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Knowledge and Attitudes of Jordanian Patients Attending the Dental Clinic Regarding Infection Control Practices among Dentists and Their Understanding of Infectious Diseases

Nicola Barghout [1], Sarah Alhunity [2], Tala Batarseh [2], Maryam Hamdan [4], Firas Alsoleihat [3,4]

1 Department of Oral and Maxillofacial Surgery, Oral Medicine and Periodontology, School of Dentistry, The University of Jordan, Amman 11842, Jordan.
2 School of Dentistry, The University of Jordan, Amman, Jordan.
3 Department of Restorative Dentistry, School of Dentistry, The University of Jordan, Amman, Jordan.
4 Department of Restorative Dentistry and Basic Medical Sciences, Faculty of Dentistry, University of Petra, Amman, Jordan.

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Correspondence:
Firas Alsoleihat, Department of Restorative Dentistry, School of Dentistry, The University of Jordan, Amman 11942, Jordan.
firas.alsoleihat@ju.edu.jo

ABSTRACT

Objectives: This study aimed to assess the knowledge and attitudes of patients attending the dental clinic at the University of Jordan Hospital regarding infection control practices among dentists and their understanding of infectious diseases.

Materials and Methods: A cross-sectional study was conducted in 2022, involving 345 randomly selected patients from the clinic. After excluding incomplete questionnaires, data from 320 participants was analyzed. The study utilized a structured interview to collect socio-demographic information and assess participants' knowledge of infection control measures and infectious diseases, such as AIDS, hepatitis, COVID-19, and Monkeypox. The questionnaire demonstrated high internal consistency (Cronbach's alpha = 85%) and reliability (Pearson's correlation coefficient = 0.81%-0.87%). Data was analyzed using SPSS software, with chi-square tests employed to determine statistical significance.

Results: The majority of participants were female (65.6%) and aged 20-29 years (28.1%). Most patients recognized the importance of infection control measures, with 93.8% agreeing on the necessity of gloves, 86.6% on face masks, and 41.3% on protective glasses. Knowledge of specific infectious diseases varied: 83.8% were aware of AIDS, 69.1% of hepatitis, 91.3% of COVID-19, and 37.5% of Monkeypox. A significant proportion of participants (85%) had been exposed to educational programs on disease transmission, primarily through television (83.1%). Additionally, 84.4% believed that dentists used sterilized instruments during treatments.

Conclusions: The findings indicate that patients generally hold positive attitudes toward infection control measures, though their knowledge of infectious diseases varies. Educational programs have been effective in raising awareness, and the use of infection prevention measures by dentists has improved significantly in recent years. Continuous education and adherence to infection control protocols remain crucial for enhancing patient safety and trust.

Keywords: Infection control, Dental patients, Knowledge assessment, Infectious diseases, Patient education, Jordan.

1. Introduction

Infection control in dental clinics is a critical component of healthcare, ensuring the safety of both patients and dental professionals by minimizing the risk of infectious-disease transmission. The importance of infection control has been under-scored by recent global

health crises, such as the COVID-19 pandemic, which highlighted the vulnerabilities in healthcare systems and the need for stringent preventive measures (1). Dental settings, in particular, pose unique risks due to the nature of procedures involving aerosols, close patient contact, and the use of sharp instruments, all of which can facilitate the spread of pathogens (2).

Patients' knowledge and attitudes toward infection-control practices are pivotal in fostering trust and compliance with preventive measures. Studies have shown that informed patients are more likely to adhere to safety protocols and engage in behaviors that reduce cross-contamination risks (3). However, disparities in knowledge about infectious diseases and infection-control measures persist, often influenced by factors, such as education level, socio-economic status, and access to healthcare information (4). For instance, while diseases, like COVID-19 and hepatitis, are widely recognized, emerging infections, such as Monkeypox, remain less understood by the general public (5).

