

## Is there a relationship between students' knowledge of HIV/AIDS ways of transmission and their responses regarding their proximity to people living with HIV/AIDS?

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**Abstract** *This paper aims to identify college students' knowledge of HIV ways of transmission and correlate it with their answers concerning the proximity to people living with HIV/AIDS. We applied a questionnaire from the Brazilian Ministry of Health to 591 health undergraduate students. We analyzed the 10 questions about the virus ways of transmission, evaluating the number of correct answers and verifying the association between the number of correct answers and questions related to the proximity to people living with HIV/AIDS. Most students (96%) answered correctly 7 to 10 questions related to HIV ways of transmission (Group A) and 4% answered correctly 3 to 6 questions (Group B). Correlating these two subgroups and the answers about the non-acceptance of proximity to people living with HIV/AIDS, we found significant association between Group B and the agreement that the employer should fire an employee living with HIV and the statement that they would feel uncomfortable if a child living with HIV/AIDS studied at the same school as their own children. Negative opinions concerning the proximity to people living with HIV/AIDS were less prevalent, but were correlated to the lower knowledge of HIV ways of transmission.*

**Key words** HIV, AIDS, Students, University

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## Introduction

Thirty-five million people worldwide were living with human immunodeficiency virus (HIV) by the end of 2013<sup>1</sup>. In the same year, an estimated 2.1 million new cases of HIV infection were reported, a decrease of 38% compared to 2001. The number of deaths related to the disease is also declining. In 2013, 1.5 million people died of AIDS-related diseases annually, a fall of 35% when compared to 2005. However, the statistical data of this pandemic are not shown in a uniform way in different countries of the world<sup>1</sup>.

In Sub-Saharan Africa, about 24.7 million people are living with HIV/AIDS, which is the location most affected by the epidemic when compared to the global distribution of people living with HIV/AIDS<sup>1</sup>. The average figure is 4.8 million in the Pacific and Asia regions. In Latin America, the estimate is 16.6 million people, highlighting the fact that 75% of the cases are distributed between Brazil, Colombia, Venezuela and the Bolivian Republic<sup>1</sup>. With regard to new infection cases, a slow decline occurred in Latin America, with a decrease of 39% in the number of new infections in Mexico, while Brazil recorded an increase of 11%<sup>1</sup>.

According to the 2014 Epidemiological Bulletin of the STD, AIDS and Viral Hepatitis Department, Health Surveillance Secretariat, Ministry of Health, approximately 734,000 people are living with HIV/AIDS in Brazil, corresponding to a prevalence of 0.4% of the national population<sup>2</sup>. Among young people, in the period 2004-2013, there was an increase in the number of new cases of the disease in both genders. Among men, there is an increased incidence in the 15-24 years age group, observing that, among those aged 15-19 years, there was an increase of 120%; and among those aged 20-24 years, 75.9%. Among women, the significant increased trend is among those in the 15-19 years age group, with an increase of 10.5%<sup>2</sup>.

Despite the spread of information about the disease in the media, the higher incidence of AIDS among young Brazilians shows that there may still be misinformation about these transmission routes. According to Dziekaniak and Rover<sup>3</sup>, information is the basic input for the development of knowledge, and knowledge is the added value to information, "what is done with it", the differential that will lead to successful decision making, the "know how to do". While knowledge does not necessarily imply a behavioral change<sup>4,5</sup>, disinformation, according to lit-

erature, can facilitate prejudice and hamper the fight against stereotyped ideas about the disease<sup>6</sup>. Several studies evaluate knowledge about health issues through the most diverse questionnaires<sup>7,8</sup>. However, authors who evaluated a group in two stages, before and after an educational activity, demonstrated that, while there were more correct answers in the second stage, some incorrect answers persisted. That is, the acquisition of knowledge did not occur uniformly across the sample<sup>9</sup>. In literature and daily practice, we can observe that there are multiple and complex factors that interfere in knowledge and that it is difficult to evaluate it through direct and timely measures.

In this context, this study aims to find out whether university students have knowledge of HIV/AIDS ways of transmission, what their answers are about their proximity to people living with HIV/AIDS and to verify whether there is a correlation between knowledge of HIV/AIDS ways of transmission and such responses.

