

Barrier techniques to infection: a national survey of pediatric dentists

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Abstract

Pediatric dentists are at increasing risk of exposure to the human immunodeficiency virus (HIV). Therefore, a nationwide survey was conducted to describe pediatric dentists' use of barrier techniques and infection-control procedures and to identify factors that might impede their use. Questionnaires were mailed to a random sample of 1581 practicing pediatric dentists. Seven hundred fifty-two completed questionnaires were returned. Results showed that 95.3% of the respondents have changed some aspect of infection control during the past two years; 85.9% routinely wear gloves; 77.9% routinely wear protective glasses; and 45.6% routinely wear facemasks. Results also highlighted several problems created by the use of gloves and facemasks.

Introduction

The Centers for Disease Control estimates that 33,950 persons between ages 15 and 29 are now infected unknowingly with the human immunodeficiency virus (HIV) (Fetter 1989). Projections have indicated that by 1991 pediatric AIDS in the United States could reach 3000 cases, and pediatric HIV infection could reach as high as 20,000 cases (Nelson 1987; Hutchings 1988; Olson 1988; Sundwall and Bailey 1988). The geographic distribution of acquired immune deficiency syndrome (AIDS) already has spread from a few large cities to include suburban and rural areas (AIDS Health Care Delivery 1988; Kawata and Andriote 1988). Clearly, pediatric dentists now have an increasing risk of exposure to HIV in blood and saliva (CDC 1987a).

Over the past few years surveys have attempted to evaluate the use of barrier techniques by various dental personnel. Glove use is the barrier technique surveyed most frequently. The surveys reported that routine glove use varied from 15 to 76% (CDC 1987b; Verrusio et al. 1989). The use of protective glasses and facemasks as barrier techniques has been surveyed also. Natrass (1988) reported, for example, that 51% of dentists in Great Britain routinely wear protective glasses, while

80% of dentists in San Francisco do so. Yablon (1989) reported that 48% of dentists routinely wear facemasks, and 18% wear facemasks with some patients. Comparable data about routine facemask use was reported by Verrusio et al. (1989).

Although there have been a number of surveys about the use of infection-control and barrier techniques, the survey methods have been problematic (Palenik and Miller 1987, 1988a, 1988b; Gerbert et al. 1988; Yablon et al. 1989). Furthermore, insufficient attention has been paid to factors that influence the use of barrier techniques, and pediatric dentists as a group have not been surveyed comprehensively.

This paper reports a nationwide survey of pediatric dentists. The survey was intended to:

1. Estimate the percentages of respondents who routinely wear gloves, protective glasses, and facemasks
2. Identify factors that influence the use of gloves, protective glasses, and facemasks
3. Estimate the percentage of respondents who recently have changed some aspect of office sterilization
4. Identify factors that influence change in office sterilization.

Materials and Methods

A random sample of 1581 practitioners (approximately 40% of the nation's 3954 identified pediatric dentists) was selected from a list supplied by the American Academy of Pediatric Dentistry (AAPD). The toss of one die determined the starting point (name) on the list, and every third name was selected thereafter. Dentists who were Retired, Associate, Honorary, or not practicing full time in a pediatric practice were excluded. The sample included both pediatric dentists who were Academy members as well as those who were not.

Procedures

A survey instrument was designed to examine the use of barrier techniques and factors that might influence use of barrier techniques among pediatric dentists. Likert-type scales were used with scores along a five-point scale from *Strongly agree* to *Strongly disagree*. The survey instrument consisted of four sections:

1. Demographic data
2. Opinions concerning barrier techniques
3. Personal experiences with barrier techniques
4. Current knowledge of barrier techniques and infection control.

The survey was piloted on 30 pediatric dentists selected randomly from the target population. Twenty-one pilot surveys were returned, and no revisions in the survey instrument were deemed necessary.

A cover letter from the Executive Director of the AAPD was attached to each survey. The letter explained the importance of the survey for pediatric dentistry as a specialty.

