#### **Original Article**

## Nigerian Dental Technology Students and Human Immunodeficiency Virus Infection: Knowledge, Misconceptions and Willingness to Care

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#### Abstract

Background: The rehabilitative dental care is important for maintaining adequate nutrition, guarding against wasting syndrome and malnutrition among human immunodeficiency virus (HIV)-infected individuals. Aim: The aim of this study is to determine the Nigerian dental technology students' knowledge and misconceptions about HIV infection and their willingness to care for HIV-infected patients. Subjects and Methods: This descriptive cross-sectional study of dental technology students of Federal School of Dental Therapy and Technology Enugu, Nigeria was conducted in 2010. Data was subjected to descriptive, non-parametric and parametric statistics using the statistical package for the social sciences (SPSS) version 17.0 (Chicago Illinois, USA). P < 0.05 was considered significant. **Results:** The knowledge about the mode of HIV transmission and prevention among the respondents was high with some misconceptions. Specifically, the misconceptions about HIV transmission through a mosquito bite (P = 0.02) and shaking of hands (P = 0.03) were higher among respondents in the higher class than those in lower class. However, 10.6% (21/198), 6.1% (12/198) and 4.0% (8/198) of the respondents erroneous described HIV as harmless, self-limitation and antibiotics responsive infection respectively. Of the respondents, 78.8% (156/198) and 83.3% (165/198) of them expressed willingness to care for HIV-infected patients and expressed need for training in the clinical care of HIV-infected patients respectively. Overall, the respondents opined that the dental therapists are the most suitable dental professional to pass HIV-related information to patients in the dental setting ahead of dentists and dental surgery assistants. Conclusion: The expressed willingness to care for HIV-infected patients, knowledge about the mode of HIV transmission and prevention among the respondents were high with existent misconceptions. There were no significant differences in the knowledge about HIV infection and willingness to care for HIV-infected patients among respondents in the lower class and those in upper class.

**Keywords:** Care, Dental technology students, Human immunodeficiency virus-infected patients, Knowledge, Misconceptions, Willingness

#### Introduction

There has been a dramatic increase in the number of people infected with human immunodeficiency virus (HIV) in Nigeria and globally, since the virus discovery and identification

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in 1983. Owing to the advent, availability and accessibility to highly active antiretroviral therapy, the systemic health, quality-of-life and above all the life expectancy of HIV-infected individuals has dramatically increased.<sup>[1-3]</sup> These have also led to the consequent increase in number of HIV-infected individuals seeking dental care. This dental care demands are in the form of routine dental care, relief from the discomfort and disability associated with concomitant oral lesions and rehabilitative dental care. The receipt of rehabilitative dental care among HIV-infected patients is on the increase with favorable prognosis.<sup>[4-7]</sup> The rehabilitative dental care in the form of dentures, crown and bridges and implants, are important in maintaining adequate nutrition and guarding

against wasting syndrome and malnutrition, which are fairly common and serious problems among HIV-infected individuals.<sup>[8,9]</sup> The restoration of speech, appearance and self-esteem that may have been affected by tooth loss among HIV-infected individuals is also known to be achieved through the provision of dentures, bridges and implants.<sup>[6]</sup>

Dental technologists are non-clinical dental auxiliaries involved in fabrication of oral prosthesis such as dentures, bridges, removable orthodontic appliances and obturators.<sup>[10]</sup> The Higher National Diploma in dental technology is a 4 year full time training course, which qualifies an individual as a dental technologist. It is expected that dental technology students as future dental professionals are better prepared to provide the quality dental care for the HIV-infected Nigerian.

The knowledge of HIV/acquired immunodeficiency syndrome (AIDS) is crucial for dental professionals because of the increasing prevalence of the infection and also because of the significant role, it plays in preventing cross infection while providing care for HIV-infected patients both diagnosed and undiagnosed.

Studies on dental technologists' knowledge, attitude and willingness to care for HIV-infected patients appear few in the literature when compared to other dental professionals. The objective of the study was to assess the Nigerian dental technology students' knowledge and misconception about HIV infection and willingness to care for HIV-infected patients.

#### **Subjects and Methods**

After obtaining the necessary ethical approval and also permission from the school authority, this descriptive cross-sectional study was conducted among the 1<sup>st</sup>-4<sup>th</sup> year dental technology students of Federal School of Dental Therapy and Technology Enugu, Nigeria. The conduct of this research was consistent with the Declaration of Helsinki on Ethical Principles forl Research Involving Human Subjects. The calculated minimum sample for this study using Cochran's formula (N =  $Z^2Pq/d^2$ )<sup>[11]</sup> for epidemiological studies was 171.

