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REVIEW

Medical emergency at the dental office

Emergencia médica en el consultorio odontológico

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ABSTRACT

Although medical emergencies in the dental office are rare, they can pose significant risks to patients' lives. The present work was designed in order to provide a prevention protocol, early diagnosis and initial interventions to guarantee patient safety and minimize serious adverse events. For this purpose, a qualitative, descriptive and exploratory approach was used, carried out through bibliographic analysis of primary sources related to the topic. The results identified the inadequacies of the theoretical and practical training of dentists to address medical emergencies. In particular, the authors note that professionals in the field lack skills in cardiopulmonary resuscitation and basic life support. Additionally, not all offices have the equipment or medications necessary to provide first aid. For example, most dentists today do not have defibrillators or emergency medications in their offices. Under these conditions, it would be appropriate to propose a formal protocol that includes preventive measures, risk identification, continuous training and provision of resources. Therefore, it can be assumed that the regular use of the proposed programs, together with other measures for practical training, will improve the response capacity of professionals to emergencies and reduce the morbidity of incidents. Before concluding, it is necessary to point out the need for future research related to the evaluation of training programs and the requested economic analyzes to ensure that the proposed interventions are sustainable.

Keywords: Medical Emergencies; Dental Office; Prevention; Early Diagnosis; Action Protocol.

RESUMEN

Aunque las emergencias médicas en el consultorio odontológico son raras, pueden presentar riesgos significativos para la vida de los pacientes. El presente trabajo se diseñó con el fin de proporcionar un protocolo de prevención, diagnóstico temprano e intervenciones iniciales para garantizar la seguridad del paciente y minimizar eventos adversos graves. Para este propósito, se empleó un enfoque cualitativo, descriptivo y exploratorio, realizado por medio del análisis bibliográfico de las fuentes primarias relacionadas con el tema. Los resultados identificaron las insuficiencias de la formación teórica y práctica de los odontólogos para abordar las emergencias médicas. En particular, los autores señalan que los profesionales en el campo carecen de habilidades en reanimación cardiopulmonar y soporte vital básico. Además, no todos los consultorios disponen del equipo ni de los medicamentos necesarios para proporcionar primeros auxilios. Por ejemplo, la mayoría de los odontólogos actuales no tienen desfibriladores ni medicamentos de emergencia en sus consultorios. En estas condiciones, sería apropiado proponer un protocolo formal que incluya medidas preventivas, identificación del riesgo, capacitación continua y disposición de recursos. Por lo tanto, se puede suponer que el uso regular de los programas propuestos, junto con otras medidas para la capacitación práctica, mejorará la capacidad de respuesta de los profesionales a las emergencias y reducirá la morbosidad de los incidentes. Antes de finalizar, es necesario señalar la necesidad de las investigaciones futuras relacionadas con la evaluación de los programas de entrenamiento y los análisis económicos solicitados para garantizar que las intervenciones propuestas sean sostenibles.

Palabras clave: Emergencias Médicas; Consultorio Odontológico; Prevención; Diagnóstico Precoz; Protocolo de Actuación.

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INTRODUCTION

Dentists are not exempt from facing medical emergencies in their daily practice in the dental office.[1,2,3,4,5,6,7,8] These can happen to anyone, at any time and in any place, and are unpredictable events. These situations may or may not be related to pre-existing systemic diseases.

Stress, fear, and anxiety are the most relevant factors in triggering medical emergencies in the dental office, accounting for 75 % of cases.[9] Although considered rare in the literature, these situations can occur in the dental office and, when they do, can be very serious.

A medical emergency can occur during treatment and in the waiting room. As healthcare professionals, dentists must be prepared to handle these situations to avoid more significant patient life risks. According to Paguay et al.[9], a medical emergency is defined as a situation or condition with a high probability of triggering a risk of death. This underscores the importance and necessity of the dentist's intervention in these cases, through basic maneuvers to keep the patient alive until the rescue team arrives.[10]

With advances in medicine, patients with systemic diseases have achieved a better quality of life. Those who previously did not attend the dental office due to medical restrictions are increasingly concerned about their oral health, considering its importance for maintaining the individual's overall health. With this increase in demand for dental care, there has also been a growth in the number of patients with systemic conditions, including diabetes, heart disease, and hypertension, as well as an increase in the number of older people visiting dental offices. This increases the likelihood of a medical emergency occurring.[11]

