The association between knowledge about HIV and risk factors in young Amazon people

Associação entre conhecimento sobre HIV e fatores de risco em jovens amazônidas

Asociación entre conocimiento sobre VIH y factores de riesgo em los jóvenes de la Amazonia

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ABSTRACT
Objectives: analyze the association between the level of HIV knowledge among young people from Amazonas region, their sociodemographic profile and infection risk factors. **Methods:** cross-sectional analytical study, which used a structured questionnaire containing questions about sociodemographic, behavioral aspects and HIV knowledge. Data were grouped by sex and underwent ordinal and binary logistic regression analysis. **Results:** the students had an HIV knowledge deficit, associated with a low educational level of their parents and low family income. The most frequent risk factors were lack of knowledge on the part of female students regarding proper male condom use, their infrequent use in sexual relations and failure to do HIV testing. There was an association between level of knowledge and use of dating apps by female students. **Conclusions:** there was no association between level of knowledge and the preponderant risk factors, but the students' knowledge deficit rendered them more vulnerable to infection.
Descriptors: HIV; Adolescent; Sexual Health; Students; Risk Factors.

RESUMO
Objetivos: analisar a associação entre o nível de conhecimento sobre o HIV de jovens amazônidas e o perfil sociodemográfico e fatores de risco para a infecção. **Métodos:** estudo tipo *survey* analítico transversal empregando questionário estruturado contendo questões sociodemográficas, comportamentais e de conhecimento sobre o HIV. Os dados foram agrupados por sexo e submetidos à análise de regressão logística ordinal e binária. **Resultados:** os estudantes possuíam déficit de conhecimento sobre o HIV, associado à baixa escolaridade dos pais e à baixa renda familiar. Os fatores de risco mais frequentes foram: desconhecimento do uso correto do preservativo masculino pelas alunas, seu uso infrequente nas relações sexuais pelos estudantes e não testagem anti-HIV. Houve associação entre nível de conhecimento e uso de aplicativos de encontro pelas alunas. **Conclusões:** não houve associação entre nível de conhecimento e fatores de risco preponderantes, porém, o déficit de conhecimento dos estudantes torna-os mais vulneráveis à infecção.
Descritores: HIV; Adolescente; Saúde Sexual; Estudantes; Fatores de Riscos.

RESUMEN
Objetivos: analizar la asociación entre nivel de conocimiento sobre VIH de jóvenes de la Amazonia, perfil sociodemográfico y factores de riesgo para la infección. **Métodos:** estudio tipo *survey* analítico transversal, aplicando cuestionario estructurado, incluyéndose preguntas sociodemográficas y de conocimiento sobre VIH. Datos agrupados por sexo, sometidos a análisis de regresión logística ordinal y binaria. **Resultados:** los estudiantes tenían déficit de conocimiento sobre VIH, asociado a baja escolarización parental e ingreso familiar escaso. Los factores de riesgo más frecuentes fueron: desconocimiento del correcto uso del preservativo masculino por parte de las alumnas, infrecuencia de su uso en las relaciones sexuales de todos los estudiantes, y no realizar análisis de VIH. Existió asociación entre nivel de conocimiento y uso de aplicaciones de citas entre las alumnas. **Conclusiones:** no hubo asociación entre nivel de conocimiento y factores de riesgo preponderantes, aunque el bajo conocimiento de los estudiantes los hace más vulnerables a infectarse.
Descriptores: VHI; Adolescente; Salud Sexual; Estudiantes; Fatores de Riesgo.

INTRODUCTION

Acquired Immune Deficiency Syndrome (AIDS), caused by HIV (Human Immunodeficiency Virus), is the second highest cause of mortality among young people, accounting for around 30% of new infections by HIV among people in the age group of 15 to 25 years old[1]. In 2017, there were 3,900,000 young people across the world living with HIV (only 89,000 in Brazil), representing an increase of 85.42% from 1980 to 2017. In Brazil, there are around 860,000 individuals living with HIV, with a prevalence of 0.3% in boys and 0.2% in girls[2]. In the last ten years, the HIV detection rate has practically doubled in young men[3].

