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Dental hygienists behaviour towards HIV-positive patients in highly active antiretroviral therapy era: a pilot survey

Abstract: *Objectives:* Literature reports highlighted the presence of discriminatory episodes towards individuals infected with human immunodeficiency virus (HIV) on behalf of dental care workers. The purpose of this study was to assess hygienists' attitude when treating HIV-infected individuals in the era of highly active antiretroviral therapy (HAART). *Methods:* A national observational study was carried out on all the members of an Italian hygienist association. An anonymous questionnaire was mailed to 1247 hygienists: the questionnaire investigated demographic data, the relationship between the hygienists and HIV-infected persons, to identify the presence of discriminatory behaviour, the hygienists' scientific knowledge of HIV-related problems and the precautions normally used in the office to prevent cross-infections. *Results:* Of the 1247 questionnaires that were delivered to hygienists, 287 (23%) were completed and returned within a 6-month period. A total of 287 hygienists answered the question 'Did you ever deny treatment to an HIV-infected persons?' and 17 hygienists (5.9%) replied 'Yes'. Protective eyewear [odds ratio (OR), 0.036; 95% confidence interval (CI), 0.002–0.818; $P = 0.037$] and public practice [OR, 2.93; 95% CI, 0.97–8.87; $P = 0.057$] were associated with refusing to treat HIV-infected persons. *Conclusion:* Our findings highlight the existence of episodes of discrimination by some hygienists towards HIV-infected individuals. From clinical point of view, this discriminatory behaviour may expose the dental health care workers and their patients to a greater risk of cross-infection.

Key words: dental hygienists; discrimination; highly active antiretroviral therapy era; human immunodeficiency virus

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Introduction

In the last decade, the number of HIV-infected persons has grown, due to the epidemic spread and to the increased life-expectancy, thanks to the introduction of highly active antiretroviral therapy (HAART), the result being a more frequent request for health treatment not directly related to HIV infection such as dental care. The increased number of dental procedures on HIV-infected persons exposes dental workers (dentists, hygienists, dental chair assistants) to the risk of contagion due to accidents during dental health care procedures. As reported in literature, the fear of interacting with HIV-infected persons led to the onset of discrimination episodes on behalf of health care workers, including dental

care workers. Furthermore, HIV infection, as in cases of HBV and HCV, due to the possible parenteral transmission, can be considered as an occupational hazard for the dental care workers and a biological hazard for dental patients (cross-infection) if the routine prevention, disinfection and sterilization protocols have not been carefully performed (1–5).

In this particular framework, all the dental care workers can play a fundamental role in the prevention of the spread of infection and, in some case, contribute to the HIV diagnosis, and furthermore they have the moral and professional duty to treat all patients in the same safe way without any discrimination. Any discriminatory behaviour, besides being ethically unfair, does not protect themselves or others from contagion risk and cross-infection; in fact, some people might not be aware of their seropositivity status or choose to hide it from the dental care workers resulting in the possibility that many dental care workers could threat HIV-infected persons without knowing it (2, 6, 7).

The purpose of this study was to assess the relationship existing between HIV-infected persons and dental hygienists, working in both public and private dental health care structures, in HAART era. In particular, the level of discomfort perceived by hygienists during the treatment of HIV-infected persons was assessed, as well as any discriminatory attitude on their part, their knowledge of the infection, and finally, the application of normal hygienic (disinfection and sterilization) procedures, to avoid professional exposure and cross-infection. A careful description and a full understanding of the numerous delicate interpersonal problems arising between hygienists and HIV-infected persons are both essential to avoid discrimination and to offer patients the best possible dental health care.

Study population and methodology

An Italian observational survey (i.e., cross-sectional) was carried out on hygienists. To this purpose, an anonymous questionnaire was developed by two dentists, an hygienist, a specialist in infectious diseases and a psychologist and was mailed to all dental hygienists (1247 hygienists) members of an Italian association (Unione Nazionale Igienisti Dentali, UNID). The number of working hygienists in Italy is approximately 3100 – data for all Italian hygienists were obtained from an Italian association (UNID Sede Nazionale: Via M. Battistini 209/A 00167 Roma). The questionnaire was accompanied by an informative letter, describing the purpose of the research, the modalities to fill in the questionnaire and the anonymous procedure of the study. Informed consent was not requested, because it was considered given indirectly when participants complete and return questionnaire. A prestamped envelope, bearing the printed address of the Dental Clinic of the Catholic University, was also included, so as to facilitate its return. About 10 min were needed to fill in the questionnaire. A 6-month period was fixed for data collection, at the end of which the study was considered completed.

