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Evaluation of Awareness and Knowledge Levels of Dental Assistants on Dental Materials and Sterilization Processes

Dental Asistanların Dental Materyaller ve Sterilizasyon Prosedürleri Hakkında Bilgi ve Farkındalık Düzeylerinin İncelenmesi

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Abstract: Objective: The aim of this study is to measure the knowledge level of materials and equipment for endodontics and pedodontics, as well as sterilization and disinfection procedures, of dental assistants in dental institutions and intern oral and dental health technician students studying at college. Methods: Four hundred ninety-eight people, including dental assistants working in public, private and university institutions, between the ages of 18-65, and students of the Oral and Dental Health Technician School of Universities, participated in the study. A questionnaire was applied to the participants. With the help of the survey consisting of different questions, the participants' knowledge levels about pedodontic and endodontic materials and sterilization procedures were measured. Results: The knowledge level of dental assistants about dental materials was found to be low in 5.2% of the participants, medium in 32.5% of the participants, and high in 62.3% of the participants. There isn't any significant difference between the assistants' knowledge level and their gender (p=0.23), age group (p=0.09), educational status (p=0.41), professional experience (p=0.51), certification (p=0.39), and the institution that they work for (p=0.24). Conclusion: It was found that dental assistants have a lack of knowledge in this subject. It is thought that planning and perform regular training education programmes in terms of both acquiring new information and repeating existing information can be effective for eliminating the deficiencies of dental assistants.
Keywords: Dental assistant, Endodontic material, Pedodontics material, Sterilization, Disinfection.

Öz: Amaç: Bu çalışmanın amacı, diş hekimliği kurumlarında görev yapan dişhekimi asistanları ile üniversitede öğrenim gören stajyer ağız ve diş sağlığı teknisyeni öğrencilerinin endodonti ve pedodonti malzeme ve ekipmanları ile sterilizasyon ve dezenfeksiyon işlemlerine yönelik bilgi düzeylerini ölçmektir. Yöntem: Çalışmaya kamu, özel ve üniversite kurumlarında çalışan, 18-65 yaş arası diş hekimliği asistanları ve üniversitelerin Ağız ve Diş Sağlığı Teknisyenliği Yüksekokulu öğrencilerinden oluşan 498 kişi katıldı. Katılımcılara yazılı bir anket uygulandı. Farklı sorulardan oluşan anket yardımıyla katılımcıların pedodontik ve endodontik materyaller ve sterilizasyon prosedürleri hakkındaki bilgi düzeyleri ölçüldü. Bulgular: Diş hekimi asistanlarının dental materyaller konusundaki bilgi düzeyleri katılımcıların %5,2'sinde düşük, %32,5'unda orta, %62,3'ünde ise yüksek bulundu. Asistanların bilgi düzeyleri ile cinsiyetleri (p=0,23), yaş grupları (p=0,09), eğitim durumları (p=0,41), mesleki tecrübeleri (p=0,51), sertifikaları (p=0,39) ve çalıştıkları kurum (p=0,24) arasında anlamlı bir fark bulunmadı. Sonuç: Diş hekimi asistanlarının pedodontik ve endodontik materyaller ile sterilizasyon prosedürleri hakkında bilgi eksikliklerinin olduğu tespit edildi. Hem yeni bilgilerin edinilmesi hem de mevcut bilgilerin tekrarlanması açısından eğitim programlarının planlanması ve düzenli olarak uygulanmasının diş hekimi asistanlarının eksikliklerinin giderilmesinde etkili olabileceği düşünülmektedir.
Anahtar Kelimeler: Dental asistan, Endodontik materyal, Pedodontik materyal, Sterilizasyon, Dezenfeksiyon.

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Introduction

Dentists, dental assistants, and medical secretaries are essential elements of a contemporary oral and dental health clinics (Morison, Marley, and Machniewski, 2011). In countries where dental assistants are not defined as a profession by legal regulation, duties and responsibilities are given in many different business lines from secretarial services to financial issues, from sterilization to surgical assistant and unfortunately often many do not have basic training in these areas (Dental Assisting National Board, 2017).