N = calculated minimum sample size, Z = the standard normal deviate set at 1.96 corresponding to 95% confidence level, P = the prevalence rate, which is 0.886 (88.6%) of dental nursing students<sup>[12]</sup> who expressed willingness to care for HIV-infected patients, q = 1.0-p, d = degree of accuracy desired (error margin) = 5% = 0.05. However, all the dental technology students of the school were included because of the small size of the study population (413 students) and the lack of baseline data on knowledge, attitude and willingness to care for HIV-infected patients among this group of dental professionals in Nigeria. The administrative record of the Department of Dental Technology showed that lower class had 314 students (Year I = 107 students and Year II = 56 students) while the higher class had 99 students (Year III = 56 students)

and Year IV = 43 students). However, the students who were absent for any reason during the day of the study were excluded from the study. The tool of data collection was a self-developed questionnaire, which was standardized by pretesting on dental technician students undergoing external posting in University of Benin Teaching Hospital. This self-administered questionnaire was used to obtain information on demography (age, gender and year), general knowledge about modes of transmission and prevention of HIV, feelings and willingness to care for HIV patients, the perceived role of dental technologists in the dissemination of HIV-related information, willingness to be involved in the dissemination of HIV-related information to dental patients and the public and the most suitable dental professional to pass HIV-related information in the dental clinic. The response for questions that assessed general knowledge about modes of transmission and prevention of HIV were yes, no and I don't know. Using standard knowledge on HIV, the responses were categorized as correct knowledge and incorrect no knowledge. The questionnaires were distributed during a normal class session and collected at the end of the same day. Participation in this research was voluntary and no incentive was offered. Informed consent was obtained from participants after being informed of the objective of the study, assured of the confidentiality of reported information and anonymity of the questionnaire. Data analysis was performed using the Statistical Package for Social Science (SPSS version 17.0, Chicago, IL, USA) and test of significance was done with Chi-square statistics, Fisher's exact test and independent t-test where indicated. For the purpose of analysis, the 1st and 2nd year students were categorized as those in the lower class while the 3<sup>rd</sup> and 4<sup>th</sup> year students were categorized as those in the higher class. In the assessment of overall knowledge about HIV transmission and prevention, correct knowledge was scored as 1 while incorrect/no knowledge was scored as 0 and comparison of average score using independent *t*-test.

#### Results

A total of 260 questionnaires were distributed with 180 and 80 questionnaires distributed in the lower class and higher class respectively. Of the 260 questionnaires distributed, 198 questionnaires were returned filled giving an overall retrieval rate of 76.2% (198/260). The retrieval rate for the respondents in lower class was 81.7% (147/180) while that for the higher class was 63.8% (51/80). The majorities of the respondents were females and aged 20-23 years. The proportion of age groups are different between the upper and the class (P = 0.04) [Table 1]. The knowledge about the mode of HIV transmission and prevention among the respondents was high with some misconceptions. The misconceptions about transmission of HIV were highest for blood donation followed by mosquito bite and sharing of cups and plates. Overall, the HIV transmission and prevention mean knowledge score (standard deviation) was not significantly varied between respondents in the lower class 8.04(0.12) and those in the higher class 7.57 (0.29) ( P = 0.08, 95% confidence

interval = 0.04-0.99). However, the misconception about HIV transmission through a mosquito bite (P = 0.02) and shaking of hands (P = 0.03) were higher among respondents in the higher class [Table 2].

About two-third 64.6% (128/198) of the respondents described HIV infection as a serious and deadly infection while 10.6% (21/198), 6.1% (12/198) and 4.0% (8/198) of the respondents erroneous described it as self-limitation infection, infection that can be effectively treated with antibiotics and harmless infection, respectively [Table 3]. The sympathetic and empathetic feelings were higher among the respondents in upper class, but disgust and indifferent feelings were higher among respondents in lower class. However, this was not statistically significant (P=0.81) [Table 4]. About three-quarters 78.8% (156/198) of the respondents expressed willingness to care for HIV-infected patients. There was no significant association between the class of the respondents (lower class and upper class) and the expressed willingness to care for HIV-infected patients (P = 0.42) [Table 5]. The majority 83.3% (165/198) of the respondents expressed need for training on the clinical care of HIV-infected patients and this was not significantly different among respondents in those in lower class 82.3% (121/147) and higher class 86.3% (44/51) (P = 0.62) [Table 6].

