

INFECTION CONTROL KNOWLEDGE AND PRACTICES IN KUWAIT - A SURVEY ON ORAL HEALTH CARE WORKERS

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في عام ١٩٩٢م تم عمل مسح احصائي على بعض العاملين في مجال صحة الفم والأسنان بالكويت وذلك لتقييم مدى معرفتهم عن طرق الوقاية من العدوى وكيفية انتقالها وما هو سلوكهم واتجاه هذا الموضوع ومقارنة النتائج بنتائج عالمية أخرى.

شمل المسح (٢١٥) طبيب أسنان و (١٢) فني في صحة الفم والأسنان من وزارة الصحة و (١٢) طالب (السنه النهائية) من طلبة صحة الفم والأسنان الدارسين بكلية العلوم الصحية.

تم إرسال الأسئلة للمشاركين بالمسح بواسطة البريد، للتأكد من الرد على الأسئلة تم إرسال رسائل تذكيرية للمشاركين والاتصال الشخصي بهم بواسطة التلفون.

النتائج: أوضحت النتائج ما يلي:

- ١ - كان ٤, ١٥٪ من المشاركين قد أتموا كورسات عن الوقاية من العدوى.
- ٢ - الكفوف الواقية - القناع الواقي - والألبسة الواقية الطويلة تستعمل بشكل كبير وعكسها النظارات الواقية.
- ٣ - التعقيم البخاري للأدوات المستعملة يستخدم بشكل عام وبنسبة ٩٤٪ أما التطهير السطحي فقد كان محدوداً ما عدا طلبة فني صحة الفم والأسنان.
- على الرغم من أن نسبة كبيرة من المشاركين بالدراسة يعتقدون أنهم معرضون للإصابة بمرض التهاب الكبد الفيروسي إلا أنه لا يتم عادة سؤال المريض عن هذا المرض بالسيرة الصحية.
- أوضحت الدراسة أن ممارسة وتطبيق وسائل الوقاية من العدوى لدى المشاركين عالية مقارنة بالتقارير المأخوذة في الثمانينات من الولايات المتحدة الأمريكية وهولندا.
- هذه النتائج دلالة على زيادة معلومات ووعي الممارسين العاملين في مجال صحة الفم والأسنان بالكويت.
- توصيات لتحسين الأداء في مجال الوقاية من العدوى:
- ١ - زيادة عدد الدورات التدريبية في مجال الوقاية من العدوى مع التركيز للحضور الاجباري.
- ٢ - وضع لوائح علمية دقيقة عن كيفية تطبيق وسائل الوقاية من العدوى والحد من انتشارها والحرص على تطبيقها من قبل المسؤولين.
- ٣ - يجب أن تعطى دورات تدريبية ومعلومات كافية للعاملين في مجال صحة الفم عن الأمراض المعدية وبالأخص مرض الايدز والالتهاب الكبدي الفيروسي وكيفية التعامل معه.
- ٤ - يجب تقييم كل العاملين الجدد في مجال صحة الفم وتوفير الدورات التدريبية لهم إذا استلزم.
- ٥ - على الادارة توفير كل ما يحتاجه الممارس لتطبيق أسس الوقاية من العدوى.
- ٦ - عند تطبيق نظام الوقاية من العدوى يجب معرفة التكلفة لهذا النظام ووضعه ضمن الميزانية العامة.

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In 1992, a questionnaire on infection control practices, knowledge, behavior and attitudes was distributed to all dentists (215), hygienists (12) and hygiene students (23) in the Ministry of Public Health and the College of Health Sciences in Kuwait. The response rate was 53%. Gloves, masks and full length garments were widely used; protective glasses were not. Autoclaving is universally available and was used by 94% of the respondents for sterilizing instruments. Except for second year hygiene students, compliance with disinfection of surfaces was limited. Medical history questions related to HIV infection were not generally asked. A high percentage of respondents believed they were at risk of HIV infection which was an increasing perception relative to years of experience.