In Turkey, where a similar situation existed until recently, 'Article 13' was added to the Law No. 27916 (Article 9) dated 11.4.1928 and numbered 1219, published in the Official Gazette on April 26, 2011, on the Practice of the Style of Medicine and Medical Sciences. with the paragraph 'graduated from the oral and dental health program of vocational schools; the profession of 'oral and dental health technician' is defined under the phrase 'health technician who assists the dentist in patient examination and ensures that the treatment materials are prepared and kept ready for use. Also training and certification practice has been initiated with the organization of the Ministry of Health of the Republic of Turkey for the authorization of those who carry out business and transactions related to this profession. However, in our country, nurses, health officers or other college graduates who do not have any special education are still working in oral and dental health centers, hospitals, and universities instead of dentist assistants (Yusufoğlu and Ünsal, 2021). Since these people do not have field-specific education and experience, a fully efficient oral and dental health service is not possible. For this reason, the importance and number of dental assistants is increasing day by day and colleges continue to be opened in this field (Kılıçarslan, 2013). However, there are still not enough trained dental assistants in institutions providing dental services.

The effects of dental assistants in terms of not interrupting the treatment services related to oral and dental health and the quality of the treatments are very important. This effect depends on factors such as the assistant's level of knowledge, professional experience, and job skills. Professional experience and knowledge are shaped through different learning paths and models such as higher schools, courses, and seminars (Mustafa, Humam, and Al Mosuli, 2015).

Dentist assistants' full knowledge of dental materials and concepts contributes significantly to the completion of the treatment quickly, smoothly and in a short time, especially in departments such as endodontics and pedodontics where procedures are performed on the patient in more than one appointment. Dental assistants have important responsibilities in the use of many tools, including x-rays in endodontics, and in communication with the laboratory,

especially in the treatment of children with cooperation problems in pedodontics (Gutmann, 1999). In addition, due to the repetitive use of instruments in both sections, sterilization and disinfection stages should be known correctly (Bagg, Sweeney, Roy, Sharp, and Smith, 2001). Necrotic tissues, blood, debris and antigen-containing salivary fluid may remain on both endodontic and pedodontics instruments. It is very important that sterilization and disinfection procedures are carried out completely so that they do not cause cross-infection (transmission from patient to patient, from doctor to patient or from patient to doctor) (Enabulele and Omo, 2018).

There are no study investigating the endodontic and pedodontics material knowledge and awareness levels of dental assistants in our country. The aim of this study is to measure the knowledge level of materials and equipment for endodontics and pedodontics, as well as sterilization and disinfection procedures, of dental assistants in dental institutions and intern oral and dental health technician students studying at college. In addition, the results obtained; it is aimed to evaluate the differences in terms of experience and education.

Material and Methods

This study does not include any interventional procedures in humans or animals and was conducted in accordance with the Declaration of Helsinki. This study was approved by the ethics committee of Karabuk University Non-Invasive Clinical Studies (25.02.2021, no:2021-486).

Four hundred ninety-eight people, including dental assistants working in public, private and university institutions, between the ages of 18-65, and students of the Oral and Dental Health Technician School of Universities, participated in the study. The participants were selected from the 2nd year students who had taken these courses and the staff working in the hospital from endodontics, periodontology, and pedodontics clinics. A written questionnaire was applied to the participants. The survey consists of three parts. In the first part, questions about demographic characteristics. In the second part; it consists of 17 multiple choice questions to evaluate the knowledge level of dental assistants about the tools and materials used in dentistry. Correct answers were scored as 1, incorrect answers were scored as 0, and the total score was calculated. Those with a total score of 0-5 were considered to have low knowledge level, those with a score of 6-11 were considered to have a medium knowledge level, and those with a score of 12-17 were considered to have a high level of knowledge. In the third section, there are questions about sterilization and disinfection procedures, and correct answers are scored as 1 and incorrect answers are scored as 0. Those with a total score of 0-3 were

considered as low, those with a score of 4-6 as medium, and those with a score of 7-10 as having a high level of knowledge about sterilization. Written consent was obtained from the participants and participation in the study was done on a voluntary basis.

Statistical Analysis

The statistical analysis of the data was performed using MiniTab 17 Statistical Software (Statistical Software Release, Version 17.3.1. Minitab Inc. USA). Descriptive statics were obtained in frequency and percentage. T test was used for multiple comparisons of normally distributed variables with continuous variation. Kruskal Wallis test was used for non normally distributed variables. Mann-Whitney test and Chi-square test were used in the evaluation of the binary comparisons. P values <0.05 were used for indication of statistical significance for all tests.