Table 1: Demographic characteristics of the respondents					
Characteristics	naracteristics Class n (%)		Total <i>n</i> (%)	P value	
	Lower	Upper			
Age (years)					
<20	35 (23.8)	5 (9.8)	40 (20.2)	0.04 <sup>F</sup>	
20-23	84 (57.1)	31 (60.8)	115 (58.1)		
24-27	16 (10.9)	12 (23.5)	28 (14.1)		
>27	12 (8.2)	3 (5.9)	15 (7.6)		
Gender					
Male	62 (42.2)	19 (37.3)	81 (40.9)	0.54	
Female	85 (57.8)	32 (62.7)	117 (59.1)		
Total	147 (100.0)	51 (100.0)	198 (100.0)		
FFisher's exact					

Respondents that expressed unwillingness to care for HIV-infected patients indicated higher training need on care for HIV-infected patients than those respondents that expressed willingness to care HIV-infected patients. However, this was not statistically significant (P = 0.50) [Table 7].

Three-quarters 75.3% (149/198) of the respondents asserted that the dental technologists have a role of in educating the general public about HIV among the respondents. This was not significantly varied among the respondents in lower class 74.1% (109/147) and higher class 40 (78.4%) (P=0.80) [Table 8]. Overall, the respondents opined that the dental therapists are the most suitable dental professional to pass HIV-related information to patients in the dental setting ahead of the dentist and dental surgery assistant (P=0.12) [Table 9]. A total of 83.2% (163/198) of the respondents expressed willingness to disseminate HIV-related information to the public. This was not significantly different among respondents in lower class 83.0% (122/198) than upper class 80.4% (41/51) (P=0.57) [Table 10].

#### **Discussion**

The knowledge about the mode of HIV transmission and prevention among the respondents was high, but with misconceptions about the acquisition of HIV through blood donation, mosquito bite and sharing cups and plates. The misconceptions about HIV infection were also noted in the description of the infection as harmless, self-limiting and antibiotic responsive infection among the respondents. The misconceptions about the modes of HIV transmission have similarly been documented among dental nursing students,<sup>[12]</sup> dental students<sup>[13]</sup> and dentists<sup>[14]</sup> in Nigeria, but are of variable degree in comparison with the finding in this study. The majority (83.2%) of the respondents expressed willingness to disseminate HIV-related information to dental patients and the general public, which may rooted on their consideration that dental technologists have roles in disseminating of HIV-related information to patients in the dental clinic and society at large. The noted misconceptions in

Table 2: General knowledge about HIV transmission and prevention among the respondents							
Characteristics	Correct knowledge n (%)		Incorrect/no knowledge n (%)			P value	
	Lower class	Upper class	Total	Lower class	Upper class	Total	
Modes of transmission							
Sexual	141 (95.9)	46 (90.2)	187 (94.4)	6 (4.1)	5 (9.8)	11 (5.6)	0.12
Mosquito bite	128 (87.1)	37 (72.5)	165 (83.3)	19 (12.9)	14 (27.5)	33 (16.7)	0.02
Intravenous needle	137 (93.2)	45 (88.2)	182 (91.9)	10 (6.8)	6 (11.8)	16 (8.1)	0.26
Shaking of hands	141 (96.6)	45 (88.2)	186 (94.4)	5 (3.4)	6 (11.8)	11 (5.6)	0.03
Blood transfusion	143 (97.3)	46 (90.2)	189 (95.5)	4 (2.7)	5 (9.8)	9 (4.5)	0.05Ĕ
Blood donation	120 (81.6)	35 (68.6)	155 (78.3)	27 (18.4)	16 (31.4)	43 (21.7)	0.05
Sharing of cups/plates	126 (85.7)	44 (86.3)	170 (85.9)	21 (14.3)	7 (13.7)	28 (14.1)	0.92
Modes of prevention							
Abstinence	127 (86.4)	41 (80.4)	168 (84.8)	20 (13.6)	10 (19.6)	30 (15.2)	0.30
Fidelity	122 (83.0)	42 (82.4)	164 (82.8)	25 (17.0)	9 (17.6)	34 (17.2)	0.92
Condom	92 (62.6)	32 (62.7)	124 (62.6)	55 (37.4)	19 (37.3)	74 (37.4)	0.98

