Job profile and infection control of dental assistants in Tehran, Iran

Hadi Ghasemi [ID][a], MohammadPooyan Jadidfard [ID][b], Kazem Alirezaee[C]

[a]Associate Professor, Dept. of Community Oral Health, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
[b]Assistant Professor, Dept. of Community Oral Health, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
[c]Graduated student, Dept. of Community Oral Health, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran
Correspondence to Hadi Ghasemi (email:ha.ghasemi@sbmu.ac.ir).

Objectives This study aimed to investigate the background characteristics and job profile of dental assistants in Iran and to assess their knowledge and practice regarding infection control.

Methods This cross-sectional study was conducted on a sample of dental assistants in Tehran, Iran. The participants completed an online questionnaire, including demographic (age, sex, marital status, and the highest level of educational attainment) and job-related (years of practice, income, working hours, job-related educational course and certificate, and knowledge and practice related to infection control) information.

Results A total of 386 dental assistants completed the questionnaires. The mean age of the assistants was 29.27±6.8 years, and 96% of them were female. Overall, 56-68% of the respondents reported <5 years of working experience, worked 30-80 hours per week with a monthly salary of nearly $80-100, and completed an educational course on dental assistance. Nearly one-third of the participants reported high satisfaction with their job, and less than 10% of them were satisfied with their salary. The assistants had adequate knowledge about most aspects of infection control. Nearly 40% of them reported no education on infection control, and 35-45% declared that they usually sterilized dental rotary instruments using disinfectants, but not autoclaving. Almost 60% of the assistants reported complete vaccination before entering their job.

Conclusion Dental assistants in Iran are rather young, highly educated women with a relatively high workload, but low job satisfaction. Their professional knowledge and performance were deficient in some aspects, reflecting inadequacies in their education. Delivery of efficient dental services with high standards requires qualified dental personnel with formal academic education based on an efficient credentialing system.

Keywords Dental assistants, Infection control, Dental team, Job satisfaction

Introduction

The written history of dental assistance as a profession dates back to the late 19th century in the United States, when Dr. Kells hired the first female dental assistant in 1885. Efforts to standardize this profession resulted in the establishment of the Nebraska Dental Assistants Association as the first dental assistant society in 1917, as well as the American Dental Assistants Association (ADAA) in 1921 and the Dental Assisting National Board (DANB) in 1948. Three decades later, DANB joined the National Commission for Health Certifying Agencies and continues to supervise training and certification of dental assistants in the United States. [1]

Today, dentistry has become more specialized than before. Various specialties, such as pediatric dentistry, orthodontics, and endodontics, involve different therapeutic activities, which require specifically trained personnel to assist dentists. Dental assistants are vital members of the oral health team as they contribute to the delivery of oral health services and facilitate teamwork in the dental office. [2] Teamwork increases the quality of dental services delivered to patients and also reduces the workload and burnout of the staff. [3] The demand for dental assistants with more advanced and specialized clinical skills is expected to increase in the near future. [4] Considering the key role of dental assistants in the delivery of optimal oral health services to patients, efforts have been made in some developed countries to organize this profession by setting rules and regulations and establishing standards. [1]

Almost in all parts of the world, dental assistants make up a significant population of the health workforce. In the United States, for example, more than 300,000 dental assistants were hired in 2014, more than 90% of whom were in the private sector. [1] The population of dental assistants is estimated at 30,000 in Canada [5], 182,000 in Germany [6], 37,000 in Spain [7], and 90,000 in Italy. [8] The job profile of dental assistants has been studied in different countries to provide information for subsequent planning and enhancing their job situation. In 2015, Baker et al. reported that more than 300,000 dental assistants were working in the United States, which was projected to increase by 25% by 2022. Nearly 93% of these assistants worked in private offices, 31% had college education, 25% had an academic degree, and the rest had high school education or diploma. They also found that full-time assistants worked 34 hours a week with a yearly salary of $35,000. [1]

In a survey conducted in Jordan, the mean age of dental assistants was 28 years, 85% of them had at least high school diploma, 51% had less than three years of experience, and about half of them worked more than eight hours per day. The most important tasks reported by dental assistants in this study were infection control, providing postoperative instructions to patients, oral health education, and office management activities. [9] In 2020, there were about 27,000 active dentists in Iran [10], but no exact statistics on dental assistants and their job characteristics is

available. As each dentist probably employs at least two to three assistants, the job market for dental assistants is estimated at 70,000-80,000 people in Iran.