Introduction

Oral health care workers are known to be at increased risk of hepatitis and HIV infection.¹³ Although the hepatitis risk has been known for years, it is clear that the routine infection control recommendations and procedures available since the 1970's had often been ignored even in highly educated groups.⁴⁵ Infection control practices in second and third world settings have not been widely documented. Furthermore, there is no information reported regarding infection control practice in Kuwait.

The oral health care system in Kuwait is primarily a national health care system, accounting for some 85% of oral health services. Personnel employed have been trained in a variety of settings worldwide. In this period of heightened awareness of infection control, the government is concerned that standardized accepted methods of infection control are followed both in the national health care system and in the private sector. A first step in improving the infection control methods is to determine current practices, knowledge and behavior among the staff trained both locally and abroad.

This study was carried out to assess and compare the infection control practices, knowledge, attitudes and behavior of oral health workers in the Ministry of Health, to compare compliance with other nations and to serve as a basis to make appropriate recommendations for improvement.

Material and Methods

A questionnaire containing 55 questions on demographic characteristics, infection control procedures, compliance, knowledge, behavior and attitudes was distributed to all dentists (215), hygienists in the Ministry of Public Health (12) and to all oral hygiene students (23) from the College of Health Sciences.

Knowledge and behavior attitudes were assessed using a Likert scale (ranging from strongly agree to strongly disagree). Infection control practices were evaluated by (1) yes/no responses; or (2) on a scale from always, more than the time, less than the time, never or (3) fill in the answer. The questionnaire was tested in 1990 (pre-invasion), was revised and took 15-20 minutes to complete. To increase the response rate, follow-up letters and telephone calls were made.

Statistical Methods

Kruskal-Wallis one-way analysis of variance (ANOVA) was used to test the difference among more than two groups and the Mann-Whitney was used in case of two groups. The Chi-square test was used to test the difference among proportions. In case of 2 x 2 contingencies tables with small observations, Fischer's Exact Test was adopted. For all tests, $p \leq 0.05$ was considered significant.

Results

Demographic data for the studied sample is shown in Tables 1-3. The response rate was 73% for hygiene students, 100% for hygienists and 47% for dentists, for a mean response rate of 53%. The mean ages were first year students, 20.6 years; second year students, 23 years; hygienists, 29 years; dentists, 37 years.

The mean number of years since graduation (excluding students) was 11.5 years. More than

Table 1. Distribution of respondents by age.*

Age	Number	Percentage
< 29 years	35	26.3
30-39	62	46.6
40-49	26	19.5
50 +	10	7.5

* May not add to 100% due to missing responses or rounding.

Table 2. Distribution of respondents by year of graduation.*

Year	Number	Percentage
Students	19	14.3
1980-1989	54	40.6
1970-1979	45	33.8
1960-1969	7	5.3
1950-1959	2	1.5

* May not add to 100% due to missing responses or rounding.

Table 3. Distribution of respondents by year of experience.*

Year	Number	Percentage
Students	19	14.3
< 5 years	15	11.3
5- 9	22	16.5
10-15	61	45.9
20-29	13	9.8
30 +	3	2.3

May not add to 100% due to missing responses or rounding.

three fourths (76.7%) of dentists were trained in the Middle East. Kuwaitis represented 32.3% of respondents. Males and females were equally represented.

The primary sources of infection control information (Table 4) were journals (55.4%) and infection control personnel (51.5%). Only 15.4% of respondents had received formal courses in infection control. Dentists trained outside the Middle East were significantly ($p < 0.05$) more likely to obtain information from journals (78.6% vs. 49.0%) and from books (67.9% vs. 34.3%).

Compliance with universally recommended infection control procedures (Table 4) varied. Gloves, masks and garments were routinely worn by most of the respondents (80.98%, 75% and 98%, respectively). Protective glasses were worn by only 52.4% of respondents.