FFisher's exact. HIV: Human immunodeficiency virus

Table 3: The descriptor of HIV infection among the	
respondents	

Opinion	Class	n (%)	Total n (%)	P value
	Lower	Upper		
Serious and deadly infection	94 (63.9)	34 (66.7)	128 (64.6)	0.86 <sup>F</sup>
Antibiotics responsive infection	10 (6.8)	2 (3.9)	12 (6.1)	
Harmless infection	5 (3.4)	3 (5.9)	8 (4.0)	
Self-limitation infection	15 (10.2)	6 (11.8)	21 (10.6)	
Controllable infection	4 (2.7)	0 (0.0)	4 (2.0)	
Not sure	16 (10.9)	6 (11.8)	22 (11.1)	
*Others	3 (2.0)	0 (0.0)	3 (1.5)	
Total	147 (100.0)	51 (100.0)	198 (100.0)	

\*Others-degenerative illness, incurable illness, contracted mainly through unprotected intercourse, FFisher's exact. HIV: Human immunodeficiency virus

Table 4: Res	pondent fee	lings toward	s HIV-infected	l patients

Feelings	Class	n (%)	Total <i>n</i> (%)	P value	
	Lower	Upper			
Empathy	36 (24.5)	13 (25.5)	49 (24.7)	0.81 <sup>⊧</sup>	
Sympathetic	86 (58.5)	32 (62.7)	118 (59.6)		
Disgust	16 (10.9)	3 (5.9)	19 (9.6)		
Indifferent	9 (6.1)	3 (5.9)	12 (6.1)		
Total	147 (100.0)	51 (100.0)	198 (100.0)		
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FFisher's exact. HIV: Human immunodeficiency virus

Table 5: Respondents'	willingness	to care for	<b>HIV-infected</b>
patients			

Willingness	Class	n (%)	Total	P value
	Lower	Upper	n (%)	
Agree	116 (78.9)	40 (78.4)	156 (78.8)	0.42 <sup>F</sup>
Undecided	22 (15.0)	10 (19.6)	32 (16.2)	
Disagree	9 (6.1)	1 (2.0)	10 (5.1)	
Total	147 (100.0)	51 (100.0)	198 (100.0)	
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FFisher's exact. HIV: Human immunodeficiency virus

### Table 6: Training needs on care for HIV-infected patients among the respondents

Needs	Class	Class <i>n</i> (%)		P value
	Lower	Upper		
Yes	121 (82.3)	44 (86.3)	165 (83.3)	0.62 <sup>F</sup>
No	16 (10.9)	3 (5.9)	19 (9.6)	
Unsure	10 (6.8)	4 (7.8)	13 (6.6)	
Total	147 (100.0)	51 (100.0)	198 (100.0)	
FFisher's exa	ct. HIV: Human immi	unodeficiency virus		

Table 7: Willingness to care versus training needs on care for HIV-infected patients among the respondents

Training	Wil	lingness <i>n</i> (	Total	P value	
	Agree	Undecided	Disagree	n (%)	
Yes	132 (84.6)	24 (75.0)	9 (90.0)	165 (83.3)	0.50 ₣
No	15 (9.6)	4 (12.5)	1 (10.0)	20 (10.1)	
Unsure	9 (5.8)	4 (12.5)	0 (0.0)	13 (6.6)	
Total	156 (100.0)	32 (100.0)	10 (100.0)	198 (100.0)	

FFisher's exact. HIV: Human immunodeficiency virus

# Table 8: Perceived role of dental technologists in educating the general public about HIV among the respondents

Role	tole Class n (%)		Total <i>n</i> (%)	P value
	Lower	Upper		
Yes	109 (74.1)	40 (78.4)	149 (75.3)	0.80
No	19 (12.9)	5 (9.8)	24 (12.1)	
Unsure	19 (12.9)	6 (11.8)	25 (12.6)	
Total	147 (100.0)	51 (100.0)	198 (100.0)	

HIV: Human immunodeficiency virus

Table 9: Respondents' opinion of the most suitable dental
professional to pass HIV-related information to patients

Dental professional	Class <i>n</i> (%)		Total	P value		
	Lower	Upper	n (%)			
Dental surgeons	36 (24.5)	21 (41.2)	57 (28.8)	0.12 <sup>⊧</sup>		
Dental therapist	59 (40.1)	15 (29.4)	74 (37.4)			
Dental surgery assistant	33 (22.4)	9 (17.6)	42 (21.2)			
Dental technologist	13 (8.8)	6 (11.8)	19 (9.6)			
Dental record officer	6 (4.1)	0 (0.0)	6 (3.0)			
Total	147 (100.0)	51 (100.0)	198 (100.0)			
FEisher's exact HIV: Human immunodeficiency virus						

Fisher's exact. HIV. Human immunodeliciency virus

Table 10: Respondents' willingness to disseminate	
HIV-related information to the public	

