

# Knowledge of HIV/AIDS and the clinical and sexual practices of dental students

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## ABSTRACT

The aim of the study was to assess knowledge of HIV/AIDS and the clinical and sexual practices of dental students. This was a cross-sectional study in which a self-administered questionnaire about age, gender, and dental program term; knowledge of HIV/AIDS transmission and prevention; use of personal protective equipment; prevention and occurrence of accidental exposure to biological material; post-exposure conduct; and sexual behavior was answered by dental students (n = 148, answer rate of 91.9%). Descriptive and inferential statistical analyses (chi-square and Fisher's exact tests) were performed, at a significance level of 5%. Students correctly recognized the routes of HIV transmission, including “blood” (100%), “sexual.3%”. Regarding frequency of condom use during sexual intercourse, 37% of dental students said “always,” 55.5% “sometimes” and 7.6% “never”. Regarding clinical practices, 99.3% of dental students said they used personal protective equipment, 28.4% had intercourse” (99.3%), “vertical transmission” (58.1%) and “sharing contaminated material” (94.6%), and ways of prevention, including “condom use” (100%) and “not sharing needles and syringes” (99suffered percutaneous injuries, the needle was the most cited exposure agent (32.5%) and in most cases (54.8%), no providences were taken after the accident. In conclusion, the students had good knowledge of HIV / AIDS and appropriate preventive attitudes in clinical care and handling of sharp instruments; however, they still need to be motivated with regard to condom use and oriented about care after accidental exposure to biological material.

**Descriptors:** HIV. Acquired Immunodeficiency Syndrome. Students; Dental. Knowledge.

## 1 INTRODUCTION

Human immunodeficiency virus (HIV) is a

cytopathic and non-oncogenic retrovirus capable of integrating into the host genome and can lead

to the development of acquired immunodeficiency syndrome (AIDS)<sup>1</sup>, which represents a major global public health problem<sup>2</sup>. In Brazil, from the beginning of the pandemic (in the 1980s) until 2019, 966,058 people were diagnosed with AIDS and 338,905 died from the disease as a basic cause. An average of 39,000 new cases have been reported every year for the past 5 years<sup>3</sup>, in addition to the 135,000 Brazilians who, according to the Ministry of Health, live with HIV and are unaware of their positive serological status<sup>4</sup>.

HIV can be transmitted through contaminated body fluids, such as blood, semen, vaginal secretions and breast milk, making occupational transmission of the virus possible in health professionals<sup>1</sup>. Lack of experience and ability to handle sharp instruments makes dental students particularly vulnerable to accidental injuries, which pose a risk of exposure to blood-borne pathogens, such as HIV<sup>5-7</sup>. In this context, it is important that dental students develop adequate knowledge about the disease process, its oral manifestations and modes of transmission<sup>8</sup>, so they are able to diagnose oral lesions associated with HIV<sup>9</sup>, which are often the first indicator of the pathology<sup>10</sup>, as well as to maintain infection control measures in order to prevent the transmission of this and other pathogens<sup>11</sup>.

Outside the clinical environment, these students are also at risk of sexual contamination, as according to the Epidemiological Bulletin of the Ministry of Health (2019)<sup>3</sup>, 52.7% of HIV/AIDS cases occurred in people between 20 and 34 years old, which is the age group of most Brazilian university students. Thus, it is important that the practices associated with this form of transmission are also investigated.

The objective of this work was to evaluate knowledge of HIV/AIDS and the clinical and sexual practices of dental students at a public

university.

## 2 METHODS

### Ethical aspects

This study was carried out according to the Declaration of Helsinki and was approved by the Research Ethics Committee of the Federal University of Piauí (CAAE:47095915.8.0000.5214). The research participants signed the free and informed consent form.

### Study design

This was a cross-sectional study that investigated knowledge of HIV/AIDS and the clinical practices and sexual behavior of dental students at a public university in Piauí. The article was written according to the recommendations of the “Strengthening the Reporting of Observational Studies in Epidemiology” (STROBE) statement<sup>12</sup>.

### Population and sample

The research was carried out at the Federal University of Piauí (UFPI). The study population was census and composed of students from the Dentistry Program who had already entered clinical activities in the period of data collection (third to ninth program terms). The study did not include students who had enrolled during the research period.

