



Clinical and Epidemiological Insights into Syncope in Dental Offices in Saudi Arabia

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Abstract

Dental practitioners frequently encounter medical emergencies, some of which pose significant threats to patient safety and well-being such as syncope, a sudden temporary loss of consciousness due to decreased blood flow to the brain. This review explores the literature regarding the incidence, causes, and awareness of syncope attacks in dental practices in Saudi Arabia. Syncope, primarily caused by cerebral hypoperfusion, lasts for an average of 12 seconds and has a lifetime prevalence of 42%, with an annual incidence of 6%. Syncope frequency varies with age, from 15% in individuals under 18 to 39% in medical students, and 23% in the elderly. The annual incidence in the general population ranges from 18.1 to 39.7 per 1000 patients with the highest prevalence in individuals aged 10-30 years mainly due to vasovagal attacks. Syncope accounts for 3-5% of emergency department visits, with a 40% hospitalisation rate and an average stay of 5.5 days. The recurrence rate is about 35%, with significant physical injury occurring in 29% of cases. The aetiology of syncope includes vasovagal, cardiac, orthostatic hypotension, neurological, endocrine, and psychiatric causes, therefore recognising and understanding these causes is essential for effective management and prevention, especially in dental settings where severe dental pain or anxiety can trigger syncopic episodes. Studies in Saudi Arabia reveal significant regional variations in syncope incidence, emphasising the need for preparedness and continuous education among dental practitioners.

Keywords: Syncope; Dental Office; Medical Emergency; Saudi

Introduction

Dental practitioners frequently encounter medical emergencies, some of which pose significant threats to patient safety and well-being [1]. This concern is heightened by the high prevalence of dental abnormalities, soft tissue pathologies, and occlusion disorders among dental patients [2]. Syncope, commonly referred to as fainting, is one such emergency [3] characterised by a sudden, temporary loss of consciousness, typically resulting from a decrease in blood flow to the brain [4]. It is a significant concern due to its potential to occur during dental procedures, posing risks to patient safety and complicating treatment. However, dental professionals can better manage syncope and ensure patient safety during dental procedures by understanding the causes and improving emergency response protocols. This review explores the relevant literature regarding the incidence, causes, and awareness of syncope attacks in dental practices in Saudi Arabia.

Syncope Epidemiology

Syncope is primarily caused by cerebral hypoperfusion and typically lasts for an average of 12 seconds [5]. The lifetime prevalence of syncope is estimated to be 42% assuming a lifespan of 70 years, with an annual incidence rate of 6% [6-9]. The frequency of syncope varies with age, ranging from 15% in individuals under 18 years of age to 39% among medical students [10,11] and reaching 23% in the elderly [4]. In the general population, the annual incidence of syncope episodes is between 18.1 and 39.7 per 1000 patients, with a similar incidence observed between genders and the highest prevalence is between the ages of 10 and 30 years, predominantly due to vasovagal attacks [8,9]. The initial report on syncope incidence indicated a rate of 6.2 episodes per 1000 persons a year [12,13] but there is a notable increase in the incidence after the age of 70, with rates of 5.7 episodes per 1000 individuals per year

between the ages of 60 and 69, and 11.1 episodes per 1000 individuals per year between the ages of 70 and 79 [6]. For individuals aged 80 and above, the annual incidence may reach as high as 19.5 per 1000 individuals [8,9].

Syncope accounts for approximately 3-5% of emergency department visits, with a hospitalization rate of about 40% of cases and an average hospital stay of 5.5 days [7]. The condition has a recurrence rate of approximately 35%, with 29% of patients experiencing physical injury and 4.7% sustaining major trauma [13]. In elderly patients with syncope, the prevalence of trauma can reach 43% due to carotid sinus hypersensitivity [12,13]. Beyond the morbidity associated with syncope, there is a significant social impact, including a decline in the quality of life and economic burden with higher costs attributed to hospitalisation.

Aetiology of syncope

The aetiology of syncope is multifactorial encompassing a range of physiological and pathological conditions [14-16]. with the most frequent cause being vasovagal attacks, also known as neurocardiogenic syncope which is triggered by a reflex mechanism involving the autonomic nervous system [17-20]. This type of syncope is often precipitated by emotional stress, pain, or prolonged standing, leading to a sudden drop in heart rate and blood pressure, resulting in decreased cerebral perfusion [14,17,18]. The prevalence and patterns of common chief complaints among patients in dental clinics in Saudi Arabia revealed that dental pain and routine check-ups were frequent issues [2,21]. However, syncope often triggered by severe dental pain or anxiety, poses a significant risk during dental procedures, necessitating careful management and monitoring to ensure patient safety.