Considering the important role of dental assistants in the process of oral health care and insufficient studies on this profession, the present study aimed to examine various underlying and occupational characteristics of dental assistants in Iran.

Methods and Materials

In this cross-sectional study, information was collected using a self-administered questionnaire. The target population of this study included 386 dental assistants, who were selected via convenience sampling in Tehran, capital of Iran. Based on the sample size formula ($N = ((z_{(1-\alpha/2)})^2 p(1-p))/d^2$), with assumptions of P=40%, α=0.05, z(1-α/2)=1.96, and d=0.054, a sample size of 306 people was estimated. To compensate for a 30% probability of incomplete questionnaires, 80 more samples were added, reaching a sample size of 386 people.

The questionnaire used in this study included questions related to the dental assistants' demographic information, job profile (i.e., years of work as a dental assistant, working in one or multiple centers, having a job-related certificate, participating in a related educational course, working hours in a week, number of working shifts per day, level of satisfaction with the job, and salary), and knowledge and practice related to infection control. Regarding knowledge and practice, the assistants answered each question on a five-point Likert scale, ranging from "fully agree" to "fully disagree" (later combined and presented as "agree", "no idea", and "disagree" in the result section).

To determine the validity of the questionnaire, 10 professors from different departments of the School of Dentistry of Shahid Beheshti University of Medical Sciences were asked to express their opinion regarding its face and content validity. For face validity, the professors evaluated the statements of the questionnaire in terms of the writing style, clarity, and fluency. For content validity, the content validity ratio (CVR) and content validity index (CVI) were calculated. The professors chose one option from the scale of "necessary", "useful but unnecessary", and "unnecessary" to determine CVR, using the following formula:

$CVR = [(Ne - (N/2))/(N/2)]$, where "N" stands for the number of evaluating experts (i.e., 10 professors) and "Ne" denotes the number of experts who chose the option "necessary" for each question. Finally, items with CVRs <0.33 were removed (according to the Lawshe table). [11]

Moreover, to calculate CVI, the relevance, clarity, and simplicity of each of the questionnaire statements were determined by the professors, based on a four-point Likert scale related to relevance ("quite relevant", "relevant",

"somewhat relevant", and "irrelevant"), clarity, and simplicity ("very good", "good", "weak", and "very weak"). The CVI was calculated as the ratio of professors who chose options "quiet relevant" and "relevant" for relevance, and "very good" and "good" for clarity and simplicity to the total number of professors who commented on that item. Items with CVI<0.79 were removed. After calculating CVR and CVI, seven questions were eliminated, and the final questionnaire containing 54 questions was used as the study instrument. Additionally, to determine the reliability of the questionnaire, the test-retest method was used. For this purpose, 10 dental assistants completed the questionnaire twice in a 10-day interval, which indicated an acceptable reliability coefficient (0.834).

The Ethics Committee of Shahid Beheshti School of Dentistry approved this study (ethics code: IR.SBMU.RIDS.REC.1398.246). The questionnaire was completed anonymously, and all the respondents were assured about the confidentiality of their responses. Their agreement to complete the questionnaire was regarded as informed consent to enter the study.

The questionnaires were completed by the participants both online and in-person from September to December 2020. The questions were transferred to an online survey application (www.porsline.ir), and its link was sent to dental assistants who were members of four social media (Telegram®) channels. After three months and several reminders, this method yielded 316 completed questionnaires. To reach the required sample size, 70 other dental assistants were also accessed by one of the researchers (K.A.) in their workplace from selected regions of Tehran, Iran. This method was the most feasible way to access dental assistants in this study, as there was no official registry.

Descriptive statistics included frequency and percentage of assistants belonging to each category. To present a general image of the dental assistants' job profile and to highlight different aspects of this profession, we decided not to perform any statistical analyses in the present study and to only present descriptive data.

Results

A total of 386 dental assistants with the following background characteristics completed the questionnaires: mean age, 29.27±6.8 years; 96% female; and 80% single. Also, 56% of the assistants had more than high school diploma. Table 1 presents the assistants' responses to questions related to different aspects of their job. Almost two-thirds of the participants had <5 years of experience as a dental assistant; the majority of them worked in one dental center; 56% of them reported a monthly salary of <2,000,000 Tomans (nearly $80-100); and almost 70% of

them completed an educational course on dental assistance and had a certificate. Besides, nearly 65% of the assistants worked 30-80 hours per week, mostly two shifts per day. Less than one-third of the respondents reported high satisfaction with their job, and less than 10% of them were satisfied with their salary.