Results

A total of 498 people participated in our study. 154 (30.92%) of the participants are men and 344 (69.08%) are women. 220 participants (42.47%) stated that they participated in a training program (certification, course, seminar) related to general dentistry, and 298 (57.53%) participants did not participate any training program. The demographic information of our participants is shown in Table 1.

Table 1: Sociodemographic Information

	Variables	n	%
Gender	Female	344	69.1%
	Male	154	30.9%
Age	18-25	432	83.2%
	26-35	51	12.5%
	36-65	15	4.3%
Educational Level	Primary School	4	0.8%
	High School	22	4.4%
	University	248	49.8%
	Intern (College student)	224	45.0%
Professional Experience	Intern (College student)	333	66.9%
	1-3 years	106	21.3%
	4-10 years	42	8.4%
	More than 10 years	17	3.4%
Institutions	Public institution	270	54.2%
	Private	228	45.8%

The knowledge level of dental assistants about dental materials was found to be low in 5.2% of the participants, medium in 32.5% of the participants, and high in 62.3% of the participants. There isn’t any significant difference between the assistants' knowledge level and their gender (p=0.23), age group (p=0.09), educational status (p=0.41), professional experience (p=0.51), certification (p=0.39), and the institution that they work for (p=0.24) (Table 2).

Table 2: The Relationship Between Dental Assistants' Knowledge Levels And Sociodemographic Characteristics

		Knowledge Level								
		Low		Moderate		High		Total		
		N	%	N	%	N	%	N	%	p value
	18-25	27	6.2	146	33.8	259	60	432	100	
Age	26-35	1	2	14	27.4	36	70.6	51	100	0.09
	36-65	0	0	2	13.3	13	86.7	15	100	
	Female	13	3.8	92	26.7	239	69.5	344	100	
Gender	Male	15	9.7	70	45.5	69	44.8	154	100	0.23
	Primary School	1	25	0	0	3	75	4	100	
	High School	1	4.5	8	36.4	13	59.1	22	100	
Educational level	University and above	8	3.2	57	23	183	73.8	248	100	0.41
	Intern student	18	8	97	43.3	109	48.7	224	100	
	Intern	24	7.2	125	37.5	184	55.3	333	100	
Professional	1-3 years	4	3.8	26	24.5	76	71.7	106	100	
experience	4-10 years	0	0	6	14.3	36	85.7	42	100	0.51
	>10 years	0	0	5	29.4	12	70.6	17	100	

In general, the knowledge rate of endodontic materials was statistically higher than the knowledge rate of pedodontic materials (p=0.003). A significant relationship was found between the level of knowledge of pedodontic materials and age (p<0.001) and professional experience (p=0.002). It was observed that the knowledge levels of women, of the 18-25 age group and of the 3 years old or less professional experience were higher. There was no significant relationship between educational status and knowledge of pedodontic materials (p=0.08). While there was no significant relationship between the knowledge rate of endodontic materials and gender (p=0.32), age (p=0.43) and education level (p=0.07), a significant relationship was found with professional experience (p=0.003). It has been observed that as professional experience increases, the level of knowledge also increases. 17 questions that measuring the knowledge levels of assistants in the survey form are given in Figure 1. The question most answered correctly by assistants is “what is the material used to ensure contact between two teeth during filling?”, and the question that answered least correctly is “which filling material is not used in primary teeth?” (Figure 2).

Please tick the options you think are correct in the following questions.