### Data collection

This study used a self-administered questionnaire (completed by a respondent without intervention of the researcher), composed of closed and semi-opened questions, addressing the following topics: age, sex, and dental program term; knowledge of HIV / AIDS transmission and prevention; use of personal protective equipment (PPE) in the clinic; prevention and occurrence of accidental

exposure to biological material; post-exposure conduct; and sexual behavior (number of fixed and casual partners and condom use).

### Statistical analysis

The data were analyzed using SPSS® for Windows v. 20.0 (IBM, Armonk, NY, USA). The dependent variables were knowledge about HIV transmission, accidental exposure to biological material and condom use during sexual intercourse. The independent variables were age, sex and dental program term. Univariate analyses were performed, using simple descriptive statistics with distribution of absolute frequencies, simple percentages and measures of central tendency. To assess the associations between dependent and independent categorical variables, the chi-square and Fisher's exact tests were applied. To observe the differences in the means of the numerical independent variables (age, number of fixed partners and number of casual partners) among the categories of the dependent variable "condom use during sexual intercourse," the Mann-Whitney test was applied, as the data showed the distribution was not normal. The level of significance adopted was 5%.

### 3 RESULTS

Of the 161 students from the [hidden text] Dentistry Program who met the inclusion criteria, 148 (91.92%) agreed to participate in the study. The average age of the participants was  $22.4 \pm 2.8$  years. The age group was 19 to 42 years old, with 58 students (39.2%) aged up to 21 years old, 77 students (52%) aged between 22 and 25 years old and 11 students (7.4%) over 25 years old. Fifty students (33.8%) were male and 98 (66.2%) students were female. As for the dental program term, 62 students (41.9%) were distributed from the third to the fifth terms, and 86 students (58.1%) were distributed from the sixth to the

ninth terms.

The questions that assessed the knowledge of the dental students about transmission and prevention of HIV/AIDS are presented in table 1. The association between the dependent variable "knowledge of HIV transmission" and the independent variables "age group," "sex" and "program term" is described in table 2. There was no association between these variables.

Students were asked about attitudes during clinical practice, such as the use of PPE and parenteral exposure. Accidents with sharp instruments were reported by 28.4% of the participants, of whom 54.8% reported not taking any post-exposure measures (table 3). Regarding sexual practices, students were asked about how many fixed and casual partners they had in the last 12 months, and the mean responses were  $1.2 (\pm 0.6)$  and  $3.5 (\pm 2.8)$ , respectively. Regarding the use of condoms during sexual intercourse, the answers are in table 3.

Tables 4 and 5 show, respectively, the association of the dependent variables "accident occurrence with biological material" and "condom use during sexual intercourse" with the independent variables "age group," "sex" and "dental program term". There was no association between these variables.

Table 6 shows the difference in the means of the numerical independent variables of the study between the categories of the dependent variable "condom use during sexual intercourse." There was a statistical difference between the age of students who always used and those who did not always use condoms.

### 4 DISCUSSION

Good knowledge of HIV/AIDS positively interferes for dental students to fulfill their ethical duty to treat, without distinction, individuals who are seropositive for the infection seeking care at the educational institution<sup>13,14</sup>. In

Table 1. Knowledge of dental students regarding HIV/AIDS transmission and prevention (n=148)

Questions	n	%
<i>Do you know how HIV is transmitted?</i>		
Yes	144	97.3
Partly	4	2.7
No	-	-
<i>What are the routes of HIV transmission? (#)</i>		
Blood <sup>†</sup>	148	100.0
Sexual intercourse <sup>†</sup>	147	99.3
Vertical transmission <sup>†</sup>	86	58.1
Sharing of contaminated material <sup>†</sup>	140	94.6
Kissing and hugging	2	1.4
<i>What are the ways to prevent HIV/AIDS? (#)</i>		
Condom use <sup>†</sup>	148	100.0
Not sharing needles and syringes <sup>†</sup>	147	99.3
To avoid having sex with people with the vírus	63	42.6
Not to share personal objects with people with the vírus	64	43.2
<i>Are there AIDS drugs to be used after a risky situation?</i>		
Yes <sup>†</sup>	110	74.3
No	11	7.4
Do not know	27	16.9
Did not answer	2	1.4
<b>Total</b>	<b>148</b>	<b>100</b>

#Multiple answers; <sup>†</sup>Right answer.