The assistants' level of knowledge on some aspects of infection control is presented in Figure 1. The majority of the assistants showed their agreement in 13 out of 15 statements. Overall, 53% of the assistants agreed with the sentence, stating the need to evacuate rotary instruments before each new patient. About half of the respondents agreed with or were uncertain that cleaning rotary

instruments with disinfectant solutions could sterilize them. Figure 2 shows the assistants' sterilization practice related to four frequently used dental instruments. For sterilization of rotary instruments, 35-45% of the assistants reported that they usually used disinfectant solutions, but not autoclaving. In this figure, the rate of sterilization of ultrasonic scaler is 66%.

Moreover, according to Figure 3, almost 60% of the respondents reported complete vaccination before starting their job as a dental assistant, and nearly 40% of them either did not participate in an educational course on infection control or did not receive such training routinely in their practice.
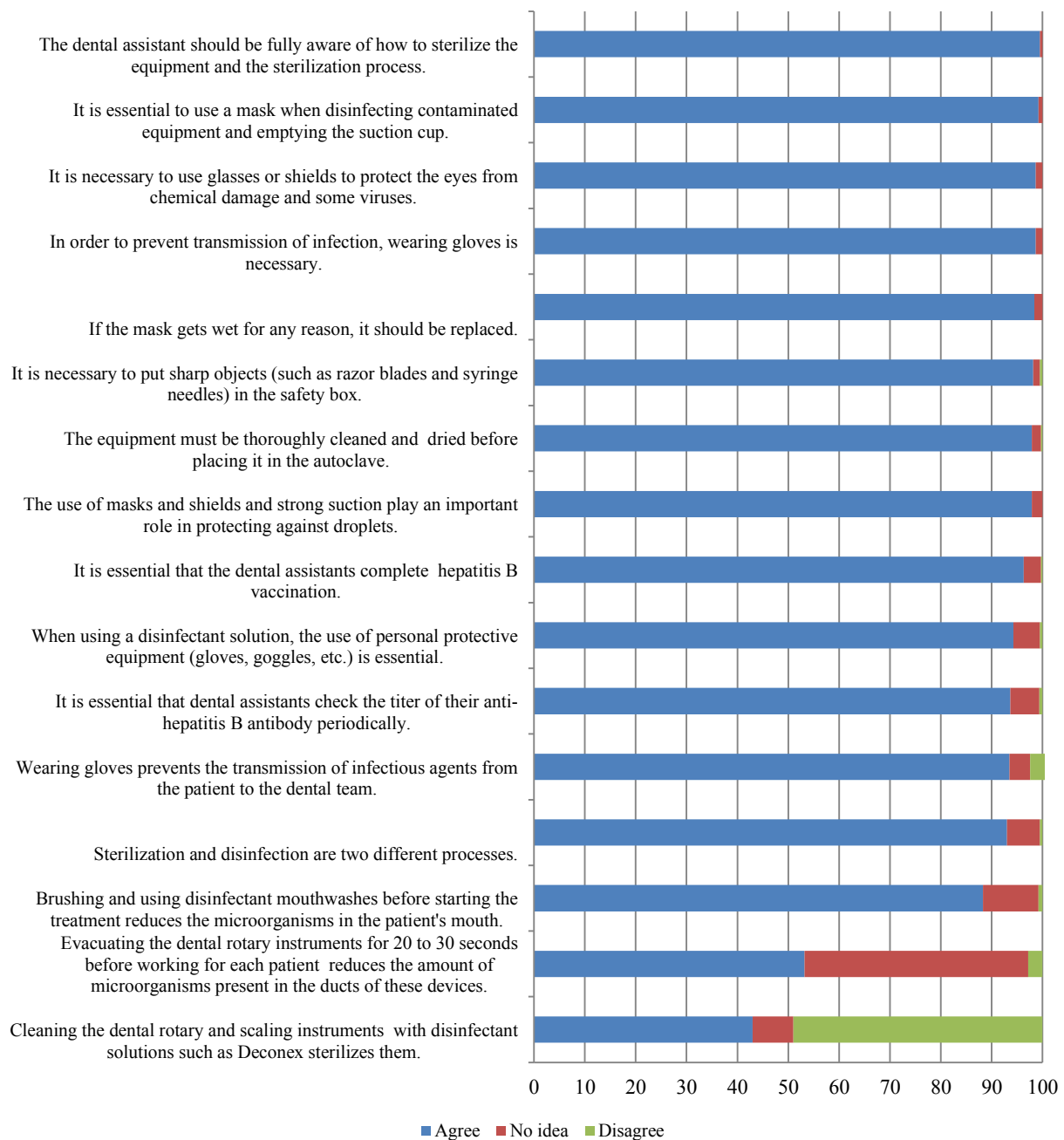