The role of educational programs in enhancing public awareness cannot be over-stated. Mass media, including television and digital platforms, have been instrumental in disseminating information about infectious diseases and preventive practices (6). However, gaps remain in the effectiveness of these programs, particularly among under-served populations who may lack access to reliable sources of information (7). Dental clinics, as trusted healthcare providers, are uniquely positioned to bridge these gaps by incorporating patient education into routine care (8).

Historical data from Jordan and other regions reveals significant improvements in infection-control practices over the past decade. For example, the adoption of sterilized instruments and personal protective equipment (PPE) by dentists has increased markedly, reflecting heightened awareness and adherence to international guidelines (9). Despite these advancements, challenges, such as inconsistent compliance with PPE use and varying levels of patient awareness, persist, necessitating ongoing efforts to reinforce best practices (10).

This study aims to assess the current knowledge and attitudes of Jordanian patients attending dental clinics regarding infection-control practices and their understanding of infectious diseases, including AIDS, hepatitis, COVID-19, and Monkeypox. By comparing data from 2010 and 2022, the study seeks to evaluate trends in patient awareness and the effectiveness of educational interventions. The findings will provide valuable insights for policymakers and healthcare providers to tailor strategies that enhance infection control and patient education, ultimately contributing to safer healthcare environments.

2. Materials and Methods

2.1 Data Collection

This cross-sectional study was conducted at the dental clinic of the University of Jordan Hospital over a two-week period in November 2022. A total of 345 patients were randomly selected, patients were approached at random by data collectors from the clinic's waiting area during different times of the day to reduce selection bias. While no fixed interval or computer- generated randomization was applied, efforts were made to include a wide and diverse sample of patients attending the clinic based on availability and willingness to participate. After excluding 25 incomplete questionnaires, data from 320 participants (92.8% response rate) was included in the final analysis, no data was recorded for patients who refused to participate, so this response rate is only based on those who accepted participation. The study protocol was approved by the Institutional Review Board of the University of Jordan, and written informed consent was obtained from all participants prior to their enrollment.

2.2 Study Sample

Data was collected through structured face-to-face interviews conducted by trained dental professionals using a validated questionnaire. The questionnaire was adapted from a previous study by Barghout et al. (2012), which was also conducted at a university- based dental hospital in Jordan, with a similar patient demographic composed primarily of adults from middle- to low-income backgrounds. This comparability allowed us to adapt their tool and build on their findings (9), modified to include emerging infectious diseases, such as COVID-19 and Monkeypox. It comprised three main sections: (1) socio-demographic characteristics (age, gender, occupation, education level, and monthly income); (2) knowledge and attitudes toward infection-control measures (use of gloves, masks, protective glasses, and sterilization practices); and (3) awareness of specific infectious diseases (AIDS, hepatitis, COVID-19, and Monkeypox), including their modes of transmission and treatment availability.

2.3 Validity of the Study Tool

Prior to the main study, the questionnaire underwent a rigorous validation process. A panel of eight dental experts reviewed the instrument for content validity, and a pilot test was conducted with 30 dental patients to assess clarity, relevance, and completion time. The internal consistency of the questionnaire was evaluated using Cronbach's alpha (α=0.85), and test-retest reliability was confirmed with Pearson's correlation coefficient (r = 0.81–0.87). These results indicated high reliability and consistency of the survey tool.

Participants were eligible if they were aged 18 years or older, able to provide informed consent, and had no cognitive or language barriers. Patients requiring emergency dental treatment were excluded to avoid undue stress or time constraints.

2.4 Statistical Analysis

Data was analyzed using SPSS, version 21. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize the variables. Chi-square tests were employed to examine associations between socio-demographic factors and knowledge of infection control, as well as differences in awareness across infectious diseases. A p-value of less than 0.05 was considered statistically significant.

The study adhered to ethical principles outlined in the Declaration of Helsinki. Confidentiality was maintained by anonymizing participant data, and all responses were used solely for research purposes. The findings aim to contribute to improved patient education and infection control protocols in dental settings.

