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Dental hygienist in Qatar: Review and challenges

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Abstract

Bachelor's and diploma dental hygienists' practices vary in different countries regarding education duration, the scope of practice, salary, and challenges. The present review article aims to posit a comparison of the dental hygiene profession in Qatar and other world's countries as US, UK, Europe, Australia, Asia, and GCC countries; to identify the challenges and gaps of dental hygiene in the dental hygiene field in Qatar, and to set suggestions for dental hygienists' associations worldwide to resolve the present challenges that dental hygienists face.

The review used various articles to explore the history of dental hygienists and compare the profession in different countries. The study adopted the scholarly publications that the researchers obtained from academic databases, including PubMed, Google Scholar, Science Direct, published theses and dissertations, a popular news article, the trade sources commonly referred to as the trade publications, and government documents.

The findings suggest that lower salaries and limited scope of work are eminent in Asia and GCC countries. European countries have different legislation for dental hygienists, making their scope of work limited to the country where the professionals study. This review also suggests the high level of stress, burnout, and musculoskeletal disorders among dental hygienist professions in most countries. We recommend resolving the dental hygienists' challenges by increasing awareness among the dentists, medical professions, and general public, standardizing their scope of practice, assigning those assistants, and giving those technologies to simplify their work.

Keywords: Dental Hygiene; Oral Health; Qatar; Dental Practice

1. Introduction

Researchers worldwide have demonstrated varying oral health behaviours based on cultural values, lifestyles, and norms. Oral health behaviours entail people's responses, habits, and attitudes towards dental hygiene that predict dental diseases' prevalence rate, such as periapical, periodontal, and gingivitis diseases [1]. In the Middle East countries, traditional methods based on miswak have heavily influenced people. However, the ways are rapidly changing, with

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most people or the Arabs now using conventional toothpaste and toothbrushes for dental hygiene [2]. Recent evidence illustrates that the main work of dental hygienists is to provide dental health services, including radiography, provision of dental education, dental prophylaxis, and dental medications. The dental hygienists also work in public health, research, academia, and industry to provide dental hygiene programs to support oral hygiene [3]. These dental hygiene programs aim to educate or train and graduate professional dental hygienists who provided oral services for citizens. Besides, the programs educate dental hygienists on oral health behaviours, including the need for people to visit dental clinics and improve their oral cleaning practices [1]. The primary aim of the article is to provide an overview dental hygiene profession in various countries, with synopsis of the circumstances in Qatar. The article is organized by themed sections, including the history of dental hygienists, the difference between a diploma and Bachelor's dental hygiene programs in the USA, UK, Australia, and GCC countries, and scope of practice of dental hygienists globally. The article is also structured by themed subsections of challenges faced by a dental hygienist in work and gaps in dental hygiene practices in Qatar.

2. Methodology

2.1. History of Dental Hygienists

The evolution of dental hygiene dates back to more than 100 years and continues to grow. Oral health experts witnessed the inception of dental hygiene following the opening of the first school of dental hygiene in 1907 by Dr Alfred C. Fones, who developed the concept of dental hygienists in Connecticut [4]. Dr Alfred Fones introduced the idea to provide better insights on the benefits of oral care in reducing pathogens, mainly the bacteria that cause dental caries [4]. Dr Alfred employed Irene Newman, the first dental hygienist and trained her to carry out dental prophylaxis among patients within his facility [5]. Irene Newman became the first to perform dental hygiene tasks in the clinical setting, which led to establishing the first dental hygiene program in 1913 by Dr Fones in Bridgeport, Connecticut [5]. The first graduates to complete the first dental hygiene programs in Connecticut graduated in 1914 and were hired in school-based settings to guide and encourage oral care behaviors among children [5]. In 1917, Irene Newman was the first to be licensed as a dental hygienist, and within three years, six states introduced dental hygiene programs and licensed their dental hygienists. In 1923, The American Dental Hygienists' Association (ADHA) was developed and was comprised of 46 members that supported the growth of the dental hygienist profession [6]. Between 1935 and 1940, there was the rapid spread of dental hygienist programs worldwide following the implementation of program admissions and requirements by the ADHA. During this time, a high school diploma in dental hygiene was compulsory for licensure, and the licensing board needed a two-year course for a person to be licensed as a dental hygienist [5]. This led to the implementation of Registered Dental Hygienist by the ADHA, and the first regional board examination was delivered in 1968. In the 1970s, guidelines to continue dental hygiene education was established by the ADHA. By the 1980s, there was a transformation in the hygiene industry when Washington turned to be the leading state to adopt unsupervised dental hygiene practice in specific facilities. This encouraged other states, including Colorado, to follow similar initiatives. In the 1990s, 14 states allowed licensed dental hygienists to provide local anesthesia [6]. By the year 2000, more than half of the 50 states that had introduced and implemented dental hygiene programs allowed the administration of local anesthesia, which was mainly provided by the registered or licensed dental hygienist [5]. From 2002 through 2009, several dental hygienist programs had been developed that focused on esthetic services, including whitening products and veneers, latex and nonlatex products, dentinal hypersensitivity, and more private settings that provided digital radiography were opened [7]. From 2010 to its current status, dental hygienists have the necessary expertise, and they offer treatment options to patients. They have more treatment options, including surgical and nonsurgical techniques, mainly for periodontal therapy.