Table 4. Infection control health questions and needle puncture. Percent of responses.

	% Respondents (Answering Always)		% Respondents (Answering Always)
Source of Infection Control Information		Use of Gloves-Cross Infection	
1. Journals	55	1. Change gloves between patients	95
2. Infection Control Personnel	52	2. Remove and replace gloves after phone use	70
3. Printed material	44	3. Change gloves when patient leaves	57
4. BOOKS	42	4. Wear gloves while reviewing reports	23
5. Professional associates	20	5. Use gloves for more than one patient	4
6. Formal courses	15		
7. Sales agents	9		
Use of Barrier Techniques		Disinfection of Surfaces	
1. Wear uniforms	98	1. Handpiece	84
2. Autoclave handpiece	94	2. Air/water syringe	76
3. Use paper towels	91	3. Instrument tray	67
4. Wash ungloved hands	84	4. Spittoon	59
5. Use face mask	75	5. Suction hose	56
6. Use liquid chemical sterilization	72	6. Headrest	48
7. Use glass face shields	52	7. Handpiece connection	41
8. Autoclave burs	38	8. Light handles	40
		9. Counter handles	31
		10. Counter tops	28
		11. Switches	16
Use of Gloves in Various Procedures		Health History Questions	
1. Surgery	98	1. History of hepatitis	
2. Endodontics	96	2. Hepatitis or HIV risk	
3. Periodontics	94	3. Ulcers	
4. Pedodontics	93	4. Swollen nodes	
5. Fixed prosthetics	93	5. Sudden weight loss	
6. Restorative	91	6. Sexual history	
7. Sealing only	91		
8. Removable prosthetics	88		
9. X-ray procedures	86	Needlestick or Instrument Puncture	
10. Orthodontics	81	in the last three months	
11. Diagnostic procedures	80	1 month	Mean No. 0.7
		3 months	Range 0.3-3.5
			2.3
			1.4-7.5

The routine use of gloves ranged from 98% to 80% depending on the type of procedure carried out. Fifty-seven percent of respondents change gloves when they leave the patient; 70% change gloves when they use the phone; 23% use gloves while reviewing the records.

Autoclaves are universally available in Kuwait and were used in most clinics (94%). However, only 38% of respondents autoclave burs. Dentists trained outside the Middle East were significantly ($p < 0.05$) more likely to autoclave burs (66.7% vs. 28.2%). Among respondents using liquid chemical sterilization (72%), 54% used glutaraldehyde, 17.8% used alcohol alone, 17.8% used alcohol-glutaraldehyde and 10% used sodium hypochlorite. Sterilization times reported from the different methods were less than recommended in all cases.

Only second year hygiene students disinfect work surfaces. The hygiene students were significantly ($P < 0.05$) more likely to routinely disinfect work surfaces than other groups. Such compliance was still at unacceptable level, e.g. the treatment light handles (58.3% vs. 30.9%), head rests (66.7% vs. 39.8%), instrument trays (82.9% vs. 59.0%), suction hose (70.3% vs. 50.0%), chair switches (37.5% vs. 9.8%), cabinet handles (53.1% vs. 21.7%), cabinet tops (56.3% vs. 43.8%), hand-piece connections (68.6% vs. 28.6%).

Seventy-five percent of the respondents disposed off needles in the safety container provided. Seventy percent reuse the needle for the same patient and most of them (95.4%) recap the needle for injection.

Compliance with asking recommended questions relating to HIV, AIDS and other infections was generally weak, ranging from 13% for "sexual history" to 60% for "history of hepatitis" as shown in Table 4. Although 80% take a medical history, less than two-thirds (64%) record the history. Similarly, 75% take a dental history, but less than two-thirds (64%) record the dental history. Kuwaitis were significantly ($P < 0.05$) more likely than non-Kuwaitis to record a medical history (76.7% vs. 59.3%), take a dental history (92.9% vs. 67.8%) and record a dental history (79.1% vs. 55.2%).