A cover letter, survey, and stamped self-addressed envelope were mailed to each of the 1581 pediatric dentists in the sample. Subject anonymity and confidentiality were assured. A reminder postcard was mailed one week later.

Results

Of the 1581 questionnaires distributed, 792 (50%) were returned. Forty returned questionnaires were incomplete, leaving 752 (47.6%). Table 1 describes respondents' major demographic characteristics. Most were male and were members of the AAPD. All trustee districts were represented. The vast majority of practices reported a predominantly white patient group. The largest number of respondents (25.8%) reported practicing pediatric dentistry 0–5 years; the smallest, 21–25 years (7.8%).

The typical use of barrier control techniques is shown in Fig 1. Gloves are used routinely by 85.9% of the sample; protective eyewear is used routinely by 77.9%; and face-masks are used routinely by 45.6%.

Table 2 indicates the number of practices that have made specific adjustments to the presence of HIV or AIDS. The majority of respondents have made changes in their infection-control techniques, become more cautious, and have taken continuing education courses on AIDS. Most have dealt with staff concern about AIDS and have sent staff to

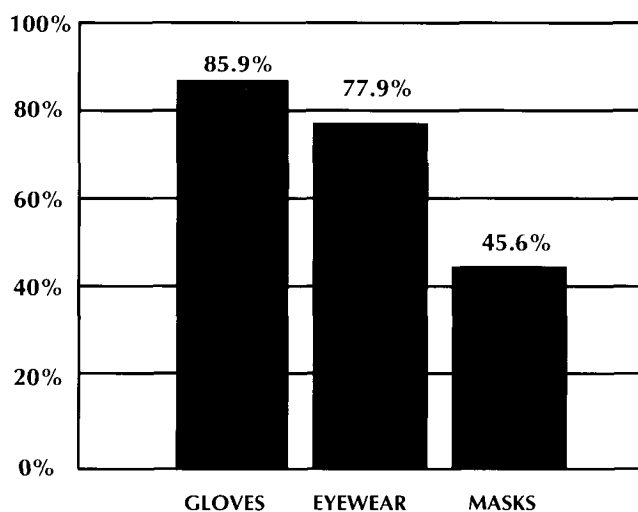


Fig 1. Percentages of pediatric dentists wearing gloves, eyewear, and masks.

TABLE 1. Demographic Characteristics of Respondents

Characteristic	Number of Respondents	Percentage (%)
Sex		
Male	636	84.6
Female	116	15.4
Membership in the American Academy of Pediatric Dentistry		
Yes	614	81.6
No	138	18.4
Trustee Districts of the American Academy of Pediatric Dentistry		
District 1 CT,MA,ME,NH,NY,RI,VT	84	11.2
District 2 DE,DC,MD,NJ,PA	79	10.5
District 3 AL,FL,GA,KY,MS,NC,SC,TN,VA,WV	162	21.5
District 4 IL,IN,IA,OH,MI,MN,NE,ND,SD,WI	155	20.6
District 5 AR,CO,KS,LA,MO,NM,OK,TX	121	16.1
District 6 AK,AZ,CA,HI,ID,MT,NV,OR,UT,WA,WY	147	19.5
Blank Responses	4	0.5
Ethnic Background of Majority of Pediatric Patients		
White	589	78.3
Mixed ethnic groups	95	12.6
Hispanic	27	3.6
Black	23	3.1
Asian	18	2.4

N = 752

continuing education courses. It is interesting that 21.4% reported treating HIV-positive patients, and 19.4% have treated patients with AIDS.