Cardiac syncope, another significant cause, arises from structural heart diseases, arrhythmias, or other cardiac conditions that impair the heart's ability to maintain adequate blood flow [22]. Conditions such as bradyarrhythmias, tachyarrhythmias, and structural abnormalities like aortic stenosis or hypertrophic cardiomyopathy are common cardiac aetiologies [22]. Orthostatic hypotension, a condition where blood pressure drops significantly upon standing, can also lead to syncope [23] and is often observed in patients with autonomic dysfunction, dehydration, or those taking certain medications [23-25]. Neurological causes of syncope include cerebrovascular diseases such as transient ischemic attacks or strokes and conditions like subclavian steal syndrome where blood flow is diverted from the brain to the arm due to a stenosis or occlusion in the subclavian artery [26]. Additionally, syncope can result from endocrine disorders such as hypoglycemia or adrenal insufficiency, and psychiatric conditions, including anxiety and panic disorders [26].

Understanding the diverse aetiologies of syncope is crucial for accurate diagnosis and effective management. Furthermore, dental practitioners must recognise the clinical manifestations of syncope and understand its underlying causes to effectively manage and prevent such emergencies in their clinics.

Clinical Manifestation of Syncope in Dental Clinics

The clinical manifestation of syncope in dental settings is characterised by a series of distinct phases and symptoms that can be identified and managed by dental practitioners [27-29]. The initial phase, known as pre-syncope, involves prodromal symptoms that serve as warning signs of an impending syncopic episode [30,31]. Patients may experience a warm feeling in the face and neck, pale or ashen colouration, sweating, a feeling of coldness, abdominal discomfort, light-headedness, dizziness, mydriasis (pupillary dilation), yawning, and an increased heart rate [30,31] indicative of the body's response to stress and subsequent decrease in cerebral blood flow. During the syncope phase, the patient loses consciousness and exhibits generalised muscle relaxation marked by a sudden fall in blood pressure and a slowing of the heart rate, known as bradycardia [32,33]. The patient may also exhibit seizure-like movements such as twitching of the hands, legs, and face, and their eyes may remain open with an upward gaze [27,28]. These clinical signs are the result of a transient decrease in cerebral perfusion, leading to a temporary loss of consciousness.

The final phase, post-syncope, involves the recovery of consciousness and the return of normal physiological functions [27,28]. Patients may experience a variable period of mental confusion, an increase in heart rate to a strong and regular rhythm, and the normalization of blood pressure levels [27,28]. Dental practitioners must monitor patients closely during this phase to ensure a complete recovery and to provide appropriate care if any complications arise.

Epidemiological Insights into Syncope in Dental Clinics in Saudi Arabia

Table 1 shows the characteristics of retrospective observational and cross-sectional studies on syncope conducted in six cities in Saudi Arabia: Jeddah, Ha'il, Makkah, Riyadh, and the Eastern Province. These studies collectively provide a comprehensive understanding of the incidence, causes, and awareness of syncope in dental settings across different regions of Saudi Arabia, highlighting the importance of preparedness and continuous education for dental practitioners. (Table 1)

Study	Year	City	Objective	Methodology	Key Findings
Al-Sebaei MO	2024	Jeddah	To determine the frequency and features of medical emergencies in a dental hospital	Retrospective observational study over 14 years	17.4 medical emergencies per 100,000 patients, with syncope being a common emergency
Elnaem IS, Alghris AM, Alenzi LH, Alshammari HA, Alanazi RB	2024	Ha'il	To assess the knowledge and practices of medical and dental students regarding medical emergencies	Cross-sectional study	Most students were aware of the basic management of syncope but gaps in practical skills and confidence were noted
Aljuwaybiri R, Almekhlafi FA, Alzahrani RM, <i>et al.</i>	2023	Makkah	To assess the knowledge and awareness of syncope among the general population	Cross-sectional study	General awareness of syncope was present but there were significant gaps in knowledge regarding its causes and management
Braimah R, Ali- Alsuliman D, Taiwo A., <i>et al.</i>	2022	Riyadh	To report medical emergencies during Exodontia in a referral dental centre	Cross-sectional study	Syncope was one of the most common emergencies encountered during tooth extractions
Sheikho MA, Alyahya FH, Alzahrani FA	2018	Riyadh	To assess the awareness and knowledge of medical emergencies in dental clinics	Cross-sectional study	Less than half of practitioners routinely checked vital signs before surgical extractions and only 46.4% experienced a medical emergency during their career
Alhamad M, Alnahwi T, Alshayeb H., <i>et al.</i>	2015	Eastern Province	To report the prevalence of medical emergencies in dental clinics	Cross-sectional study	Vasovagal syncope was the most frequently reported medical emergency, experienced by 53.1% of dentists surveyed

Table 1: Characteristics of studies on syncope in dental clinics in Saudi Arabia.