Lack of knowledge about HIV transmission and prevention has been indicated as one of the risk factors for spreading the epidemic among young people both in Brazil and other countries[4-6]. In Brazil, studies show that such knowledge varies among the country's regions. Students from the South and Southeast regions have a good level of knowledge[7-8], as opposed to the Northeast and Center-West regions where it is low[9-10]. Apart from low HIV knowledge, there are other HIV infection risk factors among young people, such as irregular condom use in sexual relations, consumption of alcoholic beverages before sexual relations, use of illicit drugs, multiple sexual partners[11-13] and use of dating apps[14].

During the literature review on the subject, the authors did not find any study on how much people in Brazil's North region know about HIV knowledge, its forms of transmission/prevention, epidemiological knowledge, the importance of HIV testing and the preponderant HIV risk factors among its inhabitants. This could be due to the low concentration and development of graduate studies courses in health in the region[15]. The North region has the highest growth of HIV and AIDS reporting rates among the country's regions. Belém ranked third among all the Brazilian state capitals in 2018, compared to fourth in 2017 [3]. To the present day, the causes of this phenomenon are not known. This study is highly important because it supports the creation of strategies to fight the epidemic that is spreading across the Amazon region. However, it will focus solely on young people since it is the age group where HIV and AIDS detection rates are growing[1-3].

OBJECTIVE

To analyze the association between the level of HIV knowledge among young people from the state of Amazonas, sociodemographic profile and infection risk factors.

METHODS

Ethical aspects

This study is part of the project "Knowledge in order to take action: proposals for more effective HIV prevention measures for young people in the city of Belém do Pará", approved by the Research Ethics Committee of the Institute of Health Sciences of the Federal University of Pará under Opinion No. 1.659.887 and CAAE 57275316.0.0000.0018.

Design, study location and period

This is a cross-sectional, analytical survey-based study with secondary school students from the Belém state school system. Belém is divided into eight Administrative Districts (AD): Belém (DABEL), Guamá (DAGUA), Sacramenta (DASAC), Bengui (DABEN), Icoaraci (DAICO), Outeiro (DAOUT), Entroncamento (DAENT) and Mosqueiro (DAMOS). The data collection took place between March and April 2016.

Sample and inclusion and exclusion criteria

The target population was comprised of 45,157 secondary school students from the Belém state school system[16], which served as the basis for calculating sample size. To obtain a representative sample from each AD, the method of cluster probability sampling was employed, and the number of administrative districts in Belém was considered in the stratification.

Sample size was calculated with EPI INFO, version 7.2.2.16. An expected frequency of 50% and acceptable error of margin of 5% were adopted. A confidence level between 99% to 99.9% was used for the sample size, varying from 654 to 1057, and the final sample collected was 859, which was within the established sample interval.

Case-control sampling was used for selecting the schools that participated in the study, where the schools with the highest number of enrolled students from each AD were selected: 1) DAMOS: Honorato Filgueiras Elementary and Secondary State School (EEEFM) (1,328 students); DAOUT: EEEFM do Outeiro (1,301 students); 3) DAICO: EEEFM Avertano Rocha (2,248 students); 4) DABEN: Maria Luiza da Costa Rego (2,439 students); 5) DASAC: EEEFM José Alves Maia (1,845 students); 6) DAENT: EEEFM Antônio Gomes Moreira Júnior (1,502 students); 7) DABEL: Barão do Igarapé Miri (1,812 students); 8) DAGUA: EEEFM Brigradeiro Fontenelle (1,908 students). All these schools are located on the outskirts of Belém.

For choosing the participants, one high school class from each grade in the school was randomly selected and all the students were invited to participate in the study. An explanation was given about the survey and its importance for the youth of Belém. The students who agreed to participate were given a free and informed consent form, well as another form using more age-appropriate language, in order to understand the project. After reading them, the forms were signed together with their respective legal guardians. The eligibility criteria were the following: secondary school students from the Belém state school system, representing both sexes and enrolled in the morning session of the schools selected due to the higher concentration of students.