## Methods

This study is part of a research that analyzes health and disease concepts and practices among university students. In Brazil, there is still little research that addresses this issue among faculty members and university students in the field of health. In this quantitative phase, we investigated knowledge about HIV/AIDS ways of transmission and the responses on the interaction with people living with HIV/AIDS among health undergraduate students. We included in the sample all students enrolled in the respective course in the years 2012, 2013 and 2014, through the National High School Examination (ENEM), who attended the first two teaching weeks, that is, newly admitted to the University, and accepted to participate in the study by signing the Informed Consent Form (ICF). We applied a 50-question questionnaire developed by the Ministry of Health<sup>10</sup> to evaluate programs for the prevention of sexually transmitted diseases (STDs) and AIDS. Questions sought to ascertain individual knowledge of AIDS and STDs, to see how people viewed AIDS and people living with HIV/AIDS, to understand aspects of the individual sexual practice and whether individuals had had any STDs in the last few months. Since our research also seeks to find what students know about AIDS and how they view the disease and people living with HIV/AIDS, we used the same questionnaire, since it includes similar aspects. The applied in-

strument included questions related to the ways of transmission, opinion, prevention and virus infection diagnostic tests<sup>10</sup>.

Our sample consisted of 591 university students who signed an ICF, agreeing to participate in the research, confirming that they were aware that questionnaires were anonymous and data would be analyzed without their personal identification. Research was conducted in accordance with the directives and norms regulating research involving human beings, as per Resolution 196/96, later replaced by Resolution 466/12<sup>11,12</sup> and approved by the Research Ethics Committee, State Health Secretariat of Bahia.

The ten questions from the questionnaire on HIV/AIDS ways of transmission and the five questions of the instrument on women's rights and proximity to people living with HIV/AIDS were analyzed at this stage of the study, which are detailed in Tables 1 and 2. There were only two possible answers, YES (Y) or NO (N) for the 10 questions about the ways of transmission, as well as for the five other questions (YES, if they agreed with the statement, NO, if they disagreed) about opinions and the proximity to people living with HIV/AIDS. Responses were tabulated in a spreadsheet, evaluating the frequencies of positive (YES) or negative (NO) responses. After a first analysis of the answers regarding the 10 questions about HIV/AIDS ways of transmission, students were divided into two groups according to the number of correct answers: 3-6 correct answers (Group A) and 7-10 correct answers (Group B), aiming at correlating the number of

correct answers and prejudiced responses. Answers to the five questions of the questionnaire that contained possible relations with prejudice, about the social interaction with people living with HIV/AIDS had their frequency studied and described as a proportion of the sample.

In order to study the possible relation between knowledge of the ways of transmission, evaluated by the number of correct answers, and the responses regarding proximity to people living with HIV/AIDS, we analyzed comparatively students of the two different groups (A and B)

**Table 1.** Answers from students when asked about HIV / AIDS ways of transmission.

| HIV / AIDS ways of transmission<br>(10 questions) | Answers      |             |
|---|--------------|-------------|
|   | Yes<br>N (%) | No<br>N (%) |
| Sex without a condom                              | 581 (98.3%)  | 10 (1.7%)   |
| Cutlery, plates and cups                          | 33 (5.6%)    | 557 (94.4%) |
| Use the same bathroom                             | 54 (9.2%)    | 533 (90.8%) |
| Mouth kiss  | 158 (27.1%)  | 426 (72.9%) |
| Pregnancy or childbirth                           | 568 (96.4%)  | 21(3.6%)    |
| Breastfeeding                                     | 351 (61.1%)  | 223 (38.9%) |
| Insect bites                                      | 64(11.5%)    | 492(88.5%)  |
| Contaminated blood                                | 577 (98.8%)  | 07 (1.2%)   |
| Syringes and / or needles                         | 574 (97.6%)  | 14(2.4%)    |
| Playing with children who have the virus          | 13(2.2%)     | 576 (97.8%) |

**Table 2.** Correlation between the students' knowledge of HIV / AIDS ways of transmission (groups A and B) and responses that are contrary to their proximity to people living with HIV.