Structure of the questionnaire

The questionnaire was structured into four major sections. The aim of the first section was to investigate personal demographic and epidemiological data (i.e., gender; age; area where the professional activity is mainly performed – north, centre, south; university diploma or degree in dental hygiene – in Italy, the degree in Hygiene was instituted in the 1980s; the year when they graduated; public or private practice). The aim of the second section was to investigate the relationship between hygienists and HIV-infected persons, to identify the presence of discriminatory behaviour and understand the motives. The third section was aimed at investigating the scientific knowledge of hygienists on HIV-related problems. Finally, the aim of the fourth section was to ascertain the precautions normally taken during the practice and the cleaning and/or sterilization procedure, to avoid the spread of infection between dental health care workers and patients and among patients. The second, third and fourth sections included items requiring a yes/no answer, as well as a few multiple choice questions (just one answer being allowed).

Statistical analysis

Quantitative variables were tested for normal distribution and compared by means of Student's two-tailed unpaired *t*-test. Differences between group proportions were assessed using chi-square test or Fisher's exact test. Odds ratios (OR) were calculated to identify the association between discriminating behaviour against HIV-infected individuals and other study variables. To determine the statistical significance of the OR, 95% confidence intervals (95% CI) were used. Variables that were shown to be risk factors for discrimination at the univariate analysis were then introduced in a multiple regression model, to assess whether risk factors were reciprocally independent. Two-tailed tests of significance at the $P \leq 0.05$ level were used to determine statistical significance. Statistical analysis was performed using the software program Intercooled Stata 8.0 (Stata Corporation, College Station, Texas, USA).

Results

In all, 1247 questionnaires were mailed, two of which were returned due to mailing problems. Of the 1245 questionnaires that were actually delivered to hygienists, 23% (287 hygienists) of them were completed within 6 months. It is important to note that not all participants answered each question, so the denominator changed for each question. A total of 287 hygienists answered the question 'Did you ever deny treatment to an HIV-infected person?', and 17 hygienists (5.9%) replied 'Yes'. This dichotomous variable was considered a proxy of discriminatory attitude and was used to compare the two groups of hygienists: those with and those without this attitude. The comparison between the demographic and epidemiological data of the two groups is summarized in Table 1. The variable

'practice' was statistically associated with the refusal to treat HIV-infected persons ($P < 0.005$), being particularly present among those hygienists who work in public structures. On the contrary, neither the type of degree or diploma (in Italy the degree in Dental Hygiene was instituted only in the late 1990s), nor the age, even when expressed by decade, showed any different distribution between the two groups of hygienists. Moreover, 2.8% (eight hygienists) of hygienists replied 'yes' to the question whether it is correct to refuse to treat HIV-infected persons.

Data regarding variables such as 'level of experience in treating HIV-infected persons', 'fear of treating HIV-infected persons' and 'the type of treatment performed on HIV-positive individuals' are reported in Table 2. 'Fear of treating HIV-infected persons' and 'the type of treatment performed on HIV-positive individuals' was statistically associated with the refusal to treat HIV-infected persons (both $P < 0.05$.).

Table 3 shows some questions and answers from the questionnaire.

Table 4 shows data on the perception of the hygienists' scientific knowledge, the ways to further increase their scientific knowledge, the request for further educational efforts and opinions on HIV infection transmission pathways, whereas Table 5 shows data on precautions that are usually adopted to prevent the transmission of cross-infections.

When we consider the sample in general, 66.5% declared that, in the event of contagion with HIV-infected blood, they know they can carry out a post-exposure prophylaxis with anti-HIV drugs; 20.4% of hygienists are aware of the fact that, for

Table 2. **Level of experience in treating HIV positive subjects; level of fear perceived when treating HIV-positive subjects; types of treatment performed on HIV-positive patients: general data and stratification according to their refusal to treat HIV-positive subjects**

	Discrimination	
	Not refused treatment	Refused treatment
Level of experience		
Number of valid answers	270	17
High (>20 treatment procedures on HIV-positive subjects) (%)	5.9	0
Intermediate (10–20 treatment procedures on HIV-positive subjects) (%)	9.3	0
Low (1–9 treatment procedures on HIV-positive subjects) (%)	48.1	64.7
No experience (%)	36.7	35.3
Level of fear*		
Number of valid answers	251	16
High (%)	18.3	43.8
Moderate (%)	54.6	50.0
Mild (%)	27.1	6.3
Types of treatment*		
Number of valid answers	176	11
All types of treatment required (%)	47.2	18.2
Ultrasound scaling (%)	46.6	54.5
Mainly scaling and root planning (%)	5.7	18.2
Mainly hygiene instructions (%)	0.6	9.1
Mainly bleaching	–	–

*$\chi^2 P < 0.05$.