Table 3 displays the percentage of respondents who agree with various statements of opinion concerning HIV and AIDS. The two "agree" categories were combined for tabulating the data that follow. Generally, opinions were mixed on these questions. For example,

TABLE 2. Responses to Practice Information

<i>Statement</i>	<i>Number Agreeing with Statement</i>	<i>Percentage (%)</i>
The threat of AIDS/HIV has changed my office procedures in the last two years.	635	84.4
Have you made changes in infection control in your office in the past two years?	717	95.3
Has knowledge of AIDS made you more cautious?	703	93.5
Have you taken any continuing ed on infection control in the past two years?	581	77.3
Has your staff expressed concern about AIDS in the past two years?	534	71.0
Has your staff attended educational courses on AIDS in the past two years?	494	65.7
Have you treated children who are HIV-positive with no signs or clinical symptoms?	161	21.4
Have you treated children with AIDS/HIV?	146	19.4

N = 752

TABLE 3. Opinions Concerning Barrier Techniques

<i>Statement</i>	<i>Number Agreeing with Statement</i>	<i>Percentage (%)</i>
All children in a pediatric dental practice should be treated as if they were carriers of the AIDS/HIV virus.	381	50.7
Pediatric dentists have little risk of becoming infected with AIDS/HIV.	368	48.9
The Federal Government has been ineffective in its efforts to control spread of AIDS.	333	44.3
AIDS is a serious threat to pediatric dentists.	297	39.5
I am concerned about the possibility of contracting AIDS/HIV from children treated in my dental practice.	294	39.1
I would feel comfortable treating children with AIDS/HIV.	272	36.1
Cost of barrier techniques acts as a deterrent to use.	224	29.8
The media overdramatize the seriousness of AIDS	183	24.3
If I'd known about AIDS, I might not have chosen dentistry as a career.	71	9.5

N = 752

half of the respondents indicated agreement that all children should be treated as if they were carriers of the virus, while nearly half agreed that pediatric dentists had little risk of becoming infected with AIDS.

Table 4 (next page) reports the percentage of respondents who agreed with various statements about wearing protective eyewear. No negative factors were widely endorsed as problematic for pediatric dentists.

Table 5 (next page) reports responses to similar statements concerning the use of gloves. The statements that patients complain about the taste and smell of gloves were supported widely, as were the statements that gloves have a negative impact on both manual dexterity and efficiency.

Table 6 (next page) reports responses to similar statements about facemasks. The statements point to impaired communication, fogging of glasses, and discomfort as deterrents to wearing facemasks. Nearly half of the respondents noted concern over facemasks creating anxiety in children.

Seven items on the survey dealt with knowledge about HIV transmission, barrier techniques, and other infection-control procedures. Generally, a high degree of knowledge was demonstrated. For example, 90.7% of the respondents agreed that handpieces, prophylaxes and instruments always should be disinfected postoperatively, and only 8.6% agreed that alcohol is an effective surface disinfectant. However, there are gaps in consensual knowledge. For example, 56.5% of the respondents neither agreed nor disagreed with the statement that one-third of all sterilizers fail to sterilize adequately.

Six items on the survey listed potential information sources (e.g.: CDC guidelines) and asked whether each source had influenced the respondents' infection-control procedures. Journal articles (70.8%), OSHA guidelines (70.4%), ADA guidelines (69.5%), and dental meetings (62.8%) were supported frequently.

Discussion

Overall, the data suggest that respondents are making efforts to comply with infection-control recommendations; however, some practitioners still are not using gloves, many are not using protective glasses, and more than half are not using facemasks. These data are consistent with previous surveys that indicate partial adherence to recommenda-

tions and guidelines (Field et al. 1988; Yablon et al. 1989). The surveys indicate an increase in routine glove and eyewear use and a slow rise in facemask use.

Professional education about the transmission of HIV, AIDS, barrier techniques, and infection control has produced dramatic behavior changes among dentists. Clearly, the educational effort should be continued. At the same time, it might be beneficial for researchers to focus on identifying and addressing those factors that directly impede use of barrier techniques.

The respondents' major objections to wearing gloves were children's complaints about taste and smell, and impaired manual dexterity. Hence, research might be directed toward developing gloves that minimize these aversive experiences.

The respondents had no major objections to protective eyewear aside from discomfort. Researchers could seek to develop protective eyewear that minimizes discomfort.