Often, the onset of a medical emergency may be related to the dental environment itself, which for years was considered a traumatic experience associated with pain and discomfort. According to Saavedra[11], the stress caused by pain, anxiety, and/or tension in patients undergoing dental treatment can cause a physiological imbalance, altering blood pressure (BP). For this reason, dentists must check their patients' blood pressure at each appointment and before surgical procedures to avoid possible complications. Sánchez-Zamora[12] states that medical emergencies occur more frequently in hospital dental settings than dental offices. However, the triggering causes are similar, reinforcing the need for a complete medical history as a preventive measure. Cervantes et al.[13] demonstrated the importance of a detailed medical history during the dental consultation, indicating that 90 % of medical emergencies can be avoided with this measure. Loli Robles [14] highlighted prevention as the best way to manage medical emergencies in the dental office. To this end, a thorough physical examination and a detailed medical history, including information on the patient's current state of health, allergy history, and medication use, can help develop an appropriate treatment plan, thus minimizing potential medical emergencies arising from dental treatment. According to Cataño et al.[15], effective control of anxiety and pain during dental procedures is vitally essential in preventing urgent incidents. Despite knowing the importance of the dentist's role in first aid or basic life support (BLS), many dental students and dentists do not feel capable of performing first aid in the event of a medical emergency in their offices. This has been proven in various studies, including Romero[16], where 76,9 % of participating dentists did not feel prepared to deal with a medical emergency. This fact was also pointed out in a study conducted by Olivera et al.[17], who interviewed dental students in Peru and found that they had little knowledge of the subject. This further highlights the need for professionals to be trained in emergencies since, although considered rare in the literature, medical emergencies and deaths due to these emergencies remain a risk that professionals may face in the dental office.

Prevention

According to Rojas et al.[18], 10 % of medical emergencies during dental appointments are unavoidable. In comparison, the remaining 90 % can be prevented through a rigorous physical, emotional, and medical evaluation of the patient. The dentist's role in managing medical emergencies begins with prevention. A study conducted by Mayta[19] revealed that three-quarters of medical emergencies that occur in the dental office originate from an episode of pain or the dentist's inability to perceive and minimize patient anxiety. Therefore, prevention is based on knowledge of the patient and their limitations and on introducing modifications to treatments, if necessary.[20] Prevention, as a pillar of medical emergency management, begins when the patient enters the office, and the healthcare professional begins their physical assessment. This is followed by collecting medical history, monitoring vital signs and psychological evaluation, and determining the degree of medical risk.[21] Visual inspection is established from the first contact with the patient, assessing, for example, the coloration of the skin, lips, and eyes, as well as posture and coherence of speech. The clinician's ability to associate physical characteristics with underlying pathologies compensates, in some cases, for the patient's lack of knowledge about their actual state of health since most only go to the doctor when they have symptoms.[22] The medical history should include questions that address four categories: systemic diseases, medication, habits, and allergies.[23] This makes it possible to analyze the patient's symptoms, diagnosed conditions, and whether they follow a regular treatment regimen.

Measuring vital signs is the most practical and accurate method for determining the patient's general state of health at that moment. Monitoring vital signs not only helps the dentist diagnose an ongoing medical emergency but also allows them to identify the deterioration of critical functions before the emergency occurs.[24] In addition, vital signs provide information in acute clinical situations to assess whether the primary care provided is effective.[25] Regular blood pressure and heart rate measurements reduce the risk of cardiovascular accidents and acute events, so they should be assessed at all appointments. No less important, the patient's level of consciousness and orientation should be constantly evaluated during dental treatment, using short, simple questions and analyzing their responsiveness.[26] The assessment of the patient's psychological profile and anxiety level also allows for fundamental modifications to be made to the treatment, such as an anxiety reduction protocol. Behavioral and physiological changes, such as tachycardia, tachypnea, tremors, and pallor, are clinical signs of a fearful patient that should not be ignored. Given that approximately 30 % of the population suffers from at least one medical condition, one of the challenges for healthcare professionals is knowing how to manage a patient with multiple comorbidities. With the help of the American Society of Anesthesiologists (ASA) physical

and psychological assessment system, it is possible to determine the patient's degree of medical risk in dental consultations.[27] By gathering information that provides a comprehensive view of the patient, assessing their ability to tolerate the emotional and physical stress associated with dental treatment is possible. Thus, the dentist must change the clinical approach whenever necessary, such as implementing an anxiety reduction protocol, adjusting medications and their doses, or using a sedative method.[28]

Preparation

Preparation includes timely recognition of failures and preparation of the work team. The basic principles of preparation include theoretical and practical training for the entire team in medical emergencies, a defined protocol for action, and the availability of the necessary medications and equipment to ensure that the care provided is the most appropriate.[29]