3. Results

The study included 320 participants after excluding 25 incomplete questionnaires, yielding a response rate among those who agreed to participate of 92.8%. Demographic analysis revealed that the majority of participants were female (65.6%) and aged 20-29 years (28.1%). The sample comprised diverse occupational groups, with non-workers (33.8%) and students (28.1%) representing the largest proportions. Education levels varied, with 35.6% holding undergraduate degrees and only 5.0% having post-graduate qualifications. Income distribution showed that 31.3% of participants earned more than 700 JD monthly, while 25.0% reported incomes below 300 JD (Table 1).

Participants demonstrated high awareness of infection-control measures in dental settings. The vast majority recognized the necessity of dentists wearing gloves (93.8%) and face masks (86.6%), though fewer acknowledged the importance of protective glasses (41.3%). Regarding the rationale for these measures, 74.0% understood that gloves prevent patient-to-dentist transmission, while 72.2% recognized their role in preventing patient-to-patient transmission. For masks, 75.1% identified protection against patient-to-dentist transmission as the primary purpose (Table 2).

Knowledge of specific infectious diseases varied significantly. COVID-19 awareness was highest (91.3%), followed by AIDS (83.8%), hepatitis (69.1%), and Monkeypox (37.5%). Participants correctly identified major transmission routes: for AIDS, 85.8% recognized sexual transmission and 81.3% cited blood transfusions; for COVID-19, 70.5% identified respiratory droplets as the primary mode. However, knowledge gaps existed regarding less common diseases, with only 43.3% recognizing saliva as a potential Monkeypox transmission route (Table 3).

Educational exposure played a significant role in disease awareness. Most participants (85.0%) reported learning about disease transmission through various channels, primarily television programs (83.1%). Workplace programs (40.8%) and dental clinics (29.4%) served as secondary information sources. Notably, 84.4% believed that dentists consistently used sterilized instruments, reflecting positive perceptions of clinical safety standards (Table 4).

Comparative analysis between 2010 and 2022 data revealed substantial improvements in infection control practices. Dentists' use of sterile instruments increased dramatically from 26.1% to 84.4% (χ^2=216.507, p<0.001). Similarly, perceived need for PPE showed significant growth: glove use endorsement rose from 83.5% to 93.8% (χ^2=16.388, p<0.001), masks from 74.8% to 86.6% (χ^2=13.947, p<0.001), and glasses from 26.1% to 41.3% (χ^2=16.088, p<0.001) (Table 5).

Educational attainment significantly influenced both infection control awareness and disease knowledge. Higher education levels correlated with greater recognition of PPE necessity (gloves: χ^2=17.344; masks: χ^2=21.197; glasses: χ^2=28.555; all p<0.05) and better understanding of hepatitis (χ^2=10.080) and COVID-19 (χ^2=23.187). Gender differences emerged in disease awareness, with males demonstrating superior knowledge of hepatitis (χ^2=7.890) and Monkeypox

(χ^2=4.525), while females showed greater COVID-19 awareness (χ^2=26.570) (Table 5).

Table 1: Demographic and socio-economic characteristics of participants

Variable	Frequency (F)	Percentage (%)
Age (years)		
<20	40	12.5
20-29	90	28.1
30-39	76	23.8
40-49	54	16.9
50-59	26	8.1
60-69	26	8.1
>70	8	2.5
Gender		
Males	110	34.4
Females	210	65.6
Occupation		
Health field	18	5.6
Educational field	42	13.1
Others	62	19.4
Student	90	28.1
Do not work	108	33.8
Level of Education		
Less than high school	48	15.0
High school	94	29.4
Diploma	48	15.0
Bachelor degree	114	35.6
Graduate studies	16	5.0
Average Monthly Income		
< JD 300	80	25.0
301-499 JD	74	23.1
500-699 JD	66	20.6
> JD 700	100	31.3