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Willingness	Class <i>n</i> (%)		Total <i>n</i> (%)	P value				
	Lower	Upper						
Yes	122 (83.0)	41 (80.4)	163 (83.2)	0.57				
No	15 (10.3)	5 (9.8)	20 (10.2)					
Unsure	8 (5.5)	5 (9.8)	13 (6.6)					
Total	147 (100.0)	51 (100.0)	198 (100.0)					
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HIV: Human immunodeficiency virus

this study indicated that the quality of HIV-related information emanating from the respondents is obviously suboptimal because they are not adequately prepared for accurate dissemination of HIV-related information to patients and the general public. It is therefore emphatic to clarify these misconceptions among the students before graduation through improved training and modification of curriculum to improve their information on HIV and infection control. The level of discrepancy in knowledge showed that there is a need for guidelines on this subject for dental technology students for them to be effectively utilized as a health educator on HIV-related issues.

In this study, the respondents generally recognized dental therapists as the most suitable dental professional to pass HIV-related information to patients in the dental setting ahead of the dentist and dental surgery assistant. The close interaction with dental therapist students who are being trained in the institution and lesser contact with other dental professionals may have broadened their knowledge about dental therapist role in primary prevention of oral disease through oral hygiene instruction, dietary counseling and scaling and polishing thereby influencing their choice. The dental technologists are actively involved in the fabrication of oral prosthetics. These prosthetics replace missing and lost teeth and jaws with consequent improvement in nutrition and overall quality-of-life. In this study, 78.8% of the respondents expressed willingness to care for HIV-infected patients. This is lower than 93.0% reported in a national survey among Nigerian dentists<sup>[15]</sup> and 88.6% reported among Nigerian dental nursing students<sup>[12]</sup> signifying that non clinic-exposed dental professional students may be less likely to express willingness to treat HIV-infected patients. However, this is higher than the willingness reported among dental students (58.8-63.3%),<sup>[16,17]</sup> dentists (63.6-78.4)<sup>[13,18]</sup> and dental auxiliaries (74.7%)<sup>[19]</sup> in Nigeria and the high level of willingness to care for HIV-infected patients in this may be attributable to the high sympathetic and empathetic feelings expressed toward HIV-infected individuals among the respondents. The willingness to care for HIV-infected patients was not significantly different among the respondents in lower class and higher class (78.9% vs. 78.4%). The high expressed needs for training on the clinical HIV care in this study signifies that well-tailored training will be the ultimate strategy for increased willingness in the future if implemented. This reaffirmed the quest for more information on HIV-related issues among dental auxiliaries as previously reported in Nigeria by Azodo et al.[19] Similarly, the need for further education on HIV related issues like basic HIV/AIDS related issues and patient management has been reported among dental students in private and public university in Sudan.<sup>[20]</sup> Training using HIV/AIDS information, role modeling, diffusion of training and discussions of discrimination and human rights in Nigeria has been shown to increase the willingness to treat and teach colleagues about people with HIV among health workers.<sup>[21]</sup> This lends support to the fact that training on HIV will help in increasing the willingness of this group of dental professionals to care for HIV-infected patients. However, the finding of this study contrasted with this fact, as non-statistically significant association was found between expressed willingness to care and expressed training need on care for HIV-infected patients. This may be explained by the non-significant variation in the positive feelings toward HIV-infected patients among respondents in lower class and higher class (empathy 36 [24.5%] vs. 13 [25.5%]), (sympathetic 86 [58.5%] vs. 32 [62.7%]).

The non-significant differences in the willingness to care, training need on the clinical HIV care and willingness to disseminate HIV-related information among respondents in lower class and higher class may be explained by the non-significant different in overall knowledge about HIV transmission and prevention among the two groups. It appears therefore that the ascent dental technology education does not positively affect HIV transmission and prevention knowledge and willingness to care HIV-infected individuals. There is a need to further educate dental technology students to increase their knowledge, facilitate accurate dissemination of HIV-related information and improve the willingness to care for HIV-infected patients. The findings of this study are

limited by the self-reporting nature and mode of selection of the respondents. However, the design and pretesting of the questionnaire was deemed to reduce social desirability of the responses thereby making a quality baseline data on knowledge and misconceptions about HIV infection and willingness to care for HIV-infected patients among Nigerian dental technology students.

#### Conclusion

The knowledge about the mode of HIV transmission and prevention among the respondents was high, but misconception still existed among the respondents. The expressed willingness to care for HIV-infected patients in this study was high and varied with previously reported values among dental professionals in Nigeria. However, there were no significant differences in knowledge about HIV infection and willingness to care for HIV-infected patients among respondents in lower class and those in upper class.

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