Study Protocol

The data collection instrument was prepared by the authors of the study in collaboration with educational professionals, based on the literature pertaining to HIV[10]. It was a self-administered questionnaire with questions related to sociodemographic and behavioral variables and knowledge about the virus. Once created, and before the official start of the data collection, it was tested various times – to confirm understanding of the instrument,

coherence and average length of time needed to complete it – with secondary school students from public schools that did not participate in the study (Escola de Aplicação of the Federal University of Pará and EEEFM Justo Chermontt), totaling 300 students. This activity enabled the questionnaire to be improved, eliminating any confusing elements found during its testing.

The final version of the questionnaire was composed of questions in relation to sociodemographic variables, risk behaviors and assessment of HIV knowledge (transmission/prevention, treatment and epidemiology). It was administered to the students in the presence of a researcher in order to avoid information sharing between participants. The assessment section contained 17 affirmative statements to which the students had to answer "true" or "false" or "I don't know".

The data was gathered collectively in each selected school, inviting all the participating students to a large classroom where a prior explanation was given. The students were instructed to work out any questions beforehand in order not to communicate between themselves and to answer the questions individually after reading the questionnaire. Once completed, the questionnaire was placed in an envelope with no identification and sealed in everyone's presence.

Chart 1 – HIV knowledge questionnaire administered to secondary school students from the state school system, Belém, Pará, Brazil, 2016

Statements	True	False	I don't know
1. HIV is transmitted through sharing contaminated needles and transfusion of contaminated blood	x		
2. HIV is not transmitted via oral sex, since saliva kills the virus		x	
3. Ejaculating outside the vagina or anus prevents HIV transmission		x	
4. Proper condom use ensures HIV prevention	x		
5. In anal or vaginal sex, only the person being penetrated is at risk of infection		x	
5. Sharing nail clippers or razors transmit HIV		x	
6. HIV-positive mothers transmit the virus through breastfeeding	x		
7. Mosquitoes can transmit HIV after biting someone carrying the virus		x	
8. HIV can be transmitted to the fetus during pregnancy	x		
9. Kissing and sharing silverware transmit HIV		x	
10. Belém and the state of Pará are in 18th place in Brazil in terms of HIV and AIDS reporting rates		x	
13. The age group most affected by HIV is after 45 years of age		x	
14. Homosexuals are the people most affected by HIV/AIDS		x	
15. People over 65 years old are not at risk of contracting HIV		x	
16. HIV treatment is simple and has no adverse effects		x	
17. There is a cure for AIDS		x	

Note: x – correct answer.

The students sat in individual desks, arranged in rows and spaced laterally for the purpose of privacy. The questionnaire did not have any personal identification and was only distinguished by school, sex and the grade the student was in.

Results and statistical analysis

The data was stored in an electronic database for subsequent processing and was analyzed using Bioestat software (version 5.3) and the program Minitab 18°. The responses to the HIV knowledge level questionnaire were assigned scores, measured in percentage of correct answers. Due to the numerical nature and since they followed an order, they were categorized as ordinal variables into three levels of knowledge: low or insufficient (0% to 49.9%), average (50% to 69.9%) and high (70% to 100%). Ordinal logistic analysis was used to verify the association between the sociodemographic variables and the level of knowledge of each student and binary regression to determine the association between level of knowledge and HIV risk factors. In the logistic analysis, level of knowledge was considered a dependent variable, whereas in the binary regression it was independent.

Before the regression analyses, association analyses of the dependent and independent variables were performed by the chi-square test in the Bioestat program (version 5.3), whereas Minitab 18° was used for the regression analyses. Any association with a level of significance of $p<0.10$ was included for ordinal logistic regression analysis. For the ordinal logistic analysis, the methodology from the previous study was employed[17]. In summary, the first step entailed performing the chi-square test for linear trend, since level of knowledge is a variable of an ordinal nature. For each sociodemographic variable, one response option was considered a control category (reference). The Minitab 18° program uses a proportional odds model for ordinal logistic regression. The coding criterion adopted by this program was followed, and knowledge category order selected was: Low, Average and High.