Table 2; Knowledge about the transmission of the HIV according to age group, sex and program term of dental students (n=148)

Independent variables	Knowledge about HIV transmission				p value*
	Yes		Partly		
	n	%	n	%	
<i>Age group (in years)</i>					0.65
≤ 21	56	96.6%	2	3.4%	
> 21	88	97.8%	2	2.2%	
<i>Gender</i>					0.18
Male	50	100.0%	-	-	
Female	94	85.9%	4	4.1%	
<i>Program term</i>					0.17
3rd to 5th	59	95.2%	3	4.8%	
6th to 9th	85	98.8%	1	1.2%	

Fisher's exact test.

Table 3. Clinical and sexual practices of dental students

Variables	n	%
<i>Use of PPE (n=148)</i>		
Yes	147	99.3%
Did not answer	1	0.7%
<i>Kind of PPE (#) (n=147)</i>		
Coat	147	100.0%
Mask	147	100.0%
Glasses	139	94.6%
Procedure gloves	147	100.0%
Surgical gown	89	60.5%
Cap	147	100.0%
Shoe covers	7	4.8%
Others	29	19.7%
<i>Measures to prevent accidental exposure (#) (n=148)</i>		
Attention	144	97.3%
Do not recap needles	59	39.9%
Performing correct technique	125	84.5%
Use of closed toe shoes	130	87.8%
Increase knowledge about pathways streaming	65	43.9%
<i>Occurrence of sharps accidents (n=148)</i>		
Yes	42	28.4%
No	106	71.6%
<i>Exposure agent (n=42)</i>		
Needle	13	32.5%
Blade/Lancet	3	7.5%
Probes	11	27.5%
Others	13	32.5%
Did not answer	2	4.7%
<i>Circumstance of the accident (n=42)</i>		
Dental procedure	27	64.3%
Instrument washing	7	16.6%
Medication administration	1	2.4%
Disposal of sharps	1	2.4%
Needle recap	1	2.4%
Others	5	11.9%
<i>Action taken after an accident (n=42)</i>		
Notification	6	14.3%
Serological examination of the source patient	2	4.8%
Immunization	3	7.1%
No measure	23	54.8%
Others	8	19.0%
<i>Use of condom during sexual intercourse (n=119)</i>		
Sometimes	66	55.5
Always	44	37.0
Never	9	7.6
<i>Use of condom during sex with fixed partners (n=118)</i>		
Sometimes	71	60.2
Always	38	32.2
Never	9	7.6
<i>Use of condom during sex with casual partners (n=28)</i>		
Sometimes	10	35.7
Always	17	60.7
Never	1	3.6
<i>Reasons for not using a condom during sexual intercourse (n=61)</i>		
Trust in the partner	30	49.2
Not liking	10	16.4
Not having a condom at that moment	8	13.1
Having relationships with clean people	3	4.9
Others	10	16.4

# Multiple answers; PPE: personal protective equipment.

Table 4. Occurrence of accidents with biological material according to age, sex and program term of dental students (n=148)

Independent variables	Occurrence of accidents with biological material				p value*
	Yes		No		
	n	%	n	%	
<i>Age group (in years)</i>					0.58
≤ 21	15	25.9%	43	74.1%	
> 21	27	30.0%	63	70.0%	
<i>Gender</i>					0.64
Male	13	26.0%	37	74.0%	
Female	29	29.6%	69	70.4%	
<i>Program term</i>					0.34
3rd to 5th	15	24.2%	47	75.8%	
6th to 9th	27	31.4%	59	68.6%	

\*chi-square test.

Table 5. Condom use according to age, sex and program term of dental students (n=148)

Independent variables	Use a condom				p value*
	Yes		Never/sometimes		
	n	%	n	%	
<i>Age group (in years)</i>					0.30
≤ 21	17	43.6%	22	56.4%	
> 21	27	33.8%	53	66.3%	
<i>Gender</i>					0.29
Male	23	48.9%	24	51.1%	
Female	21	29.2%	51	70.8%	
<i>Program term</i>					0.50
3rd to 5th	18	40.9%	26	59.1%	
6th to 9th	26	34.7%	49	65.3%	

\*chi-square test.