Figure 1: The distribution (%) of dental assistants' responses (n=386) to the questionnaire statements regarding infection control

Table 1- Distribution (%) of dental assistants (n=386) based on job-related factors

|		N	%
Years of practice	≤5	253	65
	>5	133	35
Working in several centers	Yes	63	16
	No	323	84
Salary (million Tomans)	<2	217	56
	≥2	169	44
Job-related education	Yes	264	68
	No	122	32
Job-related certificate	Yes	247	64
	No	139	36
Working hours/weeks	<30	117	30
	30-80	246	64
	≥80	23	6
Shift type (morning, afternoon, and night)	One shift	116	30
	Two shifts	230	60
	Three shifts	40	10
General job satisfaction	High	110	28
	<High	276	72
Salary satisfaction	≥High	23	6
	≤Medium	363	94
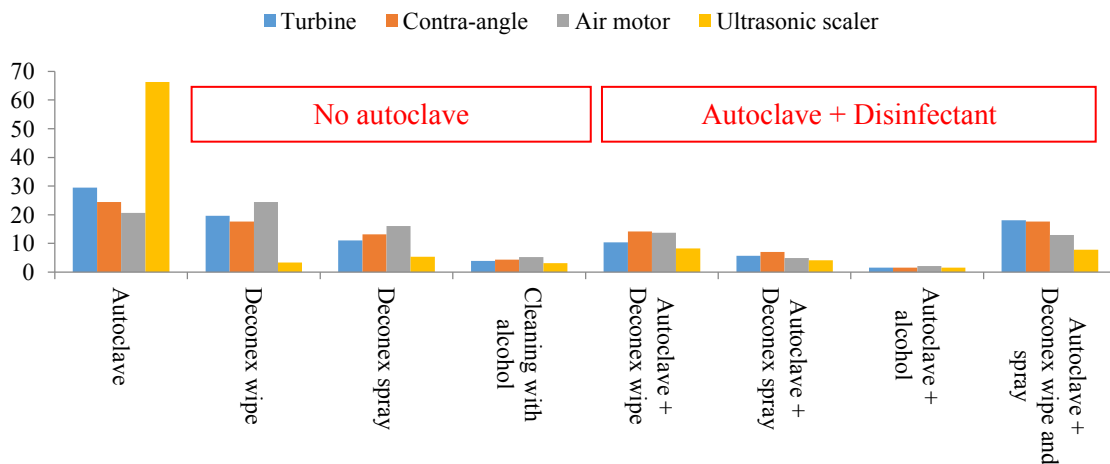
Figure 2: Distribution (%) of dental assistants' responses (n=386) to the question related to their usual practice to sterilize dental instruments
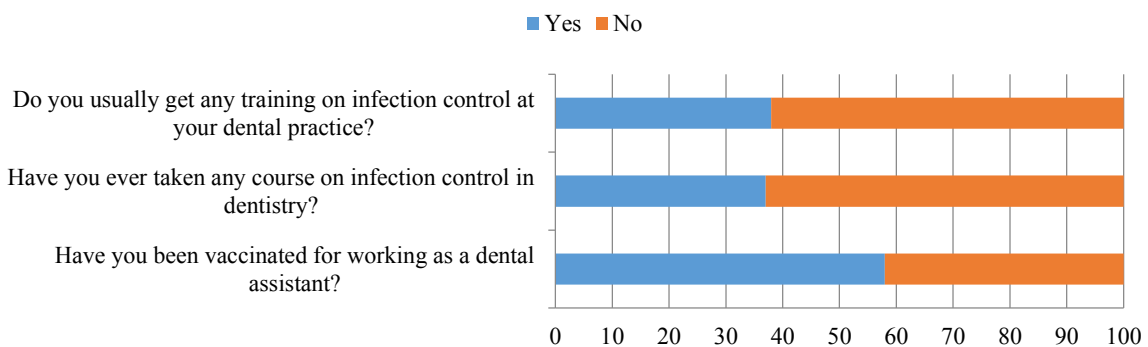