Impediments created by the use of facemasks were more complex: "affecting communication," "fogging glasses," "uncomfortable to wear," and "creating anxiety in children" were noted widely. Notwithstanding the added complexity, research could proceed along lines of developing facemasks that reduce these problems. For example, transparent masks might improve and enhance communication.

The survey results raise some interesting questions about the connections between behavior and cognition among pediatric dentists. While 95.3% of the respondents recently have made changes in infection control, only 39.5% agreed that AIDS was a "serious threat to pediatric dentists," and only 39.1% were concerned about contracting AIDS. There is no convenient explanation, therefore, of what motivated the respondents to change. A survey that identifies reasons for the changes that have been made might be beneficial in designing strategies to promote continued change.

Caution should be used in generalizing the results reported here to physicians or dentists other than pediatric dentists, and to pediatric dentists who do not respond to surveys. In the latter case, it is not unreasonable to suppose that nonrespondents differ systematically from respondents with regard to infection-control issues.

TABLE 4. Factors Affecting Use of Protective Eyewear

<i>Eyewear Factors</i>	<i>Number Agreeing with Statement</i>	<i>Percentage (%)</i>
Protective eyewear is uncomfortable to wear.	201	26.8
Protective eyewear detracts from my personal appearance.	101	13.4
Protective eyewear causes apprehension in my patients	95	12.6
Protective eyewear distorts my vision	80	10.6
Protective eyewear reflects an irritating glare from lights.	60	7.9
Protective eyewear affects my depth perception.	57	7.6

N = 752

TABLE 5. Factors Affecting Use of Gloves

<i>Statement</i>	<i>Number Agreeing with Statement</i>	<i>Percentage (%)</i>
Patients complain about glove taste.	419	55.7
Gloves affect my manual dexterity.	409	54.4
Patients complain about glove smell.	348	46.3
Gloves slow down my speed and efficiency.	340	45.2
Powder in gloves is irritating to me.	319	42.4
I experience excessive perspiration.	275	36.6
Gloves smell unpleasant to me.	239	31.8
Cost of gloves influences number of changes	201	26.7
Patients complain when I wear gloves.	163	21.6
Gloves break out my hands.	159	21.1

N = 752

TABLE 6. Factors Affecting Use of Facemasks

<i>Statement</i>	<i>Number Agreeing with Statement</i>	<i>Percentage (%)</i>
Wearing a mask affects communication with my patients.	498	66.2
Wearing a mask causes my glasses to fog.	489	65.0
Wearing a mask is uncomfortable.	470	62.5
Wearing a mask seems to create anxiety in the children I treat.	369	49.1
Wearing a mask detracts from my appearance.	285	37.9
Wearing a mask makes me feel claustrophobic.	186	24.8
Wearing a mask restricts my clinical activities.	133	17.7

N = 752

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Short-term life expectancies for many AIDS victims improving *continued from page 146*

There, only 10.3% of PCP-diagnosed AIDS patients survived one year in 1982. Five years later, that figure rose to 17.9%.

Both studies point to the introduction and use of the drug azidothymidine (AZT), also known as zidovudine, as a possible partial reason behind the short-term life expectancy improvement.

In the Harris study, nearly 37,000 AIDS cases from January 1984 through September 1987 were reviewed from the Centers for Disease Control in Atlanta, GA. An improved short-term survival trend was seen in homosexual men, in male and female intravenous drug users, in all age groups and from all geographic regions.

The researchers in San Francisco surveyed 4,323 cases and found men survived "significantly longer" than women. And those patients infected through blood transfusions died much faster than those infected in other ways.

Both studies also found those AIDS patients who first showed signs of infection that included more than PCP have not seen their short-term life expectancies improve significantly.

While these studies point to short-term improvements, the long-term prognoses are not as promising. Of the 112,241 AIDS cases reported to the CDC as of October 31, 1989, 59% are known to have died.