Moreover, the current dental hygienists can practice different dental hygiene functions, including surgical periodontal treatment [6]. In GCC countries, especially in Qatar, there was no college/ university with DH course in Qatar, so a student had to go abroad for the degree. Dr. Najat Alyafei is the first Qatari dental hygienist graduated from abroad in 1992. Alyafei have been awarded her PhD in 2021. She is considered as the first women in the country to improve dental hygiene. There were no more dental hygienists graduated since that time. Recently, a new dental hygiene program is available in Qatar, but still with few graduation and no citizen yet.

2.2. History of Dental Hygiene in Qatar

The first dental hygiene program in Qatar dates to 2014 when the College of North Atlantic (CNA-Q) introduced a 3-year diploma program. The program's introduction was based on the decisions made by the local advisory committee, which accepted the need for well-trained dental hygienists in Qatar. The committee found the need to enroll candidates on the program by combining clinical practice and classroom education. In 2016, there were three well-trained dental hygiene graduates in Qatar where two graduates were working at the Hamad Medical Corporation. Currently, there are

approximately 20 dental hygiene graduates in Qatar [8] as shown in table [1], with the majorities working in Primary Health Care Cooperation (PHCC). Dental hygienists hired by PHCC work on a particular Asnani School Oral Health Program, Led by the Dr. Najat Alyafei, that focuses on visiting public schools, educating oral hygiene, conducting oral screenings, recording oral health findings, and educating school children on the application of fluoride and future use of sealants in addition to the dental hygiene work in assigned health center. There is also a plan to introduce a bachelor's degree in the dental hygiene profession in the future, as announced by CNA-Q on 18 April 2021 will establish in September 2021. The total number of licensed Dental Hygienists who work in private sector are not published by QCHP of the Ministry of Health (MOPH).

Table 1 History of Dental Hygienist graduated from CNA-Q (2015-2019) [7]

Academic Year				
2015- 2016	2016-2017	2017-2018	2018-2019	Total
3	9	1	7	20

2.3. Difference between Diploma & Bachelor Dental Hygienist

Diploma and bachelor dental hygienists differ in terms of certification [8], type of work, and salary. Generally, a diploma in dental hygienist is a 2-year graduate-level program in which candidates pursue after they complete and pass the intermediate examination [9]. On the other hand, a bachelor's degree in dental hygienist is a four-year program that allows the candidates to work in schools, nursing homes, public health, and other places with populations that need preventive dental care services as it's shown in table [2] for the course duration in different countries.

Table 2 The difference in Dental Hygienists' Course Duration and Process Internationally

Country	**Course duration and processes**
United States	2 years to complete Associate degrees. Or for Baccalaureate degree programs require their applicants to have completed two years in college before being enrolled in the dental hygiene program [19].
United Kingdom	2 years for Diploma in Dental Or 27 months' full-time course for a Diploma in Dental Hygiene and Therapy. Or 3 years for taking a degree in Oral Health Sciences [20].
Europe	All European countries require a dental hygienist to have pursued a diploma for an entire three-year period [21].
Australia	2-years Advanced Diploma of Dental Hygiene or 3 years BSc [22].
Asia	2-year-period program in India [23]. A 3-year vocational school program or a 4-year-BSc in Japan [24].
Qatar	3- Years for BSc will start September 2021 [25].
Saudi Arabia	Same as Qatar.
UAE	A professional license requires a person to have completed a 2-year diploma or a 3-year BSc [26].
Bahrain	3-years for Associate diploma.
Kuwait & Jordan	Same as Qatar

A bachelor dental hygienist focuses on examining and providing treatment to patients with different types of oral disease, including gingivitis [10]. Professionals with a bachelor's degree in dental hygiene have expanded clinical abilities and provide preventive care, such as oral hygiene, training and educating patients on dental health and oral health behaviours, and engaging in dental hygiene research. The professionals are highly certified and provide high-standard oral care services because they are more trained than those in diploma courses [11].

In terms of salary, diploma dental hygienists receive a lower wage than those with a bachelor's degree. Based on the data presented by the Bureau of Labor Statistics, it is evident that a diploma dental hygienist is paid around $70,711 - $76,382 per year with approximately $37.06 per hour.

On the other hand, a bachelor dental hygienist receives annual pay of between $71 602-$77 155 [12]. Differences between diploma and bachelor dental hygienists vary according to states. The comparison of the dental hygienists' salary in different countries is as shown in Table [3].