The mean number of self-inflicted needle or instrument punctures (Table 4) was 0.7 per last month, and 2.3 per the last 3 months, with a range of 0.3 to 3.5 for the last month.

Almost all respondents (96-99%) agreed that homosexuals, bisexuals, heterosexuals sharing partners, prostitutes, infants of HIV-positive mothers and drug abusers are at increased risk to HIV infection (Table 5). More than four-fifths (83-86%) felt that hemophiliacs, sexual partners of hemophiliacs and health care workers are at

Table 5. HIV-related knowledge questions (percent of respondents that agree/strongly agree and mean score).

Questions	No. of Respondents (%)	Mean Score*
Patients at Risk		
- Heterosexuals sharing partners	99.0	+ 1.79
- Hemophiliacs	83.2	+ 1.26
- Bisexual males, homosexuals	98.4	+ 1.83
- Needle sharing drug abusers	99.1	+ 1.87
- Prostitutes	96.7	+ 1.82
- Infants of mothers with AIDS	99.2	+ 1.76
- Health care workers	83.8	+0.96
- Reducing sexual partners, reduces risk	91.0	+ 1.37
- Sexual partners of hemophiliacs	86.0	+ 1.28
Transmission of HIV by:		
- Semen	79.7	+ 1.27
- Blood	97.6	+ 1.80
- Saliva	61.7	+0.62
Signs in the Oral Cavity		
- Early signs of HIV found in the oral cavity	74.8	+0.91
- Hairy leukoplakia	57.0	+ 0.58
- Red, blue, purple plaques/nodules	78.2	+ 1.05
- Gingival and periodontal lesions	77.5	+0.88

Mean Score ranges from +2 (strongly agree) to -2 (strongly disagree)

increased risk. Sixty-one percent believed saliva is a mode of HIV transmission, while 80% agreed that HIV is transmitted through semen. Knowledge of the oral signs and symptoms of HIV infection varied, 57-78%.

When analyzed by experience, students were significantly more likely to agree that signs of AIDS are found in the oral cavity ($p < 0.05$) which was in contrast to respondents with more than 10 year experience. Students also agreed that HIV is transmitted through saliva ($p < 0.01$) which was in contrast to respondents with 10 or less years experience.

Respondents with 10 or less years of experience, as well as those with 10 or more years of experience were significantly ($p < 0.05$) more likely than students to agree that hemophiliacs are at an increased risk, a positive HIV test indicates exposure to HIV, hemophiliacs can be exposed to HIV through blood transfusions and hepatitis B infection control procedures are adequate protection against HIV transmission in the dental setting. Respondents with 10 or more years of experience were significantly ($p < 0.05$) more likely than those with 10 or less years experience to agree that saliva is a mode of transmission and was significantly

more likely than students to agree that HIV is transmitted in semen.

The perceived fear of the AIDS patient was significantly ($p < 0.05$) higher in the group with 1-10 years experience, and was higher in those trained outside the Middle East (Table 6). A large majority of respondents do not feel they have the skills or knowledge to identify (72.7%), treat (67.3%) or refer (53%) the AIDS patient. Ninety percent of respondents felt that the AIDS patient should not be treated in the routine clinical setting.

When analyzed by experience, respondents with 10 or less years experience and those with more than 10 years experience were significantly ($p < 0.05$) more likely than students to believe that treating the HIV positive patient increases the health care worker's risk of contracting the virus, to be fearful of treating, and to feel at risk if they treat. Those with 10 or less years experience were significantly more likely than those with 10 or more years experience to believe that treating the HIV positive patient increases the health care worker's risk ($P < 0.05$) and that the staff would be willing to treat these patients ($p < 0.05$).

Dentists trained outside the Middle East were significantly more likely to believe that the staff would

Table 6. Questions on behavior/attitude towards AIDS/ARC patients (percent of respondents that agree/strongly agree and mean score).