Table 6: Difference in the means of the numerical independents variables of the study between the categories of the variable “condom use during sexual intercourse” of dental students (n=148).

Variables	Use a condom	n	Average	SD	p value
<i>Age (in years)</i>	Ever	44	22.1	2.2	0.05
	Not always	75	23.1	3.1	
<i>Number of fixed partners in the last 12 months</i>					0.50
	Ever	36	1.2	0.5	
	Not always	74	1.2	0.7	
<i>Number of casual partners in the last 12 months</i>					0.91
	Ever	10	3.4	3.1	
	Not always	17	3.5	2.7	

SD: Standard deviation. \*Mann-Whitney test p ≤ 0.05.

this study, knowledge was assessed through questions about HIV/AIDS transmission and prevention and students obtained high rates of correct answers. It is well established in the

literature that the main routes of HIV transmission are sexual, blood and vertical<sup>1</sup>. In the present study, blood was identified by all students as a possible means of transmitting the virus, corroborating the results presented by other authors<sup>7,11,15</sup>. Almost all students also recognized that HIV can spread through sexual intercourse, but just over half were aware of vertical transmission.

In the current research, no association was detected between knowledge about HIV transmission and age group, which was in disagreement with the work by Aggarwal *et al.* (2013)<sup>16</sup> who found significantly higher knowledge in students with a higher age group. There was also no association between knowledge and sex, diverging from the study by Ellepola *et al.* (2011)<sup>17</sup>, in which female students obtained significantly higher scores of knowledge of HIV compared with male subjects. In this study, greater knowledge was observed in students who were attending the last program terms compared to those in the initial program terms, without, however, having a significant association. This relationship has been observed in the literature<sup>18-20</sup>, and it is understandable that knowledge increases as students advance in the program; however, regarding the transmissibility of diseases, it is important for dental students to own this knowledge before starting clinical practice in order to decrease the risk of cross-infection.

Regarding the attitude in a clinical environment, a high rate of adherence to the use of PPE was found, considerably higher than that found by other studies carried out with health professionals<sup>21</sup> and students of Oral Hygiene and Dentistry<sup>8</sup>. The use of a lab coat and a cap surpassed that found by Oliveira *et al.* (2002)<sup>11</sup> and that of goggles observed by Erasmus *et al.*<sup>8</sup>, this is a very positive fact, since the systematic use of biosafety standards is an important means

of preventing occupational transmission of HIV<sup>1</sup>. Several studies have highlighted the vulnerability of dental students to accidents with scarifying or sharp instruments<sup>5-7</sup>, which often contain biological material, especially blood, which is potentially contaminated. More than a quarter of the students surveyed reported having suffered accidental injuries in a dental environment, which shows a lower accident rate than those observed by Askarian *et al.* (2012)<sup>22</sup> (73%), Acosta-Gio *et al.* (2008)<sup>23</sup> (57% - 87%) and Kotelchuck *et al.* (2004)<sup>6</sup> (32.8%), but higher than that verified by Myers *et al.* (2012)<sup>7</sup>, in which 19.1% of the respondents reported having already suffered some form of exposure to blood pathogens, most often accidents with sharps. In the present study, it was observed that the more advanced the program term was, the higher the occurrence of occupational accidents. These results are expected due to the increased contact of these students with patients. The findings corroborate those of Myers *et al.* (2012)<sup>7</sup> and indicate the need for preparatory guidance from these students prior to clinical activities.

The reported occupational accidents occurred predominantly during the dental procedure, similarly to what was observed by Myers *et al.* (2012)<sup>7</sup>, followed by the time of washing instruments, corroborating previously published studies<sup>5-7</sup>. The needle was the instrument most frequently involved with accidental injuries, similar to other studies<sup>5,22</sup>. Knowing the circumstances in which accidents occur is important for the implementation of protocols and guidelines that contribute to their prevention.

When asked what actions they took after a sharp accident, more than half of the students said they had not adopted any actions, which indicates that they underestimate the risk of contracting an infectious disease through this means. Specific measures for the prevention of

HIV/AIDS, such as requesting HIV testing from the source patient and post-exposure prophylaxis, were less mentioned in the present study than in previous studies<sup>7,24</sup>, reinforcing that there is a lack of information in this aspect.