2.4. Gaps in Dental Hygiene Practices in Qatar

Self-care of people with dental problems is a severe public health problem, especially in the Middle East region. Most people understand the importance of maintaining dental hygiene for optimal oral health that focuses on promoting healthy and painless teeth by seeking professional help and information from wealthy and educated people [33]. Dental professionals, including dental hygienists, have a crucial role in oral health development. They collaborate with dental health organizations, including schools to promote dental services on-site, support healthy food, and provide dental hygiene plans [34]. Several countries have come up with dental health plans and dental professionals, including dental hygienists and dental specialists who have a crucial role in improving oral hygiene levels through educational services. An example of such countries is Qatar, where dental hygiene has been the public concern to reduce caries. A recent scientific publication affirms that due to the increasing dental problems, including periodontal diseases, gingivitis, periapical abscesses, and periodontal abscesses, dental hygienists are indispensable to provide dental health education to the whole population regarding preventive care of such infections [35]. Despite the availability of dental hygienists in Qatar, traditional cleaning methods remain the main approaches to dental hygiene. It has also been pointed out that people in Qatar mainly used traditional cleaning methods with the use of miswak to maintain dental hygiene. The main reason for using such methods was a lack of knowledge and skills about dental cleaning, dental appointments, and dental treatments [1]. This was the main gap in dental hygiene witnessed in Qatar. Some people in Qatar have a lower level for dental hygiene, with most of them using home remedies to clean their teeth [33]. People with low education levels of dental hygiene prefer using home remedies for dental cleaning, avoid visits to dental clinics and dental appointments, and had less frequency of brushing their teeth. This shows that some people in Qatar have less knowledge; hence there is a need for dental hygiene strategies such as awareness programs and educational strategies to improve people's knowledge and awareness about dental hygiene [35]. Another study showed dental hygiene and dental health in Qatar are below the satisfactory level. The study revealed that most schoolchildren lack enough knowledge about dental hygiene and dental health, which might have led to increased dental health problems [34]. The study showed that school children have insufficient dental hygiene knowledge, including brushing teeth after each meal, dental flossing, and dental visits.

Further, the study showed that a more significant majority of children in Qatar had no awareness about the cariogenic impacts of using sweetened meals, soft drinks, and the use of fluoride. These school children also demonstrated a lack of knowledge and awareness about dental plaque and had no dental health information on oral hygiene [34]. Besides, most women in Qatar lack awareness about dental hygiene, which has increased the incidences of poor dental status. Cheema et al. conducted a national survey of adult Qatari men and women aged between 18 and 64 years to determine dental health conditions and factors related to poor oral health status in the national population [36]. The study revealed that women who were less educated had poor dental health status and had poor dental health behaviours in terms of dental flossing, tooth brushing, and use of miswak to maintain oral or dental hygiene [36]. From the findings, it is evident that lack of knowledge and awareness is the main gap in dental hygiene, making oral health a public health issue in Qatar.

Similarly, there are existing gaps in terms of clinical services that dental hygienists provide in Qatar. Based on dental services, dental hygienists do not offer local anesthesia without permission from dentists. Also, they cannot take radiographs for diagnosis of dental diseases. Suppose the patient reports pain during polishing and scaling; the dental hygienist's orders an x-ray picture to examine whether the patient has interproximal caries or root caries. The dental hygienists working in the PHCC are not eligible to refer the patients directly to dental specialists like endodontists or orthodontists. Refer the patient to endodontic dentists and orthodontic dentists. Instead, they need to refer the patient to general dentists to review such cases and decide their eligibility for referral to specialists. There is also a lack of

support from dental assistants in Qatar. In most sectors in Qatar, the dental assistants are not allowed to work with the dental hygienists but offer their support to dentists.

2.5. Challenges Faced by Dental Hygienists in Work

Dental hygienists have a crucial role in oral health prevention. These dental professionals have competencies in disease prevention and promotion of oral health; hence they provide preventive programs aimed to promote oral health. Being the integrated part of the dental practice, dental hygienists perform several daily procedures like other professionals [37]. As such, these dental professionals have face issues and challenges that mainly come with their profession. Table [4] showed a comparison of challenges faced by Dental Hygienists internationally.

The main challenge the dental hygienist faces in work is job-related stress. Evidence illustrates that dental hygienists have a lot of work. For instance, during the regular visits of patients with oral or dental problems, the professionals usually take the patient's vitals, discuss the patient medical history and related concerns, and perform some examinations, including X-rays and clean patients' teeth [37]. The professionals also use much time to examine the health of patients'' gums and abnormalities that exist. Given the time to attend to each patient, dental hygienists conduct their activities quickly, which creates time problems, leading to job stress. The stress is exacerbated when there are no proper dental devices to use, such as the tools to position patients when providing the needed care and treatment [37].