Questions	No. of Respondents (%)	Mean Score*
Concerns for personal health and safety		
- If I treated patients with AIDS/ARC, I would be placed at increased risk.	76.7	+ 1.04
- I would be fearful if I had to treat people with AIDS/ARC.	78.2	+0.98
- I would feel at risk for AIDS I had to treat people with AIDS/ARC.	86.5	+ 1.31
Perceived difficulty in managing staff		
- It would be difficult to deal with staff fears about patients with AIDS.	89.7	+ 1.33
- My staff would be willing to treat patients with AIDS/ARC.	30.2	-0.27
Fear of losing other patients		
- If I treat people with AIDS/ARC, my other patients may be reluctant to continue in my care.	83.6	+ 1.19
Lack of appropriate skills		
- I have the skills I need to effectively and safely treat people with AIDS/ARC.	32.7	-0.44
- I know how to determine if patients are at risk for AIDS.	43.4	-0.14
- I know how to screen for AIDS/ARC.	27.3	-0.46
- I know when to refer patients with AIDS to physicians for medical problems.	47.0	-0.06
- AIDS patients should not be treated in the regular clinic.	90.0	+ 1.45

*Mean score ranges from + 2 (strongly agree) to -2 (strongly disagree).

be willing to treat ($p < 0.01$), that they know how to determine if a patient is at risk ($p < 0.01$) and that they know how to refer the AIDS patient ($p < 0.05$).

Respondents with 10 or more years experience were significantly more knowledgeable on how to screen AIDS patients ($p < 0.01$) and how to refer this patient for medical problems ($p < 0.001$) than the students.

Discussion

All data is self-reported and caution should be used in interpreting and generalizing the findings. This is a first time study in Kuwait. Collection of data of this nature provides a basis for decision making and training programs for Oral Health Services in the Ministry of Health which provides some 85% of oral health care in Kuwait.

The observations that very few respondents have had formal courses in infection control practices is significant. The fact that only 8% of the hygienists, who are hired from the Philippines reported having had a course in infection control further calls for corrective action. The compliance with internationally recommended procedures was weak for a number of procedures. These procedures include wearing protective eye wear, disinfection of surfaces, sterilization of burs and handpieces, use of liquid chemical sterilants and appropriate times for chemical sterilization, disposal of needles, taking and recording of medical/dental histories which contain the appropriate health questions for the 1990's. Analysis of the different groups suggests that hygiene students received training in Kuwait are more likely to practice appropriate infection control procedures than are the government dentists who have been trained in variety of settings.

The mean exposure to skin puncture per month (0.7) was similar to that reported in the USA (0.6) in 1988,¹ although the 3-month mean if projected over a year (9.2) would be much greater than reported in England in 1990 (4.9) for dental students and dentists.⁶ The expected number of skin punctures yearly in some individuals is of concern. Number of punctures can be used as proxy for potential exposure over the long term; the probability of HIV infection can increase with frequency of exposure.²

Knowledge of HIV/AIDS generally increased with age and response rates were comparable to those recorded in California in 1986.⁵ Knowledge of oral signs and symptoms of HIV infection varies, ranging to as low as 57% of respondents identifying hairy leukoplakia as associated with HIV infection. Sixty-two percent of respondents believed saliva to be a mode of HIV transmission although the scientific literature does not support this response.⁷

Fifty-seven percent of senior hygiene students reported asking medical questions to determine if the patient is an HIV risk. Overall, only 38.5% of respondents asked about HIV risk. These relatively low percentages reflect the absence of HIV questions on the standard medical history form in the hygiene school and in Oral health Services. In 1988 in Amsterdam, only 30% of respondents asked the patient about HIV risk.⁹

Kuwaiti's (students and dentists) were more likely to take and record histories, a reflection of their local (hygienists) training and their international training (specialists) in North American and Europe.