For the binary regression analysis, the average and high levels of knowledge were initially grouped into only one category (H+A) in order to be compared with the low-level category. Following this, association analyses with the dependent variables (HIV risk factors) were carried out, through the bivariate chi-square test. The variables that had a statistically significant association ($p\leq0.05$) were then subjected to binary logistic regression. In both the ordinal logistic regression and binary regression, the odds ratio, coefficient and p-value ≤0.05 were considered.

RESULTS

Sociodemographic characterization

A total of 859 students participated in the study and the number of students per AD was: DABEL: 115; DABEN: 114; DAENT: 81; DAGUA: 118; DAICO: 123; DAMOS: 140; DAOUT: 86; DASAC: 82. Of these, 472 (54.95%) were female and 387 (45.05%) were male. Most of the students were between 14 and 17 years of age (female students: 82.84%; male students: 79.84%), with a large percentage having parents whose educational level was

up to elementary school (female students – father: 50%; mother: 44.98%; male students: father – 44.25%; mother: 34.88%) and monthly family income from 1 to 3 minimum wages (female students: 51.68%; male students: 52.33%) (Table 1).

HIV knowledge versus sociodemographic profile

In terms of level of HIV knowledge assessed through the percentage of correct answers on the questionnaire, 8.69% of female students and 12.14% of male students were categorized as having a high level of knowledge (70% to 100% correct answers). For average knowledge (50% to 69.9% correct answers), it was 31.78% and 27.13% for female and male students, respectively. Low level of knowledge (0% to 49.9%) was the most prevalent, corresponding to 59.53% of female students and 60.72% of male students (Table 1).

The next stage involved analyzing the modulation of the sociodemographic profile of the students on the level of knowledge they possessed, using ordinal logistic regression. For this analysis, the data was initially subjected to chi-square association for linear trend and every category with p≤0.1 then underwent regression analysis. As can be seen in Table 1, the categories of the variables that passed the established cut-off level were: illiterate father and mother with secondary school education for female students (p=0.03 and p=0.04, respectively). For male students, they were: parents with elementary school education (fathers p=0.05, mothers p=0.08) and secondary education (fathers p=0.00; mothers p=0.01) and family income less than 1 minimum wage (p=0.03).

In the ordinal logistic regression results, OR values less than 1 were associated with a high level of HIV knowledge, whereas those higher than 1 were associated with low knowledge. As shown in Table 2, the results indicated that female students with illiterate fathers were more likely to have low HIV knowledge, while those with mothers who had secondary school education were more likely to have high knowledge. The same was noted for male students with parents who had elementary and secondary education. Family income lower than one minimum wage is a factor that increases the odds of male students having low knowledge.

Table 1 – Association between sociodemographic variables and HIV knowledge level of secondary school students from the state school system, Belém, Pará, Brazil, 2016

Variables	Female students (n=472)					Male students (n=387)				
	A 41	M 150	B 281	X^{2*}	p^{**}	A 47	M 105	B 235	X^{2*}	p^{**}
Age group										
14 to 17 years old	31	125	235	0.95	0.33	36	87	186	0.00	0.98
≥18 years old	10	25	46	1.00		11	18	49	1.00	
Father's educational level										
Illiterate	3	15	59	5.04	0.03	3	7	42	1.25	0.24
Elementary	12	64	83	0.69	0.41	14	41	67	3.87	0.05
Secondary	13	22	45	1.16	0.28	18	25	41	9.20	0.00
University	9	28	58	1.00		5	18	52	1.00	
Not stated	4	21	36			7	14	33		
Mother's educational level										
Illiterate	0	8	26	2.59	0.11	2	4	24	0.65	0.42
Elementary	16	50	90	2.01	0.15	11	34	60	3.14	0.08
Secondary	11	37	52	4.05	0.04	17	33	56	7.21	0.01
University	9	37	86	1.00		9	21	75	1.00	
Not stated	5	18	27			8	13	20		
Family income										
<1 MW	14	49	118	0.82	0.36	8	25	72	4.66	0.03
1 to 3 MW	23	86	138	0.91	0.11	26	56	118	0.54	0.40
>3 MW	4	15	25	1.00		13	24	45	1.00	