Similarly, one study found that approximately 13% of dental hygienists are emotionally exhausted during their clinical practice due to work-related stress [31]. The study revealed that the professionals feel emotionally drained from work due to long working hours, lack of support or assistance, balancing between work and personal or private life, and lack of employer encouragement during work. Gorter thus recommended the need to improve a healthy lifestyle in the workplace and time management at work to reduce burnout for dental hygienists [31]. In terms of employer encouragement, most dental hygienists experience a lack of respect, appreciation, and poor collaboration from their employers, which negatively affect their retention [36].

There are also communication challenges that dental hygienists face in work due to language barriers that negatively affect health care and contribute to poor health outcomes. It has been found that dental hygienists find difficulties in interacting with the patient during care delivery and treatment due to language barriers. This is because the patient may be speaking a different language. Consequently, using a family member as the interpreter may raise ethical issues because the possibility that the family member selected may not interpret the patient's information well but rather provide his or her view [39]. Besides, communication challenges may arise among dental hygienists and other professionals in the facility.

Given that dental hygiene and oral health are important for people all ages, dental hygienists can also provide the needed dental care to people in palliative care where healthcare professionals from different specialists work in collaboration. Thus, dental hygiene's providing dental care in such facilities may face communication challenges. This is supported in a recent study investigating the challenges that dental hygienists face while working with a multidisciplinary team while delivering care to palliative care patients with advanced cancer [39]. The study revealed that dental hygienists lack enough knowledge on palliative care, and working with patients and professionals in palliative care units is challenging because of poor communication. The study found that communication problems arise during collaboration with other healthcare professionals due to differences in nursing skills and expertise.

Consequently, dental hygienists find difficulties in seeking assistance from other professionals to meet the needs of palliative care patients [39]. From such findings, communication challenges that dental hygienists face while delivering the needed dental care may negatively impact dental health services. Besides, dental hygienists face ethical dilemmas during their practice, attributed to different cultural beliefs and values with the patient [39]. Due to different cultural backgrounds, dental hygienists face difficulties in making decisions with the patient and cannot accommodate patients from various cultures or speak a foreign language. Therefore, accomplishing the dental care practice may be challenging and can create job dissatisfaction [39]. It is well established that due to language barriers and varying cultural backgrounds, there is a possibility that the concept of dental hygiene may be misinterpreted, leading to generalization and stereotyping about cultural groups instead of promoting the delivery of individualized care [39]. There are also reported cases of musculoskeletal problems among dental hygienists. It is well established that the professionals work long hours carrying out repetitive tasks that need precise movements. They are exposed to pain in the elbows, shoulders, lower back pain, neck, and in their wrists. While providing dental health practices like cleaning, hygienists are needed to be seated; hence need them to bend or change their posture that causes back pain [37]. The professionals also look down into their patients' mouths as they provide dental cleaning, making them put their necks in an uncomfortable position. In addition, regular dental cleaning makes hygienists move arms to different positions for long

hours. Also, dental hygienists find difficulties in gaining access to patient's treatment areas despite following the best clinical practice about posture [37]. These awkward positions lead to discomfort and pain. After years of working in such situations, several dental hygienists find themselves seeking orthopedic care to treat musculoskeletal pain [40].

Dental professionals working in Qatar also experience some challenges. This can be added by other healthcare practitioners and people in Qatar as they are equated to dental assistants. Dental hygiene field is new to the people in Qatar, and not yet aware with the role of dental hygienist work in dental clinic. Besides, the dental hygienists only work at their field in PHCC, while other private health clinics may hire them when they need assistance or to work in both fields. Although Hamad Medical Corporation (HMC) seconded students to study in CNA-Q then hire them to work as Dental Hygienists in Dentistry Department; then instead to continue in HMC, they referred them to PHCC. There is also a challenge in terms of salary. In comparison to the compensation of other health practitioners, dental hygienists in Qatar earn very little.

2.6. Scope of Practice of DHs in World, Qatar, And Arab Countries

Globally, dental hygienists are oral healthcare providers licensed and registered as dental health professionals who provide preventive, educational, therapeutic and promotional oral health services to support health for the control and prevention of dental diseases. Besides, dental hygienists are permitted to providing therapeutic services that promote oral health [26]. They are acknowledged as registered medical practitioners who are internationally competent to work as specialists in dental and oral health. The professionals are trained to educate students on primary dental care for children and adults. The professionals also work as oral health therapists designated as dental nurses who improve access to dental care and provide dental treatment procedures [26].

Similarly, the scope of practice for dental hygienists globally is associated with delivering oral health services in community settings. Current evidence demonstrates that today's dental hygienists have expanded the scope of practice where they work in improving access and providing essential oral health care services, including preventive care in community settings, including long-term facilities and schools [41]. Table [5] showed the differences in scope of practice of Dental Hygienists internationally. Dental hygienists are regulated to provide oral health care services in community settings where they work under supervision or independently and provide prophylactic and preventive services and oral health education to the entire population, including school children, young adults, and the elderly [41].