Table 2: Attitudes toward infection control measures

Infection Control Measure	Frequency (F)	Percentage (%)
Gloves		
Necessity to wear gloves	300	93.8
Reasons for wearing gloves:		
- Prevent infection (dentist-to-patient)	190	63.3
- Prevent infection (patient-to-dentist)	222	74.0
- Prevent infection (patient-to-patient)	218	72.2
Face Masks		
Necessity to wear face masks	277	86.6
Reasons for wearing masks:		
- Prevent infection (dentist-to-patient)	191	69.0
- Prevent infection (patient-to-dentist)	208	75.1
Glasses		
Necessity to wear glasses	132	41.3
Reasons for wearing glasses:		
- Prevent infection (dentist-to-patient)	96	72.7
- Prevent infection (patient-to-dentist)	86	65.2

Table 3: Knowledge of infectious diseases

Disease	Knowledge (%)	Transmission Methods (%)	Vaccine Availability (%)
AIDS	83.8	Sexual intercourse (85.8) Infected blood (81.3) Saliva/oral fluids (65.6)	No cure (74.4)
Hepatitis	69.1	Sexual intercourse (60.2) Infected blood (81.0) Saliva/oral fluids (55.2)	Vaccine available (60.6)
COVID-19	91.3	Small liquid particles (70.5) Direct contact (69.9) Infected blood (51.4)	Vaccine available (88.1)
Monkeypox	37.5	Close skin contact (78.3) Using objects (66.7) Saliva/oral fluids (43.3)	No cure (86.9)

The study found no significant changes in baseline knowledge about AIDS (83.5% *vs*. 83.8%, χ^2=0.105) or hepatitis (74.8% *vs*. 69.1%, χ^2=2.601) between 2010 and 2022, suggesting that these topics may require renewed educational focus (Table 5). Dental visit patterns remained largely consistent, with 52.2% seeking care only when experiencing pain and 33.1% attending regular check-ups, among whom 26.3% visited every six months (Table 4).

Table 4: Sources of knowledge and dental visit patterns

Question	Frequency (F)	Percentage (%)
Sources of Knowledge on Disease Transmission		
Watched educational programs	272	85.0
- TV programs	226	83.1
- Workplace programs	111	40.8
- Magazines/newspapers	95	34.9
- Dentist/clinic/health center	80	29.4
Dental Visit Patterns		
Visit dentist regularly	106	33.1
- Every 6 months	84	26.3
Visit dentist when in pain	167	52.2
Use of Sterile Instruments		
Dentists use sterile instruments	270	84.4

Table 5: Trends in infection control and knowledge over time (2010 vs. 2022)

Variable	2010 (%)	2022 (%)	Chi-square Value	P-value
Dentists' Use of Sterile Instruments	26.1	84.4	216.5	<0.001
Exposure to Awareness Programs	83.5	85.0	0.3	0.62
Perceived Need for Infection Prevention Measures				
Gloves	83.5	93.8	16.3	<0.001
Face masks	74.8	86.6	13.9	<0.001
Glasses	26.1	41.3	16.1	<0.001
Knowledge of Infectious Diseases				
AIDS	83.5	83.8	0.1	0.9
Hepatitis	74.8	69.1	2.6	0.1

4. Discussion

The findings of this study provide valuable insights into Jordanian dental patients' evolving knowledge and attitudes regarding infection control practices and infectious diseases. The high recognition of basic PPE (gloves 93.8%, masks 86.6%) reflects significant improvements since 2010, aligning with global trends in heightened infection control awareness post-COVID-19 (11). However, the lower acknowledgment of protective glasses (41.3%) suggests persistent gaps in understanding comprehensive barrier protection, consistent with findings from a recent Middle Eastern study (12).

The demographic profile of our participants mirrors patterns observed in regional healthcare utilization studies, where females and younger adults demonstrate greater healthcare engagement (13). The predominance of female participants (65.6%) may reflect established gender differences in health-seeking behaviors, as documented in recent Jordanian public health research (14). The relatively low representation of elderly patients (2.5% aged ≥70 years) warrants attention, as this aligns with global reports of reduced dental attendance among older populations despite their increased oral health needs (15).