1. Which of the following is used to fill the canals during root canal treatment?
   A) Paper point B) Canal file C) Root canal sealer D) Glass ionomer cement
2. Which of the following is used to dry the canals during root canal treatment?
   A) Canal file B) Composite C) Gutta percha D) Paper point
3. Which of the following is a filling material which is used in filling root canals?
   A) Paper point B) Gutta percha C) Canal file D) Lentulo
4. Which of the following is the name of the medicament placed in the canals for dressing the tooth during root canal treatment?
   A) Calcium hydroxide B) Sodium hypochlorite C) Edta D) Gutta percha
5. Which of the following solutions should be used more carefully as they may be harmful in contact with eyes and skin?
   A) Sodium hypochlorite B) Edta C) Chlorhexidine D) Distilled water
6. Which of the two solution cause brown precipitate when mixed eachother?
   A) Sodium hypochlorite - EDTA
   B) EDTA- Chlorhexidine
   C) Sodium hypochlorite - Chlorhexidine
   D) Sodium hypochlorite - Distilled water
7. Which of the following is not one of the solutions we use during root canal treatment?
   a) Gutta percha B) Edta C) Chlorhexidine D) Sodium hypochlorite
8. Which of the following material is used to take impression for space maintainers?
   A) Fissure sealents B) Bonding agent C) Alginate D) Matrix band
9. Which of the following is used in the pulpatomy treatment of primary teeth?
   A) Ferric sulfate B) Gutta percha C) Root canal sealer D) Edta
10. Which of the following is not one of the tools used in tooth extraction?
    A) Davye B) Elevator C) Excavator D) Scaler
11. Which of the following is used to ensure contact between two teeth when filling?
    A) Matrix band B) Fulvar C) Amalgam carrier D) Burnisher
12. Which of the following is not one of the filling materials used in primary teeth?
    A) Zinc phosphate B) Compomer C) Glass ionomer D) Amalgam
13. Which of the following is not used in root canal treatment of primary teeth?
    A) Gutta percha B) Physiological serum C) Root canal sealer D) Paper point
14. Which of the following do we use when bonding stainless steel crowns to primary teeth?
    A) Bonding agent B) Glass ionomer C) Zinc oxide eugenol cement D) Composite
15. Which of the following is the protective agent we apply with disposable spoons to prevent caries in children?
    A) Alginate B) Fluoride C) Fissure sealent D) Composite
16. Do you disinfect the alginate impression with microzit?
    A) Never B) Sometimes C) When there is blood on the surface D) Always
17. Which of the following is not disposable?
    A) Suction B) Fluoride spoon C) Impression mold D) Bond brush

Figure 1. Survey Form That Measuring Assistants' Knowledge Levels

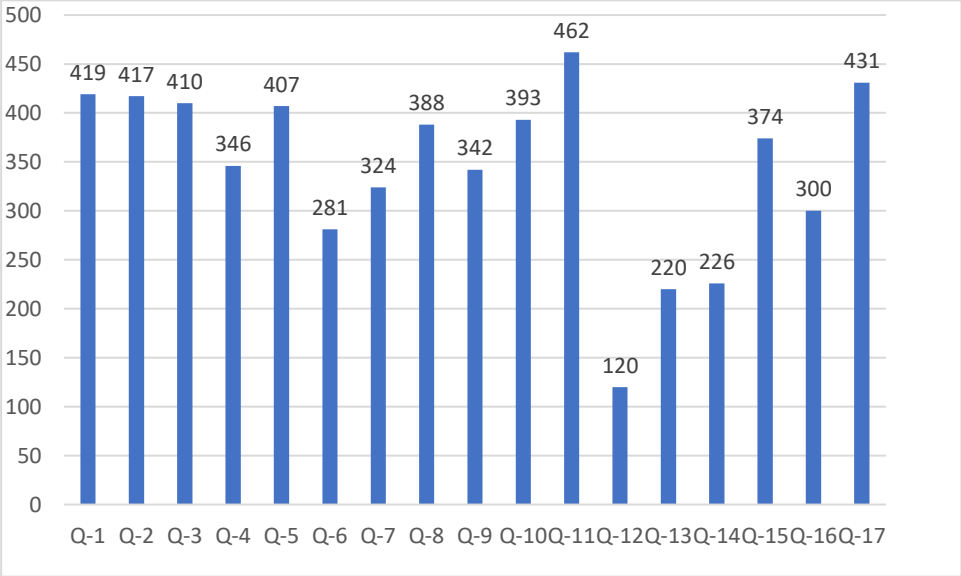

Figure 2. Correct Answer Rates of Questions

When dental assistants' knowledge levels regarding medical waste and sterilization were evaluated, it was seen that 19.9% had low knowledge, 23.1% had medium knowledge and 57.0% had high knowledge. The educations that assistants received regarding medical waste

and sterilization is given in Table 3. While there was no significant relationship between knowledge levels about sterilization and gender (p=0.51) and age (p=0.40), a significant relationship was found between educational status (p=0.001) and professional experience (p<0.001). The knowledge levels of intern assistants and assistants with longer experience were found to be higher.