In Qatar and other Arab countries, dental hygienists work mainly in dental clinics. The professionals are licensed dental hygienists who educate persons and children in oral cleaning and dental hygiene using proper toothbrushes and toothpaste to prevent and control dental caries [1]. Besides, dental hygienists in Qatar and other Arab countries also help develop oral health programs in schools and other institutions to prevent oral health problems. One such program is the Asnani school oral health program (SOHP) that dental professionals and schools developed to educate primary school students on oral health and dental hygiene. The program aimed to prevent and reduce the burden of dental caries and improve community awareness on the benefits of oral health prevention and improve health care access to dental care services [42]. Dental hygienists in Qatar can contribute to new coming projects such as oral health home care for elderly [54], and National adult screening project [55]. In addition to the National Oral Health Month for promotion and activities.

In Qatar, dental hygienists have regulatory restrictions to refer dental patients to a dentist, physician either internally within PHCC or externally. The professionals are also not allowed to prescribe dental medication, such as chlorhexidine, unless it is co-signed by the dentist. When a patient under warfarin medication visits the dental clinic for scaling and requires blood test INR. The dental hygienists' scope of practice is restricted in that the organization only conducts a chairside blood test. In contrast, the professionals are only allowed to refer the patient for further examination unless authored by the dentist. The dental hygienists also work by referring the patients for further dental treatment and related medical issues and prescribe basic radiograph under the supervision of dentists.

Table 3 Difference between Dental Hygienist Salaries Internationally

Country	Salary Differences
United States	A mean hourly wage of $ 37.53, which translates to $ 78 050 annually [13]
United Kingdom	Band 5: €24907 ($29904.34) to €30615 ($36757.59) Band 6: €31365 ($37658.07) to €37890 ($45492.25) [14].
Europe	Sweden: € 70,000 ($ 84.0840), Denmark: €58000 ($ 69669.6000) to €90000 ($ 108108.0000) Germany: €67,112 ($ 80.4804) per year [15].
Australia	Range from $ 22 to $ 30 per hour (2018 statistics) [16].
Asia	India is 19700 INR ($266.43) per month [17], while Japan is 331000 JPY ($3023.64) per month [18].
Qatar	9870 QAR ($2710.79) per month [43]
Saudi Arabia	9520 SAR ($2538.41) per month [44]
UAE	12,300 AED ($3348.74) per month [45]
Bahrain	950 BHD ($2520.15) per month [46]
Kuwait	780 KWD ($2587.37) per month [47]
Jordan	1080 JOD ($1523.29) [48]

Table 4 Comparison of Challenges faced by Dental Hygienists Internationally

Country	Challenges faced by dental hygienists
United States	Postural health problems and many new technologies for the profession may be challenging because of the large number of patients [29]
United Kingdom	Stress and burnout Lack of privilege for ordering chlorhexidine mouthwash or an x-ray even with a co-signed note from a dentist [30].
Europe	The different legislations in different countries may limit the scope of practice of dental hygienists in other European countries [31]
Australia	Musculoskeletal pain, long working hours, lack of assistants, less support from management, and self-doubt on capabilities [32]
Asia	The dental hygiene profession is only recognized in fourteen Asian countries, including Bhutan, Brunei, Hong Kong, India, Iran, Japan, Maldives, Nepal, Mongolia, Philippines, Singapore, South Korea, Thailand, and Vietnam [26]. The employment rate of dental hygienists in Japan is because of poor work collaboration, increased family responsibilities, low wages, anxiety and work stress, and lack of appreciation by other employees [33].
Qatar	Lack of awareness of the role of dental hygienists; hence they are not respecter [50]
Saudi Arabia	Burnout and despair due to having many clients that require efficient and prompt treatments [50]. Carpal cubital tunnel syndrome due to many patients.
UAE, Bahrain, & Kuwait	Same as KSA
Jordan	Constant efforts by dentists and other staff marginalize the dental hygienist's abilities and knowledge and try to ignore their roles in treatment through attempting to replace them [51].

Table 5 Differences in Scope of Practice of Dental Hygienists Internationally

Country	Scope of practice of dental hygienists
United States	Privilege for performing; -Reception work, disinfection -Disinfection and sterilization -Tooth whitening -Recording patient's oral health condition -Temporary Scaling -Mixing cement -Impression -Rubber Dam-Vacuum operations -Polishing of filing materials -Filling of dental materials -Local anaesthesia -Panoramic -Dental x-ray -Training of oral function -Dental hygiene assessment -Dental health education -Tooth brushing instruction -Root planning -Scaling -Pit and fissure sealing -Fluoride application -No privilege for extraction of deciduous teeth, caries risk tests, and dental health education for institutionalized elderly patients [21].
United Kingdom	The dental hygienists' roles in the UK are same as those in the US. However, unlike the US, they can extract deciduous teeth and perform caries risk tests and dental health education for institutionalized elderly patients.
Europe	In Denmark, dental hygienists perform the same roles as those in the UK, except they have no privilege for extracting deciduous teeth [21]. The dental hygienists' roles in Sweden are same as those in the UK [21].
Australia	The responsibilities are identical to those performed by dental hygienists in the US [52].
Asia	The practice in Thailand and South Korea is same as that in the UK [21]. Besides, the dental hygienists' responsibilities in Japan are identical to those in the UK, except they are not involved in the extraction of deciduous teeth, dental x-rays, panoramic, local anaesthesia, and filling of dental materials [21].
Qatar	-Educating students during school visits on proactive oral hygiene and raise awareness on health check-ups. -Applying fluoride and fissure sealants. -Documentation and ensuring pleasant dental visits for patients [28].
Saudi Arabia	Educating school students on oral hygiene and applying fluoride and fissure sealants [23].
UAE	Same as KSA
Bahrain	Same as KSA
Kuwait	Same as KSA
Jordan	Same as Qatar

