Editorial

HIV patients in Intensive Care Units

The Human Immunodeficiency Virus (HIV)/Acquired Immunodeficiency Syndrome (AIDS) is a global public health problem, with about 36.7 million infected people in 160 different countries by the end of 2015[1]. In Brazil, 842,710 cases — according to the Ministry of Health — from 1980 to June 2016[2].

Since its adoption in 1996, the concept of the Combined Antiretroviral Therapy (cART), also known as Highly Active Antiretroviral Therapy (HAART), changed the natural history of the infection: it improved prognosis and decreased mortality, leading therefore to the chronicity of the disease[3].

In this new HIV/AIDS setting, observing the changes in the mortality profile and the causes of hospitalization and admission to Intensive Care Units (ICUs) allowed better clinical management. A reduction in deaths related to opportunistic infections, associated with an increase in deaths due to other causes not traditionally related to HIV, were also observed[4,5].

That tendency is demonstrated by a cohort study of critically ill HIV patients. It showed concomitant decrease of respiratory failure and *Pneumocystis jiroveci* pneumonia[6], while others studies registered the increased prevalence of bacterial infections in HIV infected patients, regardless the use of cART[7-9]. Therefore, as expected, sepsis is a diagnosis that has become an increasingly common cause of intensive care[6,10], as well as an important determinant of short- and medium-term mortality[11].

HIV patients now have life similar expectancy to that of the non-HIV population[12]. Other authors state that, although mortality has improved, people living with HIV have a shorter period of healthy life when compared to the non-HIV population[13]. However, the growing improvement in the management of this infection can help reduce stigma, facilitating both early diagnosis and the immediate and universal cART[14].

In this context, the systematic review presented in this issue, authored by Dr. Hugo Boechat Andrade et al., corroborates those findings. This paper demonstrates that short-term prognostic factors, for HIV patients admitted to the ICU, are not directly related to HIV.

Studies of this nature are crucial, once that the awareness that HIV infection is assuming characteristics of a chronic disease, amenable to clinical and laboratory control, is important. The concept that HIV patients tend to behave like the general population must reach all medical specialties, in particular those who work in ICUs. Traditionally, HIV infected patients have lower chances of being accepted in ICUs when compared to patients with other diseases — such as cancer and severe liver disease, despite the greater mortality of these conditions[15].

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Systematic review of short-term prognostic factors of HIV patients admitted to an intensive care unit

Revisão sistemática de fatores prognósticos a curto prazo de pacientes HIV internados em uma unidade de cuidados intensivos

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ABSTRACT

Introduction: Knowing the short-term prognostic factors of critically ill HIV patients admitted to intensive care units (ICUs) in the era of combination antiretroviral therapy (cART) is important for the adoption of preventive measures and more effective treatment. To identify the most significant and common factors that determine short-term mortality, a systematic review of the relevant literature was carried out. **Method:** An internet search was conducted in three databases indexing scientific articles (PubMed, Scopus, and Web of Science) for studies investigating the prognostic factors of mortality or short-term survival (in ICUs and elsewhere in hospitals following ICU admission) of critically ill HIV-infected patients. The articles were selected according to pre-established criteria and evaluated independently by two researchers. The variables collected were author, year, study location, study type, number of patients with HIV, mortality, significant factors in simple logistic regression and multiple regression, main causes of admission, and inclusion criteria. **Results:** Twenty-six articles were selected for systematic review. Fifteen dealt with factors that determine mortality in the ICU, nine with hospital mortality following ICU admission, and two with both. **Conclusions:** Factors associated with the severity of acute disease, such as prognostic scores, albumin, and organ failure (shock and respiratory failure), seem to be more important as determinants of short-term mortality than those associated with HIV.

Keywords: HIV; AIDS; intensive care; prognostic factors; mortality.