Although the theoretical approach is crucial, practical training helps mitigate the stress associated with urgent clinical situations, reducing response time and decreasing patient morbidity and mortality.[30] In addition, the Advanced Life Support (ALS) course is the most recommended for advanced life support techniques, such as managing victims with respiratory arrest, recognizing cardiac arrhythmias, team resuscitation concepts, and administering emergency medications.[31]

Emergency equipment and medications: The availability of emergency equipment and medicines in the dental office determines the success of primary care in medical emergencies. Materials, equipment, and medications should be checked regularly to ensure that when any of these are used, removed, or expired, they are replaced immediately.[32] In this way, to safeguard the interests of patients and ensure that all entities follow the same recommendations, standards have been published on the licensing and inspection regime for dental clinics and offices.[33,34,35]

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General objective

To develop a protocol for the prevention, early diagnosis, and initial treatment of medical emergencies in dental offices, ensuring patient safety and reducing the likelihood of serious or fatal complications.

METHOD

This work is the result of a systematic and descriptive literature review.

This work is the result of a systematic and descriptive literature review. The objective was to evaluate dentists' preparedness for medical emergencies in the dental office and propose a protocol to improve prevention, early diagnosis, and initial management of such emergencies. Due to its nature, the methodology allowed for the analysis and synthesis of existing information to obtain an accurate and comprehensive picture of the entire spectrum of the issue addressed.

Type of Study

This is a qualitative, descriptive, and exploratory study. The qualitative aspects of the study allow us to explore dental professionals' experiences, perceptions, and knowledge. The descriptive nature of the survey facilitates the disclosure of existing practices and helps to formulate improvements through their description.

Finally, the study's exploratory aspect helps contextualize the data obtained and interpret it based on its relationship with other factors. For example, in this work, the results of the review of the existing literature are analyzed in the context of the pronounced lack of general preparation of dentists for medical emergencies.

Research

As mentioned above, this study is the result of a review of the literature. It consists of the following stages. First, the research problem was identified: inadequate preparation for medical emergencies in dental offices. Second, research questions were formulated to address the issue. In the case of this study, the questions raised had to do with the frequency of medical emergencies in dentistry, the degree of preparedness of dentists to deal with them, and the resources available for this task.

Third, data were collected from the sources of information indicated above. Fourth, the data obtained were analyzed, organized, and sorted based on previously defined categories. Finally, the final paper was written. Information collection was based mainly on reliable scientific databases, such as PubMed, Scopus, Scielo, Medline, and so on, which facilitated the search for peer-reviewed articles with solid evidence. In addition, the acquisition of books and manuals specializing in medical emergencies in dentistry provided a more applied perspective. However, guidance from international protocols and widely known manuals, such as those published by the American Heart Association, was also used to direct professionals on the appropriate course of action with emergency patients. Other sources include national and international legal or regulatory standards governing our study and contextually agreeing with the discussions and recommendations developed. Studies on the prevalence and management of medical emergencies also provided a clear context for the current state of professional preparedness. In addition, the health policy documents evaluated sought to assess government recommendations for managing medical emergencies in healthcare facilities.

Inclusion criteria

The information selection process for this study was based on criteria to ensure the quality and relevance of the data. Over the last ten years, studies from the literature were considered, considering recent achievements and expansion in dental and emergency medical practice. Peer-reviewed articles written in the main languages of the study, such as English, Spanish, and Portuguese, were selected. However, among the selected studies, priority was given to those that highlighted medical emergencies in dentistry, the management of patients with comorbidities, and protocols for management with specialized emergency teams. Finally, internationally recognized clinical guidelines were included, thus ensuring a solid and reliable basis for analysis and corresponding proposals.

Exclusion criteria

Articles that were not peer-reviewed or came from scientific sources were excluded, as they could have compromised the validity of the results. In addition, general studies that did not directly discuss the management of medical emergencies in dentistry or that provided outdated information were excluded. This ensured that the data used was relevant, reliable, and applicable to the purpose of the study.

Procedure

The procedure began with a literature review, which required searching electronic databases using related terms, such as the following:

- Medical emergencies in dental offices.
- Management of medical emergencies in dentistry.
- Protocol for medical emergencies in dentistry.
- Equipment and supplies for dental emergencies.
- First aid training for dentists.
- Training in basic life support techniques.
- Medical emergency preparedness in dental clinics.
- Medical risk, assessment, and measurement in dental patients.
- Patients with comorbidities in dentistry.