3. Conclusion

Dental health behaviours like using proper toothpaste and toothbrushes, mouth cleansers, and miswak are widely practiced to improve dental hygiene. With the need to improve dental hygiene, Dental Hygienists to play a crucial role in providing the needed services to improve people's oral health hygiene. Accredited dental hygiene programs are in place to provide the required skills and knowledge on oral hygiene. These programs are provided as associate degrees, Bachelor's degrees, and some are offered as master's degrees.

Recommendations

Dental hygienist professionals globally have generated many improvements in the oral health of all individuals. Despite their significance in the oral health sector, dental hygienists are still not fully acknowledged in some countries by both their colleagues in the dentistry department and their expected patients. They are not recognized, which places them at risk of various challenges, including stress, burnout, lack of support from colleagues, and postural health problems. Indeed, dental hygienists' associations worldwide need proper suggestions to resolve the present challenges that dental hygienists face. Therefore, the following recommendations may support the current dental hygienists;

- There needs to be widespread education of the public and other healthcare workers, especially those in the oral health services, on the role, contribution, and significance of the dental hygiene profession.
- A country like Qatar needs to develop a professional dental hygiene association to stand in for dental hygienists and promote their profession in Qatar.
- The legislation governing dental hygienists in Europe needs to be standardized to enable professionals to have a broader scope of work regardless of the European country they graduated from.
- Dental hygienists need to be allowed by authorities to work in public and private sectors worldwide to enable them to have expanded roles and enable the community around them to appreciate and acknowledge the professionals' works.
- All countries need to adopt technologies that may aid dental hygienists in performing their work without getting musculoskeletal problems due to having a poor posture or being in the same position for a long time.
- All countries need to license more qualified dental hygienists and assign them personal work assistants to alleviate the professionals' stress and work burnout.

Compliance with ethical standards

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Authors' Contribution Statement

The following is a list assigning a person's name against the following roles or tasks:

1. Conception or design of the review
2. Literature search
3. References add
4. Paragraph writing
5. Drafting the article, organizing tables with headings
6. Critical revision of the article
7. Final approval on the article and title
8. Complete review work and submission

According to the above roles, the authors confirm contribution to the paper as follows: Dr. Najat Alyafei (1-8), Ms. Amani El-Hamarnah (2, 3, 4, 7), Ms. Syeda Hafsa (2, 4, 3, 7), Mr. Belal Abu Mardieh (2, 3, 4, 7), Mr. Mohammad Alshwatereeh (2, 3, 4, 7), Ms. Suadah Asraf (2, 3, 4, 7), Ms. Shaijiya Banu (4, 7), Ms. Fahimeh Ghadiri (4, 7), Ms. Elham Saleh (4, 7), Ms. Fahina Pokker (4, 7).

Disclosure of conflict of interest

All authors declare that they have no conflicts of interest.

References

[1] Alyafei, Najat. Oral health behavior of Qatari People regarding oral cleaning techniques. Dent. 2018; 8(498): 1-8.

[2] Musaiger AO, Al-Mannai M, Abduljawad E. Association of oral hygiene habits and food intake with the risk of dental caries among undergraduate university women in Saudi Arabia. Int J Adolesc Med Health. 2014; 26: 585-589.

[3] Watwood CL, Dean T. Mapping the literature of dental hygiene: an update. J Med Libr Assoc. 2019; 107(3): 374-[13].

[4] Fones AC. The origin and history of the dental hygienists. American Dental Hygienists' Association. 20[1]3; 87(1): 58-62.

[5] Hakes H. The history of dental hygiene: Development through the years [Internet]. 2020. [Cited 2021 April 22]. Available from: https://www.todaysrdh.com/the-history-of-dental-hygiene-development-through-the-years/

[6] Bowen DM. History of dental hygiene research. American Dental Hygienists' Association. 2013; 87(1): 5-22.

[7] School of Health Science: Dental Hygiene Program. Program Report, 2020. College of the North Atlantic in Qatar (CAN-Q).

[8] Milling LA. Dental hygiene's grand history: Learn more about the colorful history of the dental hygiene profession years [Internet]. 2020.