Most respondents felt they did not have the skills to treat an AIDS patient effectively and safely, feared treating the AIDS patient, and believed that the auxiliary staff would resist receiving these patients. The respondents fear of increased risk, fear of treating and perceived difficulty with staff (78-90%) were higher than reported by Gerbert⁵ in California (76-80%) in 1986.

When compliance with selected infection control procedures is compared with other countries, the respondents in Kuwait have similar or higher compliance except for the routine use of protective glasses (Table 7). Further, respondents in Kuwait answered questions structured to give: "always, more than the time, less than 1/2 the time, Never" answers, while respondents in some countries (Table 7) answered a yes/no response without concern for the percentage of compliance time. The questions in the Kuwait survey therefore can give a more accurate picture of the use of internationally accepted infection control procedures in Kuwait viz-a-viz those used in other countries.

The worldwide concern for implementation of infection control procedures and the massive educational effort to inform the profession is bearing some fruit in Kuwait. While the AIDS epidemic remains negligible in Kuwait, the efforts of the gov-

Table 7. International comparison of compliance with selected infection control procedures in percent.

Device	Site and Year						
	Kuwait (1992)	(A) USA National (1989)	(B) California ¹ (1987)	(C) Minnesota (1989)	(D) Amsterdam (1989)	(E) USA City (1990)	(F) Minnesota Hygienists(1990)
Gloves	80-98*	76	80	86	95	86	98
Masks	75	47	70	54	84	67	64
Glasses	52	82	N.I.	88	90	89	65
Garments	98	71	33	N.I.	100	N.I.	54
Autoclave	94	N.I.**	91	N.I.	89	N.I.	N.I.

Source: (A) Verrusio, 1989¹
 (B) Gerbert, 1987²
 (C) DiAngeles, 1989³
 (D) terHorst, 1989⁴
 (E) Rydman, 1990⁵
 (F) Hastreiter, 1990⁶

* Range for selected procedures, e.g. examination, restorative, endodontics, see Table 4.

** N.I. = No Information

ernment to educate the profession through continuing education and in-service training can reduce future risks to health care workers. Increased awareness through education can help to reduce the perceived fear oral health care workers have in treating HIV-positive patients.

Given that the profession of dentistry is relatively recent in Kuwait and that practitioners have come from a variety of third world settings, this reported compliance is indicative of improved knowledge and attitudes as well as the transfer of information to Kuwait.

Based on the analysis of responses and known practices within the public sector, several avenues of action are available to the government to improve overall infection control practices. Some primary recommendations are:

- The Ministry of Health should provide formal infection control courses to the profession with mandatory attendance for continued licensing; these courses should be interactive utilizing a variety of learning techniques, given the low response reported for reading of journals;
- Internationally recommended infection control procedures should be carried out by all staff with active monitoring of clinics by both the Oral Health Services Unit and the Infection Control Unit of the Ministry of Health to assure compliance;
- Specific educational efforts should be carried out to increase the information to the oral

health care team on the risks and concerns of treating HIV positive patients or the AIDS patient and to increase the confidence of the practitioner to treat these patients.

- An assessment of knowledge of infection control procedures and infectious diseases should be carried out for all newly-hired professional staff and formal courses provided based on the pre-course results.
- The Oral Health Services Unit should correct procedural difficulties within clinics, that are of an administrative or management nature, e.g. insufficient medical records, insufficient instruments for expected patient loads, insufficient sterile handpieces, dated health history questionnaires.
- Specific procedures, e.g. autoclaving of handpieces, use of disposable handpieces or air syringe and use of chair drapes, should be analyzed on a cost/benefit basis within a Kuwait context and presented for policy determination.

In conclusion, oral health care workers in Kuwait are reporting compliance with many of the internationally recommended infection control procedures. Specific areas of weakness related to clinical practices, knowledge, attitudes and behavior of the operator toward HIV infected patients have been identified. Specific action should be taken by the Ministry of health to reduce these areas of concern through training and improved management of this sector.

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