Search equation

(“medical emergencies” OR “medical emergencies”) AND (“dentistry” OR “dental office”) AND (“management” OR “protocol” OR “prevention”) AND (“medical equipment” OR “emergency medications”) AND (“training” OR “education” OR “cardiopulmonary resuscitation”)

((“medical emergencies”[MeSH Terms] OR “emergency treatment”[MeSH Terms]) AND (“dentistry”[MeSH Terms] OR “dental office”[MeSH Terms])) AND (“training”[MeSH Terms] OR “CPR”[MeSH Terms])

This initial search yielded a broad list of publications, which was then filtered according to the inclusion and exclusion criteria. The selected articles underwent a special critical analysis, which included their main conclusions, relevance to the topic, and methodology used.

In addition, preference was given to articles that included statistics, management protocols, and recommendations. Based on the critical results, the findings were summarized in all thematic categories, including the prevalence of emergencies, adequate preparation, and necessary resources.

Finally, based on the results, a special protocol was created for the dental office context, including the most common practices, available equipment, and necessary skills for this type of medical care.

DISCUSSION

The discussion of this study’s results has revealed critical information about dentists’ preparedness and capacity to deal with medical emergencies in the dental office.[42,43,44] The results show that situational resources are characterized by several deficiencies in training, equipment, and protocols for action. In this regard, these data underscore the need for a more comprehensive and structured approach to preventing, detecting, and managing critical situations in the dental office to help specialists deal with them.[45,46,47]

According to the literature review’s references, most potential emergencies can be prevented by taking a complete medical history and thoroughly assessing the patient’s physical and emotional state.[48,49] The most cited references emphasize the importance of existing systemic diseases, medication use, known allergic reactions, and medical history. In addition, 75 % of cases are considered a stress response, as stress, anxiety, and fear during dental treatment are the most frequent causes.[50]

Therefore, prevention can be considered the identification and mitigation of these risk factors from the moment of contact with the patient.[51,52] According one study et al, monitoring and measuring blood pressure, pulse, respiratory rate, and psycho-emotional state will be helpful. This will not only prevent problems today but will also help with interventions and uncertainties in the future.[50]

However, many dentists consider the fear of not being sufficiently prepared to help patients cope with medical emergencies.[51,52] According to the literature, this is due to a lack of practice and regular training in cardiopulmonary resuscitation and basic life support.[55,56]

Ramírez and Roncancio56 considered the problem and insisted that professional training should include training and simulation programs to increase confidence and practical skills.[57,58]

Another aspect that confirmed the lack of preparation in many PHC clinics was the availability and maintenance of medical

equipment and medications. For example, automatic defibrillators, oxygen, airway kits, and specific drugs, such as adrenaline or antihistamines, are vital for effectively managing critical situations.[59,60]

Most clinics lack these resources and do not conduct regular inspections to ensure everything is working correctly. Subsequently, the lack of structural preparedness may constitute an additional risk, particularly in regions with limited access to emergency medical services.[61]

The most common emergencies reported in the literature are syncope, hypoglycemia, seizure crises, hypertensive crises, and cardiorespiratory arrest. For each of these examples, there must be a protocol for care based on immediate and effective interventions that can save the survivor's life. Syncope is the most common emergency that must be treated. In this case, knowing what to do means positioning the survivor supine with their legs raised, which helps restore venous pressure and ensures brain oxygenation.[62]

In mild cases of hypoglycemia, fast-acting carbohydrates are vital, but in severe cases, intravenous glucose is required to stabilize the patient. Interventions are aimed at protecting the patient from injury in seizures, but vital signs must be monitored, and anticonvulsants must be prepared in case of prolonged exposure.

In contrast, hypertensive crises must be monitored in all clinics, and early warning is important so that hypertensive patients can be prepared. In the event of a severe crisis, interventions are strictly dedicated to stabilizing the patient and do not involve anything more than sending for professional medical assistance if this cannot be achieved.[63,64]

Although less common, cardiac arrest represents a critical emergency that requires the immediate application of CPR. Implementing the protocol has proven to be an effective strategy for increasing survival rates. However, this type of intervention requires advanced practical training, which is not always part of dentists' education and training.[65,66]

Likewise, at the global level, implementing structured protocols and ongoing training in medical emergencies has positively reduced complications. Approaches such as the use of practical simulations and advanced life support training stand out, which have strengthened the preparedness of health professionals in other countries and could serve as a model for improving training in the local dental field.[67]

On the other hand, standardized protocols were also a standard recommendation in the literature consulted. An efficient protocol should include preventive measures, risk assessment, guidelines for action in specific emergencies, regular training of clinical staff, and the availability of adequate resources. Training in stress and anxiety management techniques for patients is also emphasized, as these can reduce the risk of emotional emergencies. Therefore, implementing such strategies will not only increase patient safety but also enhance professional confidence and the quality of dental care.[68]

One way to close the gaps identified would be to develop practical training programs, followed by numerous emergency simulations and frequent practice of the techniques. Putting on protective equipment and simulating cardiac arrest or syncope is only a first step. Another crucial point is adopting regulatory standards requiring dental offices to meet minimum preparedness requirements.