*Note: * Chi-square test for linear trend; ** Significance of the chi-square test; ***H, A, L – High, Average, Low; MW – Minimum wage (BRL 880).*

Table 2 – Ordinal logistic regression between the sociodemographic variables and knowledge level of secondary school students in the state school system, Belém, Pará, Brazil, 2016

Variables	Female students			Male students		
	OR*	CI (95%)**	p^{***}	OR	CI (95%)	P
Father's educational level						
Illiterate	2.12	1.09-4.13	0.03	--	--	--
Elementary	--	--	--	0.54	0.30-0.98	0.04
Secondary	--	--	--	0.39	0.21-0.74	0.00
Mother's educational level						
Elementary	--	--	--	0.56	0.32-0.98	0.04
Secondary	0.58	0.35-0.98	0.04	0.45	0.26-0.79	0.01
Family income						
Less than one minimum wage	--	--	--	1.86	1.04-3.34	0.04

*Note: *Odds ratio; ** Confidence interval 95%; ***Level of significance.*

HIV knowledge versus risk factors

After it was found that family income and the parents' educational level directly affected the students' HIV knowledge, the modulation of the students' level of knowledge on the risk factors examined was analyzed through binary logistic regression. Here, the analysis was separate for students who had not had any sexual relations to date (Table 3) and for those who had already had sexual relations (Table 4).

Before the regression analysis, the data was subjected to the bivariate chi-square test and any category with p≤0.05 was analyzed using binary regression. The only variable with significant association was the use of dating apps by female students. The binary regression revealed that the odds of using these apps was higher among female students with a high level of knowledge (OR=0.40; 95% CI=0.18 - 0.95; p=0.02).

Table 3 - Association between HIV knowledge level and risk factors in secondary school students from the state school system, Belém, Pará, Brazil, 2016

| Risk factors | Level of knowledge | | | | | | | |
| | Female students (n=472) | | | | Male students (n=387) | | | |
	H+A (n=191)	L (n=281)	X^{2*}	p^{**}	H/A (n=152)	L (n=235)	X^{2*}	p^{**}
Correct condom use								
Yes	94	116	2.58	0.10	131	197	0.23	0.63
No	97	165			197	38		
Dating app								
Yes	16	10	4.18	0.04	20	23	0.74	0.38
No	175	271			132	212		

Note: * Chi-square test for linear correlation; ** Significance of the chi-square test; ***H, A, L – high, average, low level of knowledge.

Table 4 – Association between risk factors and HIV knowledge level in secondary school students from the state school system who have already had sexual relations, Belém, Pará, Brazil, 2016

| Risk factors | Level of knowledge | | | | | | | |
| | Female students (n=264) | | | | Male students (n=155) | | | |
	H+A (n=101)	L (n=163)	X^{2*}	p^{**}	H/A (n=62)	L (n=93)	X^{2*}	p^{**}
Sexual partners								
1 partner	85	142	0.24	0.62	36	59	0.26	0.61
≥2 partners	16	21			26	34		
HIV testing								
Yes	4	1	2.11	0.14	3	2	0.22	0.64
No	97	162			59	91		
Always uses condom								
Yes	6	15	0.52	0.47	9	6	1.92	0.17
No	95	148			53	87		
Alcoholic beverages								
Yes	26	34	0.59	0.44	16	15	1.62	0.20
No	75	129			46	78		

Note: * Chi-square test for linear trend; ** Significance of the chi-square test; ***H, A, L – high, average, low level of knowledge.