Figure 3: Percentages of dental assistants' responses (n=386) to questions related to training for infection control and vaccination status

Discussion

The findings of the present study revealed that highly educated, young women comprised the main population of dental assistants in Iran. The majority of these assistants reported low salaries despite long working hours, resulting in low job satisfaction. One out of three assistants reported having no formal job-related education or certificate. Some aspects of their knowledge and practice related to infection control were found to be deficient. In the present study, the predominance of women in the profession of dental

assistance is in line with the findings of studies from Iran [12] and other countries [13-15,] which calls for considerations in workforce planning, as the female workforce usually requires policymaking on issues, such as maternal leave, childcare support, providing care for sick family members, and employment security after parental leave. [16]

The assistants' length of stay in a job in the current study was short, as 65% of the assistants reported work experience of five years or shorter, while only 13% of the assistants reported >10 years of work experience. This finding is consistent with the results of a study by Shooriabi et al. [12] in Iran and may reflect the unfavorable job conditions of dental assistants, as the majority of them reported low levels of satisfaction with their job and salary. Similar findings were reported by Al-Dakhil et al. (<3 years of experience in 55%) in Saudi Arabia [17] and Rederiene et al. in Lithuania (64% of dental hygienists with <5 years of experience). [18] On the other hand, Ohlendorf et al. [19] found that the assistants' median experience was eight years, indicating the longer experience of German dental assistants compared to the participants of the present study; this can also suggest the more favorable job conditions of German dental assistants.

The majority of dental assistants in this study reported low levels of satisfaction with their salary, because monthly earning of more than half of the assistants was under the minimum wage level, approved by the Iran Supreme Labor Council (approximately 2.7 million Tomans ≈$108) during 2021-2022. [20] Conversely, the majority of Brazilian dental assistants reported satisfaction with their monthly earning of $141-190. [15]

Since there is no formal university program for dental assistance in Iran, about one-third of the assistants in this study had no specific education for their job and had no job-related certificates, while two-thirds of them reported participation in short educational courses, presented by semi-official educational bodies. Considering the critical role of dental assistants in the process of dental service delivery, limited or incomplete education may result in the lower quality of service provision or cause some health hazards during treatment. [21] Dental assistants are usually responsible for infection control procedures in dental practice. Therefore, full knowledge of all related issues ensures optimal infection control and guarantees a higher quality of dental services, which requires the assistants' updated information about infection control. However, in this study, continuous education on infection control for assistants seems to be underestimated, as more than 60% of them reported no related on-the-job training.

Although the majority of the participants in this study were aware of most infection control issues, about half of them showed poor knowledge on two items, that is, the effect of evacuating rotary instruments before use for each patient and non-sterilizing effect of disinfectant solutions. Almost 5-20% of the assistants reported sterilizing the rotary instruments without the use of autoclaves, which is contrary to the standard rules of infection control. [22] Lack of highly qualified dental assistants has been also reported in Saudi Arabia [23,] emphasizing more strict educational requirements and supervisory activities, besides improving the work conditions of this crucial, but neglected oral health profession.

The present research is one of the first studies, providing general information about dental assistants in Iran and highlighting the importance of future studies on different aspects of this profession. The current results should, however, be interpreted with caution due to the application of convenience sampling, which restricted the generalizability of the findings to the entire population of dental assistants in Iran.

Conclusion

The profession of dental assistance in Iran has a large and expanding labor market, dominated by young, highly educated women. The assistants reported relatively high workloads, but low levels of job satisfaction. Deficiencies were evident in some aspects of knowledge and performance of dental assistants regarding infection control, which reflects the shortfalls of their education before and after starting their job. Delivery of efficient dental services with high standards for infection control requires competent dental personnel, who acquire up-to-date knowledge of dental sciences in formal academic curricula and continuous education programs. To promote the working environment of dental assistants, policies are needed to officially recognize this profession and establish a credentialing system for optimal job supervision.

Clinical Relevance

Scientific rationale for the study: Considering the important role of dental assistants in the provision of dental care, clear understanding of their job characteristics is essential.

Principal findings: The working conditions of dental assistants in Iran are characterized by a high workload and low job satisfaction. They are considered unsuitable based on some infection control standards.

Practical implications: Provision of optimal oral healthcare services requires suitable job conditions for all members of the dental team.

Conflict of Interest

No Conflict of Interest Declared ∎

_____

References

1.Baker B, Langelier M, Moore J, Daman S. The dental assistant workforce in the United States, 2015. Rensselaer, NY: Center for Health Workforce Studies, School of Public Health, SUNY Albany. 2015:1-67.