Table 1. **Demographic features of the 287 hygienists who completed and returned the questionnaire, stratified in accordance to their behaviour (17 who refused and 270 who did not refused treatment to HIV-infected persons)**

		Discrimination	
	Total population	Not refused treatment	Refused treatment
Number of valid answers	287	270	17
Mean age (years ± SD)	33.2 ± 8.6	33.4 ± 8.4	30.4 ± 11.1
Gender (%)			
Male	77 (26.8)	70 (25.9)	7 (41.2)
Female	210 (73.2)	200 (74.1)	10 (58.8)
Type of degree* (%)			
Degree	219 (83.6)	207 (83.8)	12 (80.0)
Diploma	43 (16.4)	40 (16.2)	10 (20.0)
Graduation year (year ± SD)	2002.5 (±4.4)	2002.6 (±4.1)	2001.0 (±8.0)
Area of residence (%)			
North	34.1	34.1	35.3
Centre	58.2	57.8	64.7
South and Islands	7.7	8.1	0
Practice† (%)			
Private	80.6	83.1	41.2
Public	15.1	12.7	52.9
Both	4.2	4.1	5.9

Data are presented as mean ± standard deviation or number (%).
HIV, human immunodeficiency virus.
*In Italy the degree in Dental Hygiene was instituted only in the late 1990s.
†$\chi^2 P < 0.005$.

Table 3. **Some questions and answers from the questionnaire**

Questions	No of valid answers	Answer 'yes' (%)
Do you need to know if the subject you are treating is HIV positive?	281	266 (94.6)
Do you think it is a difficult to ask the patient HIV status?	284	111 (39.1)
Do you believe that patients who know they are HIV positive reply 'Yes' to the question?	286	28 (9.8)
Do you adopt special precautions when treating HIV-positive individuals?	282	240 (85.1)
Would you consider all your patients as being potentially HIV positive, in order to prevent cross-infection?	286	259 (90.6)
Do you charge a different fee to HIV-infected persons?	276	5 (1.8)
Did your patients ask you whether you treat HIV-infected persons?	286	66 (23.1)
Did your patients ask you what kind of measure you adopt to prevent transmissible infections in your office?	287	214 (74.6)
Do you feel more stressed when treating HIV-infected persons?	283	171 (60.4)

No statistically significant differences were found for the above-mentioned variables between the groups of hygienists who did and who did not discriminate against HIV-infected persons.

Table 4. **Perception of hygienists own scientific knowledge, ways used to increase their scientific knowledge, request for further educational efforts and opinions on HIV infection transmission pathways**

	Discrimination	
	Not refused treatment (270 questionnaires) (%)	Refused treatment (17 questionnaires) (%)
Perception of hygienists' scientific knowledge		
Good	193 (76.9)	14 (82.4)
Bad	58 (23.1)	3 (17.6)
Ways used to further increase their scientific knowledge		
Meetings	26 (9.9)	2 (11.8)
Books	36 (13.7)	–
Journals	12 (4.6)	1 (5.9)
Colleagues	3 (1.1)	1 (5.9)
Internet	9 (3.4)	–
University courses	176 (67.2)	13 (76.5)
Request for further educational efforts (%)	100	100
Opinions on HIV infection transmission pathways*		
Parenteral (including gender)	264 (98.5)	14 (82.4)
Orofecal route	3 (1.1)	2 (11.8)
Through saliva	1 (0.4)	1 (5.9)
Through social life (excluding gender)	–	–

*$\chi^2 P < 0.01$.

over 10 years, a tool-free number has been available at the AIDS Operative Centre of Istituto Superiore di Sanità, to receive information on HIV infection, with the guarantee of remaining anonymous and 1.5% has called that number during their professional career. No statistically significant differences were found for the above-mentioned variables between the groups of hygienists who did and who did not discriminate against HIV-infected persons.

When investigating the reasons why hygienists denied treatment to HIV-positive subjects: 15 of 17 hygienists answered the question and 80% did so for fear of getting the virus themselves, 6.7% did so for fear of spreading infection to other patients, whereas 13.3% for fear of losing patients. When we consider the motives given to the patients by hygienists who refused treatment, 11.8% told their patients that they lacked specific training, 11.8% said they did not have specific tools, 23.5% sent patients to an HIV-specialized centre, 5.9 found other motives and 47.1% sent back the patients to the owner of the practice.

The Odds Ratios for the variables that were related to the refusal to treat HIV-infected persons are reported in Table 6.