| Statements  | GROUP A*               | GROUP B**               | p-value |
|---|------------------------|-------------------------|---------|
|   | (24 students)<br>N (%) | (567 students)<br>N (%) |         |
| They agreed that they would be bothered if a child living with AIDS studied at their children's school.   | 06 (25%)               | 30 (5.4%)               | 0.002   |
| They agreed that the employer should fire a person living with AIDS to protect himself and his co-workers | 02 (8.7%)              | 05 (0.9%)               | 0.027   |
| They agreed that they would be bothered if a neighboring house became a home for people living with AIDS  | 03 (13%)               | 38 (6.8%)               | 0.21    |

\* GROUP A: students who answered correctly 3 to 6 questions of 10 questions about HIV / AIDS ways of transmission. \*\* GROUP B: students who answered correctly 7 to 10 questions of 10 questions about HIV / AIDS ways of transmission.

to verify whether there was a correlation between a lower knowledge and responses that denoted the non-acceptance of the proximity to people living with HIV/AIDS. Statistical analysis was performed in the EPI-INFO 2005 program. For the study of the possible associations between the qualitative variables (Groups A and B, according to the number of correct answers and biased answers) we used Fisher's Exact Test, considering the level of  $p \leq 0.05$  as significant.

## Results

Our study sample consisted of 591 university health students who answered the questionnaire, of which 190 (32%) declared themselves male and 401 (68%), female. Mean age was 22.9 years.

When the ten questions about HIV/AIDS ways of transmission were analyzed, most university students revealed a high knowledge of the disease. Ninety-eight percent of students answered that sex without a condom is a ways of transmission; 96% stated that pregnancy and childbirth of mothers living with HIV/AIDS are also ways of transmission; 99% reported contaminated blood as a way of contracting HIV and 98% responded that contaminated syringes and needles are ways of transmission. Ninety-eight percent of participants answered that playing with children living with HIV/AIDS is not a way of transmission; 94% revealed that cutlery, dishes and glasses are not ways of contracting HIV; 91% said that using the same bathroom was also not a way of transmission, and 89% said that insect bites are not a way of contracting AIDS. The two questions with the highest proportion of incorrect answers were: 27% of the students answered that kissing in the mouth is a form of contracting AIDS and 39% answered that breastfeeding is not an HIV/AIDS way of transmission (Table 1). When we considered the number of students' correct answers to the ten questions in this stage of the questionnaire, 4% (24 students) on the sample answered correctly 3-6 questions (Group A), while 96% (567 students) of the sample answered correctly 7-10 questions (Group B). No student answered correctly fewer than three questions from this section of the questionnaire, which contained 10 questions about virus ways of transmission (Table 3).

We also evaluated the responses that indicated non-acceptance of proximity to people living with HIV/AIDS. The questions in the questionnaire investigated: "Would you mind if a child living with HIV/AIDS studied at your children's

school?", 93.8% said NO; "Do you think your employer should fire someone living with HIV/AIDS to protect you and your co-workers?", 98.8% of survey participants said NO; and "Would you mind if a house next to yours turned into a home for people living with HIV/AIDS?", 93% said NO.

Correlating the number of students' correct answers (subdivided into the two groups A and B) with answers that showed the non-acceptance of proximity to people living with HIV/AIDS, we found a statistically significant difference in relation to two out of three questions. Students with fewer correct answers on HIV ways of transmission (3-6 correct answers/Group A) agreed in greater numbers to the statements that "the employer should fire someone living with HIV/AIDS and that "he/she would be bothered if a child living with HIV/AIDS studied at their children's school." The correlation between knowledge about HIV/AIDS ways of transmission (categorized in Groups A and B) and the responses of non-acceptance of the proximity to people living with HIV/AIDS are detailed in Table 2.

**Table 3.** Number of correct answers of the 591 students regarding the 10 questions about HIV / AIDS ways of transmission.

| Number of correct answers | Students that answered correctly this number of questions |
|---------------------------|---|
|                           | N (%)   |
| None or 1                 | 0 (0%)  |
| 2                         | 0 (0%)  |
| GROUP A*                  |   |
| 3                         | 01 (0.2%)   |
| 4                         | 02 (0.3%)   |
| 5                         | 10 (1.7%)   |
| 6                         | 11 (1.9%)   |
| GROUP B**                 |   |
| 7                         | 33 (5.6%)   |
| 8                         | 121 (20.5%)   |
| 9                         | 216 (36.5%)   |
| 10                        | 197 (33.3%)   |

\* GROUP A: 24 students who answered correctly 3 to 6 questions of 10 questions about HIV / AIDS ways of transmission. \*\* GROUP B: 567 students who answered correctly 7 to 10 questions of 10 questions about HIV / AIDS ways of transmission.