[9] Kanji Z, Sunell S, Boschma G, Imai P, Craig BJ. Outcomes of dental hygiene baccalaureate degree education in Canada. Journal of dental education. 2011; 75(3): 310-320.

[10] Sunell S, McFarlane RD, Biggar HC. Differences between diploma and baccalaureate dental hygiene education in British Columbia: a qualitative perspective. International journal of dental hygiene. 2017; 15(3): 236-248.

[11] Benbow P, Kanji Z. Dental hygiene baccalaureate education: A national study of students' perceived value and intentions. Can J Dent Hyg. 2019; 53(2): 89-99.

[12] Salary.com. Salaries for dental hygienists [Internet]. 2020. [Cited 2021 April 22]. Available from: https://www1.salary.com/Salaries-for-dental-hygienist-with-a-Bachelors-Degree

[13] The US Bureau of Labor Statistics. 29-1292 Dental hygienists [Internet]. Occupational, Employment and Wages; 2020 [cited 2021 April, 22]. Available from https://www.bls.gov/oes/current/oes291292.htm.

[14] NHS. Agenda for Change- pay rates [Internet]. NHS Pay and Benefits; 2020 [cited 2021 Apr 22]. Available from https://www.healthcareers.nhs.uk/working-health/working-nhs/nhs-pay-and-benefits/agenda-change-pay-rates.

[15] DG News. Top 10 countries for dental hygienists [Internet]. 2019 [cited 2021 Apr 22]. Available from https://dentagama.com/news/top-10-countries-for-dental-hygienists.

[16] Hills Dental Design. How to become a dental hygienist in Australia? Dental Hygienist; 2019. Available from https://www.hillsdentalpennanthills.com.au/dental-hygienist-in-australia/.

[17] Salary Explorer. Dental hygienist average salary in India 2021 [Internet]. 2021 [cited 2021 Apr 22]. Available from http://www.salaryexplorer.com/salary-survey.php?loc=100&loctype=1&job=921&jobtype=3.

[18] Salary Explorer. Dental hygienist average salary in Japan 2021 [Internet]. 2021 [cited 2021 Apr 22]. Available from http://www.salaryexplorer.com/salary-survey.php?loc=107&loctype=1&job=921&jobtype=3.

[19] America Dental Hygienist' Association. Facts about the dental hygiene workforce in the United States [Internet]. 2021[cited 2021 Apr 22]. Available from https://www.adha.org/resources-docs/75118_Facts_About_the_Dental_Hygiene_Workforce.pdf.

[20] The British Society of Dental Hygiene & Therapy. Dental hygiene and dental therapy [Internet]. 2021 [cited 2021 Apr 22]. Available from http://www.bsdht.org.uk/Default.aspx?PageID=18181307&A=SearchResult&SearchID=1854595&ObjectID=18181307&ObjectType=1.

[21] Inukai J, Sakurai M, Nakagaki H, Matsui K. Comparison of clinical practice education in dental hygiene schools in eight countries. Int. Dent. J. 2012; 62(3): 122-126.

[22] Australian Dental Association. Dental Hygienist [Internet]. Dental Team; 2021 [cited 2021 Apr 22]. Available from https://www.ada.org.au/Careers/Dental-Team/Hygenist .

[23] Gupta S, Jain A, Garg S, Sood S, Kumari B. Perceptions of Indian dental hygiene students toward their profession and its relationship with their explicit self-esteem scores. Indian J Dent. 2014; 5(4): 202-210.

[24] Zaitsu T, Saito T, Kawaguchi Y. The oral healthcare system in Japan. Healthcare (Basel). 2018; 6(3): 79.

[25] College of North Atlantic in Qatar (CAN-Q). intranet. 2021. https://www.cna-qatar.com/programs/schoolofhealthsciences.

[26] Joufi AI, Wilder RS, Curran AE, Brame JL. Saudi dental hygienists' opinions regarding establishing a professional association. Int J Dent Hyg. 2018; 16(3): 322-328.

[27] Takahashi Y, Hikiji H, Nishihara T. A preliminary study of the scope of practice of dental hygienists and oral health providers in Asia. J Oral Sci. 2020; 62(4): 449-451.

[28] Primary Health Care Cooperation. Oral & dental health: Dental Service [Internet]. Clinics & services. 2021.

[29] Bernie KM. 15 trends impacting dental hygiene practice and the profession. Ins. Dent. 2018; 14(9).

[30] Toon M, Collin V, Whitehead P, Reynolds L. An analysis of stress and burnout in UK general dental practitioners: Subdimensions and causes. Br Dent J. 2019; 226: 125-130.

[31] Johannsen A, Malmqvist S, Graça S, Assunção V, Albuquerque T, Luis H. The dental hygienists in Sweden and Portugal: A comparative study. J Int Soc Prev Community Dent. 2019; 9(3): 296-302.

[32] Gorter RC. Work stress and burnout among dental hygienists. Int J Dent Hyg. 2005; 3: 88–92.