DISCUSSION

The results indicated that there was clear HIV knowledge deficit among the students who participated in the study, denoting the direct influence of the parents' level of education and family income. In relation to HIV risk factors, lack of knowledge concerning proper male condom use by female students stood out. Among students who said they had already had sexual relations, infrequent male condom use was predominant, and most had never undergone HIV testing.

The results obtained in this study from the HIV knowledge questionnaire differed from other studies conducted in the South and Southeast regions of Brazil which indicated a good level of knowledge[7-8]. However, they were similar to studies in the Northeast and Center-West regions which showed a low level[9-10]. It should be pointed out that some of these studies were conducted a decade ago[7,10]. In view of regional specificities, the differences in knowledge among regions may be due to the fact that the South and Southeast regions have greater access to technologies and means of information than the North and Northeast regions.

Another factor that may have contributed to the low percentage of correct answers by students was the social stratum to which they belonged and low level of education of their parents. The study sample was composed of students with low family income, whose parents had a low level of education and who lived on the outskirts of Belém. The results coincide with those from a study conducted among Chinese adolescents which found that the parents' level of education had a direct influence on the HIV knowledge level of these adolescents[18]. The parents' low educational level had an effect on the understanding of written language, which creates obstacles to accessing up-to-date information and an inability to discuss sexual matters with their children, without mentioning use of arguments based on scientifically correct information[19-20]. Parents with a low level of education have difficulties dealing with the sexual lives of their children, since they themselves are still immersed in myths and taboos[20].

As for the association between HIV knowledge level and infection risk factors, the results of the present study indicated a statistically significant association between HIV knowledge and use of dating apps by female students who had a high level of knowledge. This finding differs from a previous study which showed that most of the MSM who used these apps had a low level of knowledge regarding forms of HIV and STD transmission[15]. The hypothesis of the present study is that these apps require more modern devices and, therefore, can be acquired by students with higher family income, with access to means of information and, possibly, having parents with a higher level of education. In the student sample of the present study, this supposition was corroborated by the results of the study which indicated a higher probability of low HIV knowledge among students with family income lower than one minimum wage.

It is noteworthy that the present study found that knowledge of proper male condom use was practically restricted to male students. A study carried out in the city of São Paulo with women only produced similar results, suggesting that their lack of knowledge may be directly related to the subservience to which women are subjected and cultural impositions[21]. Discussions on reproductive health in family or social settings occur in a more

veiled and restricted way with girls, whereas such discussions are open and even encouraged with boys[22]. Another study conducted with parents of adolescents in a northeastern capital of Brazil showed that parents found it difficult to discuss sexual matters with their daughters and that most of the time the focus was on preventing pregnancy[23].

Infrequent male condom use in sexual relations and low HIV testing have also been observed in other previous studies in Brazil and other countries[24-27]. In Brazil, infrequent use was mainly predominant among people with low levels of HIV/AIDS knowledge, and particularly people in stable relationships, men who have sex with men (MSM) and women, due to difficulties negotiating condom use with their partners[27]. It should also be noted that male condoms are only considered as a means of contraception. A study conducted in the United States[26] found that female students starting their sexual lives and who were taking hormonal contraceptives engaged in unprotected sex, whereas those with more sexual experience used condoms during sexual relations. It is even more alarming when comparing the sexual and reproductive health indicators of Brazilian adolescents for 2015, 2012 and 2009[28]. Although the analyses indicated a drop in the prevalence of starting to have sex at an early age, there was also a lower prevalence of condom use. However, it was more common for boys than girls to start having sex at an early age, with a higher number of sexual partners and lower condom use. The North, Northeast and Center-West regions had the worst indicators.

In the present study, no significant association was noted between a high level of knowledge and male condom use in sexual relations and HIV testing. Coinciding with the results of this study, two previous Brazilian studies[25,29] found that a high level of HIV knowledge was not linked to the adoption of healthy practices. Although the young people in both the studies had a good level of knowledge regarding forms of HIV transmission and prevention, there was a prevalence of infrequent condom use[25] and lack of HIV testing[29]. Ignorance of students about HIV detection tests is considered to contribute to low testing frequency among young people[29]. The stigma surrounding the virus and AIDS also acts as an inhibitor[30]. A study conducted with North American students[30] found that those with greater knowledge about HIV and the importance of detection tests had fewer stigmas and did the tests more frequently.