## Discussion

Literature shows that young people have a good knowledge of HIV/AIDS ways of transmission<sup>13,14</sup>. In our research, with more than 500 university students, we found that more than 95% of them know the virus ways of transmission through sexual intercourse, contaminated blood, syringes and needles, pregnancy and childbirth, denoting knowledge of the subject. Much of this information is often conveyed in media campaigns. However, we still had a high number of incorrect answers when it came to the possibility of transmission by kissing in the mouth and transmission through breastfeeding.

The various studies have samples of different characteristics, but all of them reveal that there is still some lack of knowledge about HIV/AIDS ways of transmission among young people<sup>15,16</sup>. A study with students from a university in rural São Paulo revealed that 90% of young people said that transmission may occur through injectable drugs; 84% said through blood transfusion; 67%, said through sexual secretions; and 22% said through saliva<sup>16</sup>. However, literature shows that many young people still have doubts about vertical transmission and transmission through saliva and insect bites<sup>16,17</sup>. Although data collection instruments are different in the research on the subject, some of the questions about ways of transmission are seen in all of them<sup>16,17</sup>.

The relationship between knowledge about the ways of transmission and responses of non-acceptance of the proximity to people living with HIV/AIDS is controversial in literature. Studies with young people of other nationalities diverged in demonstrating the relation between knowledge and prejudice<sup>15,17,18</sup>. A study by Tavoozi et al.<sup>15</sup> carried out with high school students found that young people with less knowledge about the disease had more negative attitudes about people living with HIV/AIDS, and about half of students believed that someone living with HIV/AIDS should not study at the other students' school. In a study carried out with North American secondary school students, Holtzman et al.<sup>17</sup> did not find a correlation between knowledge about HIV and young people's behavior. In Greece, youngsters from 13 technical and professional schools had high knowledge about HIV ways of transmission, and 76% would still be friends of someone living with HIV/AIDS; but only 19% of students would like their classmates to know of a possible HIV positive diagnosis<sup>14</sup>.

In our study with university students who also had a good knowledge about HIV/AIDS ways of transmission, we found that few students demonstrated the non-acceptance of proximity to people living with HIV/AIDS. In Brazil, a study by Seidl et al.<sup>6</sup> carried out at the University of Brasília (UnB) revealed that health students tend to have less exclusionary positions when compared to students of humanities and exact sciences with regard to people living with HIV/AIDS right to education and work. One of the reasons attributed to this difference would be a greater knowledge about the subject by students of health courses, based on the very context of the area<sup>6</sup>.

Regarding the questions applied in our study, few students stated that their employer should fire someone living with HIV/AIDS for their protection and that of their co-workers. Also in the university environment of the study by Seidl et al.<sup>6</sup>, about a quarter of the sample studied agreed with this statement. However, our work did not compare students from different areas and found responses of non-acceptance of proximity to people living with HIV/AIDS at a slightly lower frequency than the study by Seidl et al.<sup>6</sup>, where about 8.2% of the sample fully agreed with the statement that the employer should fire someone living with HIV/AIDS to protect other workers and 7.8% agreed in part, with a percentage of about 15% of the sample agreeing with this statement, in a gradual scale of agreement, which was not used in our study. In another study, individuals living with HIV/AIDS participating in a survey revealed that they feared that the discovery of infection by co-workers might create prejudice or discomfort in the exercise of their own profession<sup>19</sup>. Some of the participants have resigned from work because they were afraid of being exposed by being HIV carriers; others were fired due to prejudice; and there were still those who gave up looking for jobs for fear of undergoing admission tests<sup>19</sup>.

Prejudice is considered as the attitude of an individual toward a particular group, based on the belief that that specific group would have negative features<sup>20</sup>. Prejudice is influenced by multiple factors, including cultural, cognitive, historical, economic, and personality factors. Prejudice's destruction process would not occur through the inhibition of only one factor, but of an action on the various factors<sup>20</sup>. It is not just the individual differences that favor the development of prejudice. It is based on the experiences of in-

dividuals and their social relationships, which develop through the family environment, school and communication networks, and can act in different spheres that will facilitate or hinder their emergence<sup>21</sup>. According to Galvão<sup>22</sup>, while AIDS is not associated with “physical death” anymore, the carrier experiences a “social death” due to the stigma that HIV positive status generates in interpersonal and intergroup relations.