Considering that students are also possibly vulnerable to HIV transmission outside the clinical environment, their attitudes towards the prevention of sexual infection were investigated. This is the main means of transmission of most notified cases of HIV/AIDS, and the systematic use of condoms is the most efficient way of preventing infection<sup>1</sup>. It was observed that all students in the present study recognized the use of condoms as a safe method of preventing HIV/AIDS, corroborating the findings of Fotedar *et al.* (2013)<sup>25</sup> (97%) and surpassing those found by Nasir *et al.* (2008)<sup>26</sup> (50.1%). However, when asked if they used condoms habitually, most students reported using them “sometimes,” which shows an inconsistency between knowledge and practice.

Most academics reported having only one sexual partner, but there were reports of up to four fixed and 10 casual partners in the last year, which is a situation posing greater risk for HIV/AIDS infection, since the role of multiple sexual partners indeed recognized as important for the transmission of the virus<sup>27</sup>. The use of condoms was more frequent with casual partners than with fixed partners, which is similar to a trend reported in the literature<sup>28</sup> and which shows coherence with the main reason pointed out by students for not using condoms, which was trust in the partner.

No associations were found between condom use and age group, sex or program term; however, the average age of students who “always use condoms” was statistically lower than the average age of those who “don't always use condoms,” corroborating data from the HIV/AIDS Epidemiological Bulletin of the Ministry

of Health<sup>29</sup>, which indicates a decrease in regular condom use with the advancing age of the participants.

Given the above, it is possible to infer that just having knowledge of HIV/AIDS is not enough for the adoption of safe sexual behavior. It is necessary to develop awareness and motivation strategies for the most vulnerable groups, so the risks of infection are minimized. It was also evident that dentistry teaching institutions must be committed to the prevention of occupational transmission, investing in information and training of the student body, so they work more safely in the clinic environment or when washing instruments. In addition, post-exposure protocols for biological materials should be clearly disclosed to all dental students and other members of the academic community.

## 5 CONCLUSION

It can be concluded that dental students exhibited good knowledge of HIV/AIDS and adequate preventive attitudes in clinical care and the management of sharp instruments; however, they still need to be motivated with regard to the use of condoms during sexual relations and oriented about care after accidental exposure to biological material.

## RESUMO

### **Conhecimento sobre HIV/AIDS e práticas clínicas e sexuais de estudantes de Odontologia**

O objetivo do estudo foi avaliar o conhecimento de HIV/AIDS e as práticas clínicas e sexuais de estudantes de Odontologia. Este foi um estudo transversal, no qual um questionário autoadministrado abordando: idade, gênero, período do curso; conhecimento sobre transmissão e prevenção de HIV/AIDS; uso de equipamentos de proteção individual; prevenção e ocorrência de exposição acidental a material biológico; conduta

pós-exposição e comportamento sexual foi respondido por alunos de Odontologia (n = 148, taxa de resposta de 91.9%). Foram realizadas análises estatísticas descritiva e inferencial (testes qui-quadrado e exato de Fisher), com nível de significância de 5%. Os estudantes reconheceram corretamente as rotas de transmissão de HIV, incluindo “sangue” (100%), “relação sexual” (99,3%), “transmissão vertical” (58,1%) e “compartilhamento de material contaminado” (94,6%) e os meios de prevenção, incluindo “uso de preservativo” (100%) e “não compartilhar agulhas e seringas” (99,3%). Quanto à frequência do uso de preservativo nas relações sexuais, 37% dos estudantes responderam “sempre”, 55,5% “às vezes” e 7,6% “nunca”. Com relação a práticas clínicas, 99,3% dos estudantes de Odontologia afirmaram utilizar equipamentos de proteção individual, 28,4% já sofreram acidente perfurocortante, sendo agulha o agente de exposição mais citado (32,5%) e na maioria dos casos (54,8%) nenhuma medida foi tomada após o acidente. Em conclusão, os estudantes exibiram bom conhecimento acerca de HIV/AIDS e atitudes preventivas adequadas no atendimento clínico e manejo de instrumentais perfurocortantes, entretanto ainda precisam ser motivados quanto ao uso de preservativo e orientados sobre os cuidados pós-exposição acidental a material biológico.

**Descritores:** HIV. Síndrome da Imunodeficiência Adquirida. Estudantes de Odontologia. Conhecimento.

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