Table 3: The Educations That Assistants Received Regarding Medical Waste and Sterilization

	Medical waste and sterilization training (n)	
Medical waste (+) Sterilization (-)	15	
Medical waste (-) Sterilization (+)	14	
No training	78	-
Once training	88	-
3 times training every year	43	-
Theoretical education from colleges	247	-
Information learned from the staff in the clinics through the master-apprentice relationship	13	-

Discussion

The Dental assistants are important members of the oral and dental health team. In addition dental assistants should use the dental materials in the clinic very well, they must also be fully equipped in sterilization and disinfection practices. In this way, it not only helps the dentist in performing dental procedures quickly and appropriately, but also it protects the patient and the dentist by preventing any possible cross-reactions.

In this study, we evaluated the knowledge levels of dental assistants and oral and dental health students in Turkey and it is observed that the female population is generally high (69.1%), similar to other studies (Enabulele and Omo, 2018; Sede and Enabulele, 2015; Azodo, Ezeja, and Ehizele, 2009). When we examine the age group of the participants, it has seen that the majority of them (86.7%) are between the ages of 18-25. As the reason for this situation; it may be that nearly half of the participants were intern assistants.

In a study conducted by Yusufoğlu and Ünsal (2021), it was observed that the theoretical knowledge levels of intern students and dental assistants with 1 year of experience were statistically higher than who had been working in a clinic for a longer time. As the reason for this result; they are more willing and their knowledge is newly. Unlike this situation, in our study, no significant relationship was found between the dental material knowledge level of the assistants and their age, education level and professional experience. The reason for this outcome can be majority of the participants of our study are interns and 1-3 years of professional

experience; also more than half of participant (62.3%) have a high level of knowledge.

The knowledge rate of endodontic materials was statistically higher than the knowledge rate of pedodontic materials. This is thought to be due to the endodontic treatments are frequently performed by general dentists, but pediatric patients are mostly treated in pedodontics clinics. Also; the participants are more likely to come across endodontic treatments in rotating clinical studies. A significant relationship was found between the level of knowledge of pedodontic materials and gender and professional experience. It was found that the knowledge levels of women and participants with 3 years or less professional experience were higher. It may be due to the fact that; in pedodontics clinics women and younger assistants generally work. As pedodontics clinics have a challenging working environment because of uncooperative children; these clinics are less preferred by assistants with more professional experience. For this reason, as professional experience increases, the awareness of pedodontic materials decreases due to the decrease in the working rate in pedodontic clinics. While there was no significant relationship between the awareness of endodontic materials and gender, age and education level, a significant positive relationship was found with professional experience. It is thought that the knowledge level of assistants working in endodontic clinics increases as their professional experience increases from year to year as a result of routine and common endodontic treatments.

The awareness of the endodontic materials by dental assistants was high, but the awareness of the solutions that used during root canal treatment was found to be lower. It is thought that this may be the usage areas of the solutions are more complicated compared to the materials. It has been found that the materials used in primary root canal treatments are less known. This result may be related that participants work less in pedodontics clinics in rotating clinical studies.

Aslam, Panuganti, Nanjundasetty, Halappa, and Krishna (2014), observed that 88% of the students had sufficient knowledge in a study that regarding the sterilization of root canal files. Also; Yusufoğlu and Ünsal (2021), observed that 78.5% of the participants had a high level of knowledge about sterilization. In our study, it was observed that 19.9% had low knowledge, 23.1% had medium and 57.0% had high knowledge about sterilization and disinfection.

Similar to our study, Mahdipour, Zenouz, and Gholizadeh (2007), found no significant relationship was found between dental assistants' awareness of sterilization and gender. In another study Khaki, Zarei, and Blookat (2000), was reported that female assistants pay more

attention to sterilization procedures. The education that dental assistants receive has a remarkable impact on their clinical performance. In the study by Sarl et al., it was observed that university education had a more significant effect on the clinical performance of assistants compared to other education programmes. In our study; it was seen that 49.6% of the participants received medical waste and sterilization education at the university. Their knowledge level was higher, similar to the study of Sarll, Jones, and Ashton (1996). Mahdipour et al. (2007), stated in their study that assistants working in public institutions paid more attention to sterilization procedures than those working in private clinics. No significant relationship regarding this situation was found in our study.

In our study, there is a significant relationship between the assistants' knowledge levels about sterilization and disinfection and their professional experience. The knowledge levels of participants with longer experience were found to be higher. In a study that the disinfection knowledge of dental assistants was evaluated, it was observed that their knowledge level increased as professional experience increased consistently with our study (Mustafa et al., 2015).