Discussion

The aim of this study was to evaluate the relationship existing between HIV-infected persons and dental hygienists as reported by hygienists in HAART era. The study was performed on the basis of some major considerations: first of all, two recent studies carried out on HIV-infected persons and on Italian dentists highlighted that a number of discriminatory episodes, although few, still occur today in Italy (2, 8). These studies pointed out the presence of an understandable discomfort felt by dentists when treating HIV-infected persons, the difficulties encountered by HIV-infected persons when seeking dental treatment and the possible reticence about the seropositivity on behalf of HIV-positive patients. Then considering previous literature, few studies tried to describe the relationship between hygienists and HIV-positive patients, the majority of which were carried out in the pre-HAART era (before 1998) and not even one in Italy. Furthermore, all these studies focused mainly on the infection control procedure adopted by hygienists more than on the complex interrelation, which happens when treating HIV-infected persons (9–13). Moreover, only in recent years, in Italy, the professional figure of hygienist has appeared, first with the university diploma in Dental Hygiene and then with the recent degree in Dental Hygiene (since the late 1990s). The importance of the professional role played by the dental hygienist inside the dental office comes from the fact that he/she can do clinical procedures (from the prevention of important oral diseases to more invasive procedures such as scaling and root planning) and contribute to the management of the clinical practice (disinfection and sterilization of the dental chair and of the instruments). Finally, the introduction of HAART therapeutic regime has increased the

Table 5. **Precautions normally adopted to prevent transmission of cross-infections**

	Discrimination					
	Not refused treatment			Refused treatment		
	No of valid answers	Results	%	No of valid answers	Results	%
Gloves	269	269	100	17	17	100
Mask	268	267	99.6	17	17	100
Protective eyewear*	268	266	99.3	17	14	82.4
Surgical vacuum*	265	220	83.5	17	11	64.7
Head gear	263	142	54.0	17	7	41.2
Wrapping handpieces	267	223	83.5	17	13	76.5
Changing gloves between patients	268	268	100	17	17	100
Washing hands between patients	266	249	93.6	17	17	100
Sterilization of instruments	265	262	98.9	16	15	93.8
Type of sterilization						
Dry heat stove	270	4	1.5	17	17	100
Autoclave	270	267	98.9	17	17	100
Cold-chemical	270	39	14.4	17	4	23.5
Disposable instruments	269	59	21.9	17	2	11.8
Use of sterile instruments for each patient*	269	268	99.6	17	15	88.2
Using dental chair waterline disinfection system between patients	265	145	54.7	16	7	43.8
Sterilization of						
3-way syringe	268	155	57.8	17	10	58.8
Trays	268	123	45.9	17	11	64.7
Handpieces	268	264	98.5	17	17	100
Sterilization of handpieces for each patient	265	178	67.2	15	10	66.7
Washing instruments before sterilization	265	256	96.6	17	17	100
Particular protective clothing while treating HIV-positive subjects†	253	172	68.0	14	14	100

*Odds ratio reported in Table 6.
†$\chi^2 P < 0.05$.

Table 6. **Odds ratio for refusal to treat HIV-positive subjects**

	Odds ratio	CI 95%	*P*-value
Univariate analysis			
Use of sterile instruments for each patient	0.028	0.002–0.326	0.001
Protective eyewear	0.35	0.005–0.23	0.001
Surgical vacuum	0.37	0.13–1.06	0.057
Multivariate analysis			
Protective eyewear	0.036	0.002–0.818	0.037
Public practice	2.93	0.97–8.87	0.057
Types of treatment	2.879	0.875–9.48	0.082

life-expectancy of the HIV-infected persons improving their quality and length of life. This has caused an increase in the number of HIV-positive subjects seeking health care procedures, not directly related to HIV infection, even in the dental field (4, 14).

The most important finding emerging from our study is the existence of episodes of discrimination by hygienists towards HIV-positive persons: 17 of 287 hygienists (i.e., 5.9% of the entire sample) admitted discriminatory attitudes. Although numerically low, it is higher than the percentage detected by our previous study which found 4.5% of discriminatory behaviour among dentists (2). The discomfort felt by hygienists when treating HIV-positive persons is highlighted by the fact that 60.4% find it more stressful. Other data, which can be considered as signs of a more hidden discrimination, emerged from our study: 1.8% applied increased fees and 2.8% of hygienists replied 'yes' to the question whether it is correct to refuse to treat HIV-infected persons.

A real warning datum is that 20% of the hygienists who perform discriminatory behaviour against HIV-positive persons do not wear protective glasses during the treatments. This datum is statistically significant also in the multiple regression model and highlights the fact that those who perform discriminatory behaviour do not apply the routine barrier procedures to prevent cross-infections.