Aimed at greater HIV infection prevention and control, the Brazilian Ministry of Health expanded the offer of quick testing for HIV and other sexually transmitted diseases (SDT), previously only offered in Testing and Counseling Centers, but now available in the primary health system[31]. However, the results of the present study highlight the need to raise awareness in the population regarding the importance of these tests for the sake of early diagnosis and immediate start of treatment, and thereby break the chain of transmission of the virus.

Given the negative HIV and AIDS panorama in the state of Pará, educational actions must be continuous. HIV campaigns also need to be adapted to the different cultural and/or social contexts for the communication process to be complete, respecting local linguistic specificities, people's level of education, their habits and beliefs and the level of health literacy of those involved. It is not enough to distribute male condoms if students do not know how to use them. In addition, handing out explanatory pamphlets will not be sufficient if the language of these publications is not understood by students. Therefore, open and direct dialogue between health agencies, schools and society becomes an effective tool for fighting HIV at the municipal, state and national levels.

Schools are a field where the role of health education should also provide responsible sexual guidance in the community to which students belong[10,12]. However, the absence of this theme in schools is a global problem. For example, a study pointed out that North American educational systems prioritize health education in suicide prevention, drug use and bullying, leaving little room for the sexual education of students. In addition, cultural and religious traditions can be definers of government programs on the sexual health of adolescents that are quite ineffective and even discriminatory, such as "abstinence only until marriage" (AOUM)[32].

In 2007, the Brazilian federal government launched the Health and Prevention in Schools Project, which included the Health Program in Schools, aimed at promoting the sexual and reproductive health of students in the public-school system, linking the health and education sectors. The main goal of this program is to help reduce HIV and STD rates, in addition to pregnancy. Since Health Program in Schools is closely linked to the Family Health Strategy, health professionals must work in schools to instruct teachers and students, as well as the communities in which they operate[20]. However, despite these initiatives, the results obtained suggest that the program in the schools assessed has been ineffective.

In addition, STD health education should not only be based on forms of transmission/prevention, but also on epidemiological aspects, symptoms, therapeutic-pharmaceutical treatment and possible complications. Students need to be aware of the risks to which they are exposed and the preventive mechanisms to avoid them. Furthermore, due to the early age of first sexual relations, it is indispensable that reproductive health education starts before students begin their sexual lives, ensuring they will have the necessary knowledge for a healthy and full sexual life.

Limitations of the study

The main limitation of this study was limiting the sample only to students from the public-school system, restricting the scope of the sample in its specificities to include students from the private school system. It should also be pointed out that it was cross-sectional in nature and targeted the regional population, thereby preventing generalization of its results. However, the study does provide grounds for discussion and reorientation of SDT promotion and prevention activities with young people from the state of Amazonas.

Contributions to the field

Given the relevance of the present study and the fact that HIV is a public health issue, a commitment was made to all the schools that participated in the study to return the day after the data collection to offer a lecture to address the knowledge deficits detected in the questionnaires.

CONCLUSIONS

The secondary school students from the public-school system in the city of Belém had a low level of information about HIV and risk behaviors, as well as lack of knowledge on correct male condom use, its infrequent use and failure to do HIV testing. A statistically significant association was only found between the use of dating apps by female students and a high level of HIV knowledge.

The results of this survey suggest that insufficient knowledge about forms of HIV transmission/prevention may be contributing to the spread of the epidemic in the North region and, more specifically, in the city of Belém. Reproductive health education is essential not only for young students, but also for the communities around the schools, as well as facilitated access to means of prevention and diagnosis. In addition, since teachers represent the closest information source for students, it is necessary to train these professionals in relation to the sexual issues of adolescent students.

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