp materials and transmission of fluids through aerosols or handpieces, which is why it is recommended to insist from the academy implementing health programs where care is indicated and biosafety issues are reinforced to maintain a safe environment before, during and after dental care, as well as comply with complete vaccination schedules, otherwise, communicate and detail the types of accidents that occur in the consultation, emphasizing prevention, promotion and therapeutic, of the same.

Conflict of interest statement
The authors declare that there are no conflicts of interest.

Author contributions

All authors participated in conceptualization, data curation, formal analysis, research, methodology, supervision, writing-original draft, writing-review and editing.

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