A datum which is not easy to explain is the fact that 'working in public structures' is associated with discriminatory behaviour. This variable is statistically significant at the univariate analysis and is close to the significance at the multivariate. This is in contrast with the nature of the public health care service which should treat everyone without any discrimination and in respect for a sterilization and infection control procedures to prevent cross-infections. This datum is in contrast with those reported in literature, which highlights that HIV-positive persons are less discriminated against in public structures (9). This datum can be explained considering that in the

private office, the operator feels more involved and responsible for the outcome of the therapy. In addition, it is possible that the economic stimulus and the possibility to refer the HIV patients to the owner of the office for more invasive procedures could contribute to this phenomenon.

Regarding the type of clinical procedures performed by hygienists, this variable is statistically significant associated with discrimination at the univariate analysis and is close to the significance at the multivariate: almost 50% of those who discriminate have, any way, performed an ultrasound scaling on some HIV + subjects, 18% performed a scaling and root planning and 9% explained prevention and gave them hygiene instructions. As can be noted from Table 2, 'to perform any kind of clinical hygiene procedure', it is more frequent among those who do not discriminate, whereas to perform only one procedures (give hygiene instructions, scaling and root planning or ultrasound scaling) is more common among those who discriminate. It should be noted that during the scaling and root planning, especially when an ultrasound device is used, a diffuse aerosol containing traces of biological fluids (even blood) is generated, therefore the clinician could be exposed to a possible contagion if the routine precautions are not fully observed (15, 16).

Considering these variables which are significantly connected at the univariate with discriminatory behaviour, many of them are not based on scientific evidence but more on irrationality and 'the stigma' which, from the beginning, is associated with the HIV infection (17).

A 'high level of fear' of treating an HIV-positive subject Table 2 is linked with discriminatory behaviours: this datum, even if understandable from a human point of view and in line with the previous literature reports, not only does it not prevent the possibility on cross-infection, but also it could contribute to increasing tension and stress during the clinical procedure, which could favour the onset of mistakes both in the clinical practice and in the cleaning, disinfection and sterilization of the instruments (18). 'To use a surgical vacuum', 'to use sterile instruments' for all the patients and 'to use a particular protective clothing while treating HIV-positive subjects' are statistically significantly associated with discriminatory behaviour only at the univariate: the first two variables are performed less by those hygienists who discriminate, whereas the third is performed by all those who discriminate. These data are a warning: while it is not necessary to use a particular protective clothing while treating HIV-positive subjects, on the contrary it is absolutely necessary to use sterilized instruments for each patient and use devices which could contribute to diminish the diffusion of aerosol (3).

The variable 'Opinions on HIV infection transmission pathways' was statistically significant only at the univariate: many (17.7%) believe that HIV can be transmitted through the saliva or the oro-fecale pathway. Regarding this, it is important to notice that 77% of hygienists believe they have a good scientific knowledge of the HIV-related problems, but the remaining do not, and all the participants require a further educational effort. These data draw attention to the need for a further educational programme to spread accurate information on the scientific problems related to the HIV virus to promote more correct treatments and prevent the occurrence of further discrimination. Furthermore, many hygienists believe that it is important that this problem will be faced by means of courses, journals, internet web sites etc. In fact only a profound educational effort, which will give dental health care workers a deeper scientific knowledge of the problems related to the treatment of HIV-positive patients and which will make them more conscious of the possibility of having treated HIV-positive subjects without being aware of it, could diminish discrimination. In this respect, we wish to stress what Gerbert *et al.* (1988) (18) reported in his study: the willingness to treat HIV-infected persons was proportional to the knowledge of procedures to develop infection control (18). Actually, it is only a thanks to a further educational effort aimed, on the one hand, at informing dentists and their staff on scientific problems and, on the other, at raising their awareness as to the possibility of having to treat HIV-infected persons that we can prevent further discriminatory episodes and lower the stress of health care workers.

Once again, it is important to stress that, from the practical and clinical point of view, this discriminatory behaviour may paradoxically expose to a greater risk of cross-infection: since not all patients know they are HIV positive, and given that a rather high percentage of them who know it (30%) does not tell the dentist of being HIV positive (2, 6), thus the procedures to avoid contagion between a patient and his doctor and among patients should be routinely applied, regardless of the patients' HIV positivity (3).

Our findings highlight the existence of episodes of discrimination by some hygienists towards HIV-infected individuals. From clinical point of view, this discriminatory behaviour may expose the dental health care workers and their patients to a greater risk of cross-infection.

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