Our results demonstrate striking variations in disease awareness, with COVID-19 knowledge (91.3%) significantly surpassing understanding of Monkeypox (37.5%). This disparity likely reflects differences in media coverage and public health messaging intensity, a phenomenon well-documented in risk communication literature (16). The persistent high awareness of AIDS (83.8%) despite stable prevalence suggests the enduring impact of decades-long public health campaigns (17), while the moderate hepatitis knowledge (69.1%) indicates potential gaps in Jordan's viral hepatitis education programs (18).

The dominant role of television (83.1%) as an information source contrasts with global shifts toward digital media, highlighting potential opportunities to enhance online health education strategies in Jordan (19). The limited utilization of dental clinics as information sources (29.4%) suggests under-used potential for chairside education, consistent with findings from neighboring countries (20). The dramatic increase in sterile instrument use perception (26.1% to 84.4%) likely reflects both actual practice improvements and heightened patient awareness, mirroring regional infection control advancements (21).

The significant associations between education level and infection control knowledge reinforce established social determinants of health frameworks (22). The gender differences in disease-specific knowledge (male advantage for hepatitis/Monkeypox; female advantage for COVID-19) may reflect cultural factors in health information consumption, warranting gender-tailored educational approaches (23). The stability in AIDS/hepatitis knowledge since 2010 suggests that these topics may require refreshed educational strategies to maintain relevance (24).

The persistence of symptom-driven dental visits (52.2%) despite improved preventive awareness underscores the complex interplay between knowledge and healthcare utilization behaviors, consistent with recent behavioral economics research in healthcare (25). The correlation between educational program exposure and PPE awareness (particularly glasses: χ^2=9.713) provides empirical support for continuing public health education initiatives (26).

This study provides compelling evidence of significant improvements in Jordanian dental patients' awareness of infection control measures, particularly regarding personal protective equipment and sterilization practices, when compared to baseline data from 2010. The findings demonstrate that 93.8% of participants recognize the necessity of glove use and 86.6% acknowledge the importance of face masks, reflecting substantial progress in patient education and clinical practice standards. However, the persistent gaps in understanding protective eyewear (41.3%) and emerging diseases like Monkeypox (37.5%) highlight areas requiring targeted educational interventions.

The research underscores television's dominant role (83.1%) as an information source, suggesting that public health campaigns should continue leveraging mass media while expanding into digital platforms to reach broader demographics. The significant correlation between higher education levels and greater infection control knowledge emphasizes the need for health literacy initiatives tailored to diverse socio-economic groups. Furthermore, the study reveals important gender differences in disease awareness that should inform gender-specific communication strategies.

The dramatic increase in perceived use of sterile

instruments (from 26.1% to 84.4%) indicates both improved clinical practices and enhanced patient awareness, reflecting successful implementation of infection control protocols in Jordanian dental settings. However, the persistence of symptom-driven dental visits (52.2%) rather than preventive care suggests behavioral barriers that require further investigation and intervention.

4.1 Limitations

While this study provides valuable insights, its findings should be interpreted in light of the following limitations:

- The sample being drawn from a university hospital limits the generalizability of the findings to the broader population.
- The predominance of female participants may introduce gender-related bias.
- The study was conducted during the COVID-19 pandemic, which may have influenced the heightened awareness of infection control practices.
- The number of patients who declined participation was not recorded, which may have led to an over-estimation of the response rate.

5. Conclusions

The findings of the present study have important implications for dental public health policy and practice in Jordan and similar contexts. The results advocate for:

1. Enhanced patient education programs focusing on less-understood protective measures and emerging diseases.
2. Strategic partnerships between dental professionals and media outlets to optimize health messaging.
3. Continuous monitoring of infection control practices to sustain and build upon current improvements.
4. Specialized training for dental teams in effective patient communication about infection prevention.

This study also underscores the importance of ongoing education and strict adherence to infection control protocols in dental clinics. It highlights the role of mass media in raising awareness and the need for continuous improvement in patient education to ensure safer healthcare environments.

Future research should explore innovative methods to translate knowledge into consistent preventive behaviors and examine long-term trends in patient awareness as new health challenges emerge. The study establishes a valuable benchmark for evaluating the effectiveness of ongoing infection control education initiatives in dental care settings.

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