In conclusion, it was seen that dental assistants had deficiencies regarding both the dental materials and the sterilization and disinfection procedures. In order to overcome this situation, the training programs of dental assistants must be increased and regular inspections must be carried out.

Conclusion

In our study, the awareness of dental assistants about the endodontic and pedodontics materials was evaluated and it was observed that there was a lack of knowledge, especially about pedodontic materials. This situation may be caused by the treatment differences in the clinics where dental assistants work. A balanced arrangement of the working hours of assistants in different clinics may be beneficial in terms of increasing knowledge level about the materials.

In dentistry; infection control is a very important issue for the health of both patients and employees. It was found that dental assistants have a lack of knowledge in this subject. Also it was observed that as dental assistants' professional experience increases, their knowledge level decreases. It is thought that planning and perform regular training education programmes in terms of both acquiring new information and repeating existing information can be effective for eliminating the deficiencies of dental assistants.

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References

Aslam, A., Panuganti, V., Nanjundasetty, J. K., Halappa, M., & Krishna, V. H. (2014). Knowledge and attitude of endodontic postgraduate students toward sterilization of endodontic files: A cross-sectional study. *Saudi Edu J*, 4, 18-22. https://doi.org/ 10.4103/1658-5984.127982

Azodo, C. C., Ezeja, E. B., & Ehizele, A. O. (2009). Factors influencing the selection of dental nursing as a profession. *Benin Postgrad Med*, 11, 27-36. https://doi.org/ 10.4314/bjpm.v11i1.48853

Bagg, J., Sweeney, C. P., Roy, K. M., Sharp T., & Smith, A. (2001). Cross infection control measures and the treatment of patients at risk of Creutzfeldt Jakob disease in UK general dental practice. *Br Dent J*, 191(2), 87-90. https://doi.org/10.1038/sj.bdj.4801104

Dental Assisting National Board. (2017). *Meet state requirements*. Retrieved from www.danb.org/Meet-State-Requirements.aspx. (Accessed date: 15 November 2017).

Enabulele, J. E., & Omo, J. O. (2018). Sterilization in endodontics: Knowledge, attitude, and practice of dental assistants in training in Nigeria-A cross sectional study. *Saudi Endod J*, 8(2), 106-110. https://doi.org/ 10.4103/sej.sej5217

Gutmann, M. E., & Gutmann, J. L. (1999). The dental hygienist as a co-therapist in the endodontic practice. *J Endod*, 25(4), 272-274. https://doi.org/10.1016/S0099-2399(99)80158-7.

Khaki, N., Zarei, M., & Blookat, G. H. (2000). Evaluation of dental practitioner's attitude toward infection control procedures in 1998. *Journal of Shahid Beheshti Dental School*, 19, 49-50.

Kılıçarslan, M. A. (2013). *Dört elli diş hekimliğinde yardımcı personel ve klinik yöntemi* (ss. 10-34). Ankara: Palme Yayıncılık.

Mahdipour, M., Zenouz, A. T., & Gholizadeh, N. (2007). Knowledge and Attitude of Dental Practitioners in Tabriz Regarding Infection Control Procedures. *JODDD*, 1, 103-117. https://doi.org/10.5681/joddd.2007.018

Morison, S., Marley J, & Machniewski S. (2011). Educating the dental team: exploring perceptions of roles and identities. *Br Dent J*, 211(10), 477-483. https://doi.org/10.1038/sj.bdj.2011.963

Mustafa, E. A., Humam, A. K., & Al Mosuli, T. A. (2015). Evaluation of dental assistant awareness concerning infection control policy of blood borne diseases. *J Int Dent Med Res*, 8, 21-24.

Sarll, D. W., Jones, J. H., & Ashton M. A. (1996). Cross-infection control: the role of "in-training" dental nurses. *Journal of Dentistry*, 24, 349-353. https://doi.org/10.1016/0300-5712(95)00094-1.

Sede, M. A., & Enabulele, J. E. (2015). Mercury hygiene and amalgam waste management: Knowledge and practice of trainee dental nurses. *Ghana Dent J*, 12, 12-14.

Yusufoğlu, S. İ., & Ünsal, G. (2021). Diş Hekimi Asistanlarının Endodontik ve Protetik Materyaller Hakkındaki Bilgi Düzeylerinin Değerlendirilmesi: Anket Çalışması. *Turkiye Klinikleri J Dental Sci*, 27(1), 28-33. https://doi.org/10.5336/dentalsci.2019-72687