[33] Nomura Y, Okada A, Miyoshi J, Mukaida M, Akasaka E, Saigo K, Daikoku H, Maekawa H, Sato T, Hanada N. Willingness to work and the working environment of Japanese Dental Hygienists. Int J Dent. 2018; 1-9.

[34] Najat A. Analyzing the attitudes of Qatari people toward oral health instructions. J Dent Oral Sci. 2020; 2(1): 1-9.

[35] Al-Darwish MS. Oral health knowledge, behaviour and practices among school children in Qatar. Dent Res J (Isfahan). 2016; 13(4): 342-353.

[36] Najat A. Impact of knowledge level of Qatari people towards oral health. J. Oral Health Dent. 2020; 2(1).

[37] Cheema S, Maisonneuve P, Al-Thani MH, Al-Thani AA, Abraham A, Al-Mannai GA, Al-Emadi AA, Al-Chetachi WF, Almalki BA, Hassan Khalifa SE, Haj Bakri AO. Oral health behavior and factors associated with poor oral status in Qatar: Results from a national health survey. Journal of public health dentistry. 2017; 77(4): 308-316.

[38] Crescent Products. 3 critical issues facing dental hygienists [Internet]. 2021 [cited 2021 Apr 22]. Available from https://www.crescentproducts.com/3-critical-issues-facing-dental-hygienists/

[39] Candell A, Maria E. Dental hygienists' work environment: motivating, facilitating, but also trying. Int J Dent Hyg. 2010; 8(3): 204-212.

[40] Charbonneau CJ, Kelly DM, Donnelly LR. Exploring the views of and challenges experienced by dental hygienists practicing in a multicultural society: A pilot study. Can. J. Dent. Hyg. 2014; 48(4): 139-146.

[41] Nakajima N. Challenges of dental hygienists in a multidisciplinary team approach during palliative care for patients with advanced cancer: A nationwide study. Am J Hosp Palliat Care. 2020: 1-6.

[42] Langelier M, Continelli T, Moore J, Baker B, Surdu S. Expanded scopes of practice for dental hygienists associated with improved oral health outcomes for adults. Health Aff. 2016; 35(12): 2207-15.

[43] Alyafei A. A preventative oral health program targeting school children in Qatar. In6th Annual Congress on Dentistry and Dental Medicine. [Internet]. 2020.

[44] Salary Explorer. Dental hygienist average salary in Qatar 2021 [Internet]. 2021 [cited 2021 May 3]. Available from http://www.salaryexplorer.com/salary-survey.php?loc=176&loctype=1&job=921&jobtype=3.

[45] Salary Explorer. Dental hygienist average salary in Saudi Arabia 2021 [Internet]. 2021 [cited 2021 May 3]. Available from http://www.salaryexplorer.com/salary-survey.php?loc=191&loctype=1&job=921&jobtype=3.

[46] Salary Explorer. Dental hygienist average salary in UAE 2021 [Internet]. 2021 [cited 2021 May 3]. Available from http://www.salaryexplorer.com/salary-survey.php?loc=227&loctype=1&job=921&jobtype=3.

[47] Salary Explorer. Dental hygienist average salary in Bahrain 2021 [Internet]. 2021 [cited 2021 May 3]. Available from http://www.salaryexplorer.com/salary-survey.php?loc=17&loctype=1&job=921&jobtype=3.

[48] SalaryExplorer. Dental hygienist average salary in Kuwait 2021 [Internet]. 2021 [cited 2021 May 3]. Available from http://www.salaryexplorer.com/salary-survey.php?loc=115&loctype=1&job=921&jobtype=3.

[49] Salary Explorer. Dental hygienist average salary in Jordan 2021 [Internet]. 2021 [cited 2021 May 3]. Available from http://www.salaryexplorer.com/salary-survey.php?loc=109&loctype=1&job=921&jobtype=3.

[50] Alyafei NA. Impact of knowledge level of Qatari people towards oral health. Int. J. Oral Health Dent. 2017; 2(1).

[51] Aboalshamat K, Alzahrani M, Rabie N, Alharbi R, Joudah R, Khulasya S, Alansari W. The relationship between burnout and perfectionism in medical and dental students in Saudi Arabia. J Dent Specilties. 2017; 5(2): 122-127.

[52] Malkawi ZA. Career satisfaction of Jordanian dental hygienists. Int. J Dent. Hyg. 2015; 14 (4): 243-248.

[53] Parraz EM. The practice of dental hygiene internationally [Master's Thesis]. Albuquerque, New Mexico: The University of New Mexico. 2016.

[54] Alyafei, Najat, Jaleel, Bushra. Preparing to meet the oral health needs of the elderly in Qatar - A model for Domiciliary Oral Health Care Services. World Journal of Advanced Research and Reviews. 2020.

[55] Alyafei, Najat, Gibrel, Sarra. Exceptional Design for an Adult Oral Health Screening Program, Qatar. Medical and Clinical Research Journal. 2020.