Incidence of syncope in Saudi Arabia

The incidence of syncope in dental practices in Saudi Arabia has been documented in several studies, indicating that syncope is a significant concern across different regions of Saudi Arabia (Table 2). Al-Sebaei (2024) conducted a 14-year retrospective observational study at the King Abdulaziz University Dental Hospital, reporting an incidence of 17.4 medical emergency events per 100,000 patients, with syncope being one of the most common emergencies encountered. Similarly, Alhamad et al. (2015) found that vasovagal syncope was the most frequently reported medical emergency in dental clinics in the Eastern Province of Saudi Arabia, experienced by 53.1% of the dentists surveyed.

Causes of syncope in Saudi Arabia

The causes of syncope in dental offices are multifactorial, often involving a combination of physiological and psychological factors. Anxiety is a predominant trigger, as the anticipation of pain or discomfort during dental procedures can lead to a vasovagal response, resulting in syncope. Alhamad., *et al.* (2015) highlighted that anxiety and fear were major contributing factors to syncope

episodes in dental clinics. Additionally, the administration of local anaesthesia, prolonged periods in a supine position, and underlying medical conditions such as hypoglycemia or cardiovascular issues were identified as other contributing factors. Understanding these causes is crucial for developing preventive strategies and ensuring patient safety during dental treatments.

Awareness and preparedness among dental practitioners in Saudi Arabia

Awareness and preparedness among dental practitioners regarding syncope and other medical emergencies are essential for effective management. Elnaem., *et al.* (2024) assessed the knowledge and practices of medical and dental students at the University of Ha'il, Saudi Arabia, revealing that while most students were aware of the basic management of syncope, there were gaps in their practical skills and confidence in handling such emergencies. Similarly, Sheikho., *et al.* (2018) found that less than half of the dental practitioners routinely checked vital signs before surgical extractions and only 46.4% experienced a medical emergency

Incidence	Causes	References
17.4 medical emergency events per 100,000 patients	Anxiety Local anesthesia Prolonged supine position Underlying medical conditions (e.g., hypoglycemia, cardiovascular issues)	Al-Sebaei MO
Vasovagal syncope experienced by 53.1% of dentists surveyed	Anxiety Fear Local anesthesia	Alhamad M, Alnahwi T, Alshayeb H., <i>et al.</i>
Not specified	Lack of practical skills and confidence in handling emergencies	Elnaem IS, Alghris AM, Alenzi LH, Alshammari HA, Alanazi RB
Not specified	Syncope during tooth extractions	Braimah R, Ali-Alsuliman D, Taiwo A., <i>et al.</i>
Not specified	General lack of knowledge regarding causes and management of syncope	Aljuwaybiri R, Almekhlafi FA, Alzahrani RM., <i>et al.</i>
Less than half of practitioners routinely checked vital signs	Lack of routine checks of vital signs Lack of experience with medical emergencies	Sheikho MA, Alyahya FH, Alzahrani FA

Table 2: Incidence and causes of syncope in dental practices in Saudi Arabia.

during their career. These findings underscore the importance of continuous education and training for dental professionals to enhance their competence in handling medical emergencies. A cross-sectional study by Braimah, *et al.* (2022) focused on medical emergencies during exodontia in a referral dental centre in Saudi Arabia, [34] reporting that syncope was one of the most common emergencies encountered during tooth extractions, highlighting the need for dental practitioners to be well-prepared to manage such situations [34]. Furthermore, Aljuwaybiri, *et al.* (2023) conducted a study on the knowledge and awareness of syncope among the general population in the Makkah region of Saudi Arabia, [35] finding that while there was a general awareness of syncope, there were significant knowledge gaps regarding its causes and management. These findings suggest that public education campaigns may be beneficial in improving awareness and preparedness for syncope in dental settings.

Public awareness of syncope in Saudi Arabia

A cross-sectional study by Aljuwaybiri, *et al.* (2023) focused on the knowledge and awareness of syncope among the general population in the Makkah region of Saudi Arabia [35], reporting that while there was a general awareness of syncope, there were significant knowledge gaps regarding its causes and management [35]. This suggests that public education campaigns may be beneficial in improving awareness and preparedness for syncope in dental settings.

Conclusion

The incidence of syncope in dental practices in Saudi Arabia is a notable concern, with anxiety and other factors contributing to its occurrence. Despite the relatively low frequency of such events, the potential risks necessitate a high level of awareness and preparedness among dental practitioners. Dental professionals can better manage syncope and ensure patient safety during dental procedures by understanding the causes and improving emergency response protocols. Further research and training initiatives are recommended to address the gaps in knowledge and preparedness identified in recent studies.

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Conflicts of Interest

The authors declare no conflict of interest.

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