2. Kracher C, Breen C, McMahon K, Gagliardi L, Miyasaki C, Landsberg K, et al. The evolution of the dental assisting profession. J. Dent. Educ. 2017; 81(9):eS30-7.

3. Antonova C, Yaneva-Ribagina K. Advantages of dental teamwork. J of IMAB. 2021; 27(2):3663-7.

4. Dawley J. How the economics of dental assisting is impacting your practice. DA ?. 2020; 89(3):14-6.

5. Quiñonez C. The politics of dental care in Canada. Can J Dent Hyg. 2022;56(1):47-9.

6. Ziller S, Eaton KE, Widström E. The healthcare system and the provision of oral healthcare in european union member states. part 1: Germany. Br Dent J. 2015; 218(4):239-44.

7. Bravo M, San Martín L, Casals E, Eaton KA, Widström E. The healthcare system and the provision of oral healthcare in european union member states. part 2: Spain. Br Dent J. 2015; 219(11):547-51.

8. Bindi M, Paganelli C, Eaton KA, Widström E. The healthcare system and the provision of oral healthcare in european union member states. Part 8: Italy. Br Dent J. 2017; 222(10):809-17.

9. Khader YS, Abu-Sharbain G. Dentist–assistant interaction styles in Jordan. Int J Dent Hyg. 2009; 7(2):131-5.

10. Bayat F, Vehkalahti MM, Akbarzadeh A, Monajemi F. Varying manpower alters dental health in a developing health care system. Int Dent J. 2022; 72(3):360-5.

11. Lawshe CH. A quantitative approach to content validity. Pers. Psychol. 1975; 28(4):563-75.

12. Shooriabi M, Gilavand A, Emam SA. Evaluating the awareness and performance ratio of dental assistants working in dentistry centers of the city of ahvaz in southwest Iran, about infection control. Int. J. Adv. Multidiscip. Res. 2017;7:151-6.

13. Goetz K, Hasse P, Campbell SM, Berger S, Dörfer CE, Hahn K, et al. Evaluation of job satisfaction and working atmosphere of dental nurses in Germany. Community Dent Oral Epidemiol. 2016; 44(1):24-31.

14. Al Jazairy YH, Halawany HS, Hussainan NA, Maflehi NA, Abraham NB, Jacob V. Factors affecting job satisfaction and their correlation with educational standards among dental assistants. Ind Health. 2014; 52(4):324-33.

15. Loretto NR, Caldas Ade F Jr, Coelho Junior LG. Job satisfaction among dental assistants in Brazil. Braz Dent J. 2013; 24(1):53-8.

16. Szabo S, Nove A, Matthews Z, Bajracharya A, Dhillon I, Singh DR, et al. Health workforce demography: a framework to improve understanding of the health workforce and support achievement of the Sustainable Development Goals. Hum Resour Health. 2020; 18(1):1-10.

17. AlDakhil L, Yenugadhati N, Al-Seraihi O, Al-Zoughool M. Prevalence and associated factors for needlestick and sharp injuries (NSIs) among dental assistants in Jeddah, Saudi Arabia. Environ Health Prev Med. 2019; 24(1):1-7.

18. Rederiene G, Aidukaite G, Berlin V, Buunk-Werkhoven YAB, Puriene A. Practice characteristics and views of dental hygienists in Lithuania. Int J Dent Hyg. 2020; 18(4):432-8.

19. Ohlendorf D, Haas Y, Naser A, Haenel J, Maltry L, Holzgreve F, et al. Prevalence of muscular skeletal disorders among qualified dental assistants. Int J Environ Res Public Health. 2020; 17(10):3490.

20. Ministry of Cooperatives, Labour, and Social Welfare. Minimum Wage and Subordinate Instructions of the Year 2021-2022. Tehran, (2021).

21. Romero D. Unlicensed dental assistants create a concern to patient safety: doctoral dissertation, university of southern California; 2019. 27664363.

22. Sasaki JI, Imazato S. Autoclave sterilization of dental handpieces: a literature review. J Prosthodont Res. 2020; 64(3):239-42.

23. Baismail HM, Alsalem AS, Hawsawi OT, Alanazi FG, Saad T, Alfridy ASA, et al. Attitude and practice of infection control among dental health facilities. Ann Dent Specialty. 2020; 8(4):92-7.