In our study, the question with the greatest number of answers that could denote some level of prejudice, since they reveal the non-acceptance of the proximity to people living with HIV/AIDS was in relation to the annoyance of a neighboring residence becoming a center for people living with AIDS. However, for this question, there was no significant difference between the two groups of young people with a lower and greater knowledge of the disease’s ways of transmission, showing that the idea of cohabiting aroused a negative response in both groups.

In Brasilia, authors investigated the existence of prejudice in relation to people living with HIV/AIDS in two university spheres (public and private)<sup>22</sup>. With the creation of a “Social Distance Scale”, the objective was to measure the discomfort in relation to HIV carriers. With a sample of 169 university students, different social stakeholders with more or less proximity were studied, such as friends, relatives, neighbors, acquaintances living with HIV/AIDS and others. Results revealed that the discomfort was greater when there were closer relations (friendship or kinship) when compared to formal relationships, without affective coexistence. The sample analyzed revealed a feeling of discomfort in the very close social relationships<sup>22</sup>. When they know their diagnosis, adolescent HIV carriers wish that no one else were aware of it, probably for fear of prejudice and discrimination associated with the disease<sup>23</sup>. Only family members and sometimes partners could know it, because adolescents report that friends have a habit of questioning changes in appearance secondary to disease<sup>23</sup>.

According to our results, lower knowledge was significantly associated with negative responses about proximity, although they were also appeared, less frequently, among young people with the highest number of correct answers regarding the virus ways of transmission. Tavoosi *et al.*<sup>15</sup> also found this correlation, and after having applied questionnaires to more than four thousand students, revealed a higher frequency of negative attitudes vis-à-vis people living with HIV/AIDS among students with low-

er knowledge, where 23% said that they would not shake the hand of someone living with HIV/AIDS, if they knew about the disease. In a study conducted with Malaysian medical students, Chew & Cheong<sup>24</sup> found no correlation between knowledge and negative attitudes, but 50% of the sample responded that partners of people living with HIV/AIDS should be informed even without the patient’s consent, and 49% agreed that all patients admitted to a hospital should perform serology for HIV.

The questions that denoted negative attitudes toward people living with HIV/AIDS were not similar in the various studies and there is still no universally accepted instrument in the literature for assessing young people’s behavior in relation to HIV/AIDS. The scales to correlate knowledge and prejudice revealing-attitude also differ in the studies; however, samples consist of adolescents that are mostly with high knowledge of the disease and participate in multiple sectors of society, with answers that indicate prejudice in part of the researched literature<sup>6,14,15,17</sup>.

In our study, although the responses that were contrary to the proximity to people living with HIV/AIDS were not frequent, two of the three questions showed a correlation between them and a lower knowledge about the ways of transmission of the disease, suggesting that a greater debate on this theme with young people can make some contribution in the fight against prejudice. However, the low prevalence of opinions that denoted prejudice may be related to the implemented methodology, since the questionnaire applied requested a direct and timely response, with only two options, which may not represent a daily behavior of university students. However, the anonymous nature of the questionnaire allows for a more direct and free response. Another aspect to be considered is that our newly enrolled students in the University are acquiring new knowledge to discuss and review their attitudes and opinions, and it is up to society and Universities to broaden their space to debate these issues.

In conclusion, according to the results obtained in our study, most university students are aware of HIV/AIDS ways of transmission. However, there is still some level of disinformation, especially about the virus’ vertical transmission. There was a greater frequency of negative responses regarding proximity to people living with HIV/AIDS among students with lower knowledge of HIV/AIDS ways of transmission. Further research is required to assess whether an

investment in health education actions could aid in combating prejudice in contemporary society.

### **Collaborations**

VP Santos worked on the study's concept and design, data analysis and interpretation, text writing and critical review and approved the final version; MTAD Coelho contributed to the study's concept, data interpretation, text critical review and approved the final version. EL Macário and TCS Oliveira contributed to data analysis and interpretation, text writing, bibliographic review and approved the final version.

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Article submitted 12/06/2015

Approved 21/03/2016

Final version submitted 23/03/2016