RESUMO

Introdução: Conhecer os fatores prognósticos de curto prazo de pacientes HIV, criticamente doentes, na era de terapia antirretroviral combinada, é importante para adoção de medidas preventivas e mais efetivas de tratamento. Para identificar os fatores mais significativos e comuns que determinam a mortalidade a curto prazo, uma revisão sistemática da literatura mais relevante foi conduzida. **Método:** Uma busca na internet foi conduzida em 3 bases de dados de artigos científicos indexados (PubMed, Scopus e *Web of Science*) para estudos que investigaram fatores prognósticos de mortalidade ou sobrevivência a curto prazo (em UTIs, ou em outros setores do hospital, seguindo a internação na UTI) de pacientes HIV criticamente enfermos. Os artigos foram selecionados de acordo com critérios pré-estabelecidos e avaliados independentemente por 2 pesquisadores. As variáveis coletadas foram autor, ano, local e tipo do estudo, número de pacientes com HIV, mortalidade, fatores significativos em regressão logística simples e múltipla, principais causas de admissão e critérios de inclusão. **Resultados:** Vinte e seis artigos foram selecionados para revisão sistemática. Quinze lidaram com fatores que determinavam mortalidade na UTI, 9 com mortalidade hospitalar após internação em UTI, e 2 com ambos. **Conclusões:** Fatores associados à gravidade de doença aguda, como escores prognósticos, albumina e disfunção orgânica (choque e insuficiência respiratória) parecem ser mais importantes como determinantes da mortalidade a curto prazo que aqueles associados ao HIV.

Palavras-chave: HIV; AIDS; cuidados críticos; prognóstico; mortalidade.

INTRODUCTION

The introduction, in 1996, of combined antiretroviral therapy (cART) in the treatment of acquired immunodeficiency syndrome (AIDS) decisively improved the mid- and long-term prognoses of patients with human immunodeficiency virus (HIV)[1-4]. The introduction of cART led to the chronicity of HIV infection and decreased mortality. The mortality of HIV patients with CD4+ T-lymphocyte counts greater than 500 cells/mm^3 and under cART for more than six months is similar to that of the general population[5].

Despite therapeutic advances, the current challenges in the healthcare of patients with HIV/AIDS include late diagnosis, insufficient adherence to antiretroviral treatment, and increased complications related to the chronic use of these drugs[6], such as immune senescence[7] and cardiovascular, metabolic, and neoplastic complications[8].

Consequently, not only is there high demand for intensive care unit (ICU) beds[9] but also the mortality of critically ill HIV patients remains high in Brazil and throughout the world[4,10,11]. The management of these patients remains challenging once it is a field still full of uncertainties regarding treatment procedures[12,13].

Knowing the short-term prognostic factors of critically ill HIV patients admitted to ICUs in the cART era is important for the adoption of preventive measures and more effective treatment. Understanding the set of individuals who use the resources of this hospital sector, including their main sociodemographic and clinical characteristics, is necessary for the health system to meet the needs of the population and for the formulation of public policies[14].

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OBJECTIVE

To review the determinants of short-term mortality (in the ICU and elsewhere in the hospital following ICU admission) of HIV patients admitted to ICUs through a systematic literature review focusing on articles from the cART era.

METHODS

On February 10 2016, an internet search was performed in three databases indexing scientific articles (PubMed, Scopus, and Web of Science) for studies investigating the prognostic factors of mortality or short-term survival for critically ill HIV-infected patients admitted to ICUs after the introduction of cART in 1996.

The following search terms were used in PubMed and Web of Science: ("HIV" OR "Acquired Immunodeficiency Syndrome Virus" OR "AIDS Virus" OR "AIDS Viruses" OR "Virus, AIDS" OR "Viruses, AIDS" OR "Acquired Immunodeficiency Syndrome" OR "Immunologic Deficiency Syndrome, Acquired" OR "Acquired Immune Deficiency Syndrome" OR "Acquired Immuno-Deficiency Syndrome") AND ("Critical Care"[Mesh] OR "Intensive Care" OR "Critical Illness" OR "Critically Ill" OR "Intensive Care Units").