Overall, the work provides a solid foundation for future research and improvements. It highlights the relevance of a comprehensive approach to emergency preparedness training in dentistry. Thanks to safe and well-developed practices, this will ensure that professionals can respond appropriately to emergencies and anticipate them in the first place.

CONCLUSIONS

As the research progressed, it was concluded that although medical emergencies in dental offices are rare, they remain a significant challenge for healthcare providers. Prevention, early diagnosis, and immediate treatment remain the cornerstones of patient safety and can minimize the risk of serious or life-threatening complications.

The main conclusion is that, for the procedures mentioned, most emergencies can be avoided by taking a complete medical history, monitoring symptoms and analyzing indicators, and identifying risk factors based on systemic diseases, anxiety, or medications. It should be noted that controlling stress or anxiety is critical to reducing the likelihood of adverse events.

Therefore, it is essential that dentists conduct regular emergency drills and simulations. The accurate data collected from this research shows that in most cases, healthcare providers did not have sufficient skills, were unsure how to proceed in such situations, and were unfamiliar with CPR and BLS techniques.

With regard to devices, it was also possible to establish that many advances do not include crucial equipment, such as oxygen or emergency medications, which jeopardizes the quality of first aid. Regulations need to be enacted to require offices to have the essential resources mentioned above. Overall, creating and implementing a standardized protocol for the prevention, diagnosis, and initial care of patients during medical emergencies is crucial and should include preventive measures, instructions for BLS measures, and the provision of a trained clinical team.

Indeed, research shows that although medical emergencies in dental offices are rare, they remain a challenge for healthcare providers. Prevention, diagnosis, and treatment remain the cornerstones of patient safety, reducing the risk of serious and life-threatening complications, and most emergencies during the procedures above can be avoided.

What's more, data analysis has shown that controlling patients' stress and anxiety is critical, as it reduces the likelihood of adverse events during dental treatment. So, it's essential to keep practicing and treating emergencies because, more importantly, the data collected showed that healthcare providers weren't familiar with BLS and CPR.

When evaluating the devices, it can also be established that dental offices rarely contain essential devices. This deficiency makes it impossible to provide high-quality medical care, so regulations should be enacted to require offices to have all necessary supplies and devices.

In general, it should be emphasized that, for this study, the creation and implementation of a standardized protocol for prevention,

treatment, and immediate diagnosis are crucial and must be implemented through preventive measures, instructions for BLS measures, and training of clinical staff, as well as regular audits of available devices and resources.

Regarding the specific objectives, the study showed that dentists had limited theoretical knowledge and insufficient practical skills to handle medical emergencies. Hence, the dental education curriculum needs to be reformated to include emergency management training.

Regarding the second objective, preparation in CPR and advanced airway management techniques was low. The lack of regular training and practical simulations could explain this finding, highlighting the need to include mandatory CPR training and certification in dental education.

Regarding identifying the need for emergency equipment and medications in dental offices, the findings showed limited availability of essential emergency equipment and medicines, posing a risk to patients and necessitating the implementation of control and maintenance regulations.

The hypothesis was that developing and implementing a medical emergency preparedness and management protocol, continuing education for dentists in emergency management, and adequate availability of emergency surgical equipment would significantly reduce major complications and enable professionals to advance.

The findings confirm the hypothesis. The analysis and literature review supports the idea that continuing education, practical training, and the availability of emergency equipment are crucial factors in improving dentists' preparedness for critical situations. In addition, using a standardized protocol allows professionals to prevent or act quickly during an incident, minimizing associated morbidity and mortality.

Overall, the proposed protocol proves satisfactory in terms of meeting the highlighted needs, which means that it can be concluded that they correspond to reality. The protocol's use is precisely necessary for this, so compliance with the findings can also be considered confirmed. Consequently, the present hypothesis is well demonstrated.

To conclude, the proposed protocol meets the needs highlighted in the analysis. On the one hand, it is understood that it leads to a structured and appropriate approach that can improve the response capacity to medical emergencies in the dental office. At the same time, it can be used in practice, which is a serious step towards improving the quality and safety of dental care.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: Maria Belen Cardoso, Maria Isabel Brusca, Sergio Dario Verdu, Virginia Jewtuchowicz.
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