For Scopus, other terms were used because of the structure of the search engine: search - TITLE-ABS-KEY (hiv) OR TITLE-ABS-KEY (aids) AND TITLE-ABS-KEY (critical care) OR TITLE-ABS-KEY (intensive care) OR TITLE-ABS-KEY (critically ill) OR TITLE-ABS-KEY (critical illness) AND SUBJAREA (mult OR bioc OR immu OR neur orphar OR mult OR medi OR nurs OR heal) AND PUBYEAR > 1995 .

The articles identified were then selected in stages, through the following procedures:

1. The titles (*i.e.*, 745 PubMed, 484 Scopus, and 772 Web of Science results) were screened by the author, whereupon non-relevant publications — reviews, letters to the editor, opinions, pediatric and obstetric articles, and articles without information about HIV/AIDS or ICUs or without outcome evaluation — were eliminated. This procedure reduced the number of articles to 72 from PubMed, 18 from Scopus, and 49 from Web of Science.
2. After excluding duplicate articles, 76 abstracts were read by the author and one reviewer (Cássia R.S.) to assess their eligibility. The criteria were as follows: publication after January 1st, 1996, subjects aged over 18 years old, information collected from cohorts after the onset of the cART era, and clear information available about the outcome of interest and its risk factors. In this manner, 36 articles were chosen to be read in full, whereas 40 ones were excluded due to their lack of data on prognostic factors or mortality/survival.
3. Upon reading, another 10 articles were removed, leaving 26 ones. Any disagreement between the author and reviewer was resolved by a third party (André M.J.).
4. Among the articles selected, 15 of them dealt with determinants of mortality in the ICU[4,15-28], 9 with hospital mortality[10,29-36], and 2 with both ICU and hospital mortality[37,38].

The following information was collected from each article: author, year, study location and type, number of patients with HIV, mortality, significant factors in simple logistic regression and multiple regression, main causes of admission, and general observations about each study, including the inclusion criteria. Figure 1 presents the review flowchart.

RESULTS AND DISCUSSION

Table 1 shows the main risk factors associated with ICU mortality in the reviewed articles. **Table 2** shows the factors associated with hospital mortality following ICU admission. The complete data tables are found in the **Appendix (Tables A and B)**.

Main diagnoses upon admission

The 26 articles were published from 2001 to 2014 in several countries and included a total of 10,195 HIV patients, with ICU mortality of 35.1% and hospital mortality of 39.8%. Upon ICU admission, 48.5% presented with respiratory failure, 25.2% with shock, 17.1% with coma/changes in consciousness, and 9.2% with other diagnoses. The articles reported additional causes for the eventual hospitalization of patients with organ dysfunction: liver failure, renal failure, heart failure, postoperative hospitalization following major surgeries, and polytrauma[39].

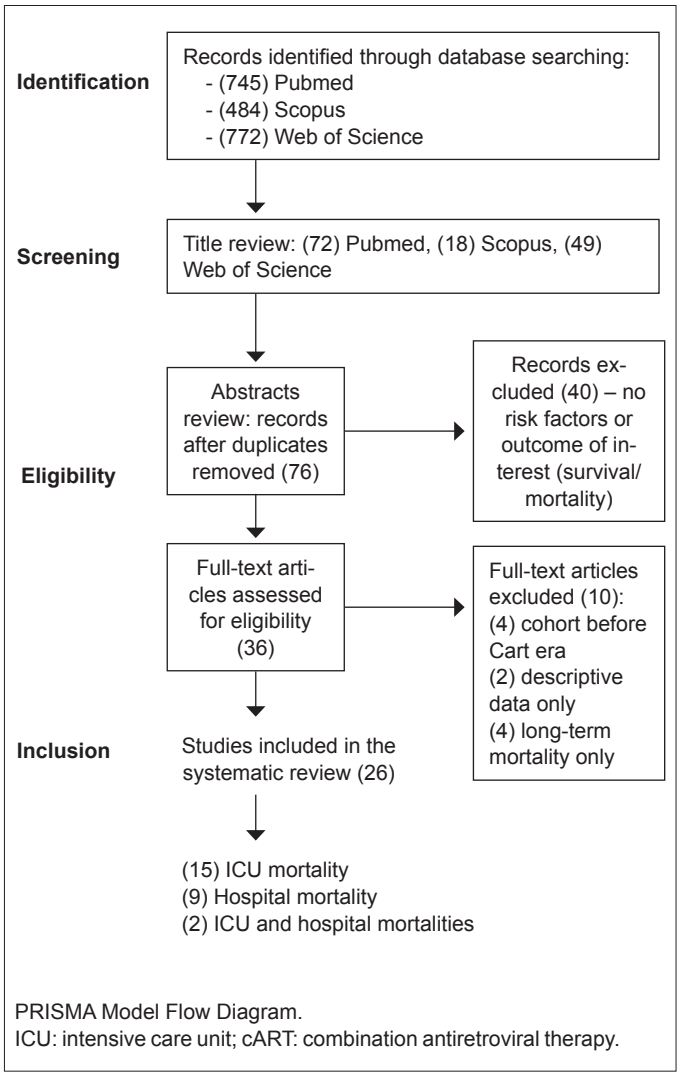

Figure 1 – Flow chart of the systematic review of the short-term prognostic factors of critically ill HIV patients (mortality in the intensive care unit and elsewhere in the hospital following intensive care unit admission).

All of the studies used single-center retrospective cohorts, except Japiassú et al.[33], which used a prospective cohort, and Barbier et al.[30], that used a multicenter retrospective cohort.

Demographic factors

In studies evaluating the mortality of the general population of critically ill patients, age and gender are commonly associated with prognosis. Extreme age and male gender are generally related to higher short- and mid-term mortality[39]. However, because critically ill HIV patients are generally young, they do not clearly demonstrate this association; in 23 of the 26 studies[22,27,37], age was not independently related to ICU or hospital mortality, and none of the articles found gender to be an independent factor[4,16,21,22,24,31,38].

Factors associated with the severity of acute disease

The factors most frequently associated with short-term mortality (ICU and hospital) are those that reflect the severity of the acute illness. Since disease severity is a subjective and complex concept, various predictive scoring systems have been developed in order to measure the severity of acute disease and predict the prognosis of ICU patients, including the Acute Physiologic and Chronic Health Evaluation (APACHE), the Simplified Acute Physiologic Score (SAPS), and the Sequential Organ Failure Assessment Score (SOFA)[40].

Of the 17 articles that studied ICU mortality, 6[15,18,25,27,37,38] reported a significant relationship between APACHE scores and outcomes in multivariate analyses, whereas 4[19,22,24,28]reported this relationship in univariate analyses.

Of the 11 articles that studied hospital mortality, 4[10,32,37,38]reported a significant relationship between APACHE scores and outcomes in multivariate analyses, whereas 2[35,36] reported this relationship in univariate analyses.

All five articles that related SAPS to ICU mortality[4,16,21,23,26] found a significant relationship in their multivariate analyses, as did the one article that related SAPS to hospital mortality[30].

One study[30] found a relationship between SOFA scores and hospital mortality in a multivariate analysis.

Serum albumin concentration is a significant laboratory parameter that mirrors the severity of acute diseases[41]. In the critically ill HIV patient population, albumin was an important prognostic factor; five articles[10,15,24,36,37] independently related albumin concentration to short-term mortality.

Four articles[20,26,29,37] reported a relationship between respiratory failure and ICU mortality in univariate analyses, and four[29,32,33,37] noted a relationship between respiratory failure and hospital mortality in univariate analyses. Only one study[29] reported an independent relationship between respiratory failure and hospital mortality.

In 9[4,16,18,20,22,23,27,37,38] of 13 articles[19,21,26,28], mechanical ventilation was significantly related to ICU mortality in multivariate analyses. Hospital mortality was independently associated with mechanical ventilation in 7 articles[10,29,30,34-37] and dependently associated in 3[31,32,38].

Respiratory failure and mechanical ventilation are confounding factors, once the latter is a treatment for the former. The two of them should not be analyzed together. It is important to differentiate, in conceptual and prognostic terms, between patients admitted to intensive care due to respiratory insufficiency and those who progress to mechanical ventilation during their stay in the unit[39,42]. The use of ventilation during a patient's stay is itself an obvious marker of mortality, once that most patients who die are on mechanical ventilation.

Shock is defined as a state of circulatory failure or insufficient tissue perfusion (cellular and tissue hypoxia) due to reduced oxygen supply and/or increased consumption or inefficient use of oxygen. Several authors[15,16,33,43-45] have shown that septic shock represents up

Table 1 – Risk factors most commonly associated with intensive care unit (ICU) mortality of critically ill patients with HIV - 17 articles.

Risk factors	Number of articles that studied the factor	Number of articles with significance only in univariate analysis	Number of articles with significance in multivariate analysis
Demographic factors			
Age	10	7	3
Gender	5	5	0
Severity of acute disease			
APACHE	10	4	6
SAPS	5	0	5
SOFA	0	0	0
Admission causes			
Sepsis/septic shock	5	1	4
Respiratory failure	4	4	0
Coma	3	2	1
Evolution during ICU stay			
Albumin	6	3	3
Vasoactive drugs	6	1	5
Mechanical ventilation	13	4	9
HIV infection/AIDS			
Duration	0	0	0
CDC stage	3	3	0
CD4	8	6	2
Viral load	1	1	0
cART before	6	5	1
cART ICU	7	3	4
Opportunistic infections	4	0	4
Infections by non- opportunistic agents	3	1	2

APACHE: Acute Physiologic and Chronic Health Evaluation score; SAPS: Simplified Acute Physiologic Score; SOFA: Sequential Organ Failure Assessment score; Duration: duration of HIV infection; CDC stage: HIV staging system by the Centers for Disease Control and Prevention; CD4: CD4 count in peripheral blood; Viral load: viral load of HIV in peripheral blood; cART before: use of combination antiretroviral therapy prior to admission to the ICU; cART ICU: onset or maintenance of combination antiretroviral drugs during the ICU stay.

to 90% or more of shock cases in HIV/AIDS patients, and the terms sepsis and septic shock were used synonymously in the reviewed articles, as described in the tables in the Appendix.

Five studies[17,18,24,26,28] analyzed the relationship between sepsis/septic shock upon ICU admission and subsequent mortality. Only one of them[24] found an association in a univariate analysis, whereas[31,33] two of them established an independent relationship with hospital mortality.

Table 2 – Risk factors most commonly associated with hospital mortality, following ICU admission, of critically ill patients with HIV - 11 articles.

Risk factors	Number of articles that studied the factor	Number of articles with significance only in univariate analysis	Number of articles with significance in multivariate analysis
Demographic factors			
Age	4	3	1
Gender	3	3	0
Severity of acute disease			
APACHE	6	2	4
SAPS	1	0	1
SOFA	1	0	1
Admission causes			
Sepsis/septic shock	2	0	2
Respiratory failure	4	3	1
Coma	0	0	0
Evolution during ICU stay			
Albumin	5	2	3
Vasoactive drugs	4	1	3
Mechanical ventilation	10	3	7
HIV infection/AIDS			
Duration	1	1	0
CDC stage	0	0	0
CD4	4	3	1
Viral load	2	2	0
cART before	3	3	0
cART ICU	7	2	1
Opportunistic infections	6	1	5
Infections by non-opportunistic agents	1	1	0

APACHE: Acute Physiologic and Chronic Health Evaluation score; SAPS: Simplified Acute Physiologic Score; SOFA: Sequential Organ Failure Assessment score; Duration: duration of HIV infection; CDC stage: HIV staging system by the Centers for Disease Control and Prevention; CD4: CD4 count in peripheral blood; Viral load: viral load of HIV in peripheral blood; cART before: use of combination antiretroviral therapy prior to admission to the ICU; cART ICU: onset or maintenance of combination antiretroviral drugs during the ICU stay.

The relationship between ICU mortality and the use of vasoactive amines in the unit was studied by six articles[4,20,21,23,24,38], only one of which[21] did not find this to be an independent factor in the outcome. The relationship between vasoactive amine use and hospital mortality was examined by three articles[29,30,32,38]; only one of them[32] found no relationship in a multivariate analysis.

Just as it is necessary to differentiate respiratory failure at admission from progression to mechanical ventilation following ICU admission, it is important to differentiate between patients who enter the ICU experiencing shock from those who develop complications from circulatory insufficiency and the consequent use of vasoactive drugs following admission.

The use of vasoactive drugs during a patient's stay is also an obvious marker of mortality, once that most patients who die are in shock and being treated with amines[39,46].

The third most frequent cause of ICU admission is coma, which is an altered level of consciousness in which the patient is difficult or impossible to be awaken in response to external stimuli. Coma can be both a cause and a consequence of shock and respiratory failure[47]. One[17] of three articles[17,21,26] found coma to be independently associated with death in the ICU.

Coma can be preceded by delirium or by metabolic or toxic encephalopathy. Delirium is also common in patients admitted to the ICU and reflects a central nervous system dysfunction[48]. The Glasgow Coma Scale is an objective way to standardize the description and severity of altered consciousness through a prognostic score[49]. Scores below 12 on a scale from 3 to 15 indicate torpor/coma, whereas scores below or equal to 8 indicate severe lesioning of the central nervous system, with a high risk of progression to respiratory failure. The frequent association of altered consciousness with shock and respiratory failure, as well as the sedation universally used in ICUs, may influence the interpretation of coma as an independent prognostic factor. Of the three most frequently occurring organ failures, altered consciousness was the least studied one, with only one article[17] establishing it as an independent relationship with short-term mortality.

Factors associated with HIV/AIDS infection

Time of HIV diagnosis, disease classification according to CDC criteria, and viral load were not independently associated with short-term mortality.

Although the CD4+ lymphocyte count reflects the patient's immune status and, thus, the likelihood of their developing opportunistic diseases and, eventually, significant clinical severity, only three articles[4,18,31] found an independent association between CD4+ count and mortality.

Little information is available on the impact of cART on the mortality of HIV patients admitted to the ICU. The effect of pre-admission antiretroviral therapy on ICU mortality was studied by six articles[4,16,17,25,27,37], one of which[37] found this factor to be significant in a multivariate analysis. Five authors[23,28,35,37,38] found antiretroviral use during an ICU stay to have an independent effect on short-term mortality. The administration of cART is controversial; some groups recommend its initiation or maintenance during ICU stays[23,50], whereas others prefer to suspend cART until the ICU

patient improves or is discharged. Therefore, it is difficult to reach a conclusion without a clinical intervention study, preferably randomized, to test the influence of cART on the prognosis of this population.

Four studies identified two opportunistic infections — *Pneumocystis jiroveci* pneumonia (PCP)[4,15,22] and tuberculosis[38] — as factors independently associated with ICU mortality. Another six articles[10,29,30,34,35,38] found PCP, cytomegalovirus, cryptococcosis, aspergillosis, and invasive candidiasis to be independently associated with hospital mortality. PCP was the most prevalent one and the leading cause of respiratory failure upon admission in all 26 articles.

Two articles[24,25] observed that non-opportunistic bacterial infections were independently associated with death in the ICU, while a third[4] one noted the same association, only in a univariate analysis. Finally, one author[29] found an association in a univariate regression between *Pseudomonas* sp. pneumonia and hospital mortality.

Infectious agents commonly found in immunocompetent individuals, such as community- or hospital-acquired pyogenic bacteria (*Streptococcus pneumoniae, Staphylococcus aureus*, and gram-negative bacilli), are more frequently seen and severe in critically ill HIV patients and play important roles in morbidity and mortality[12,33,51-53]. In this review, one article[25] reported admission due to pneumonia or a bacterial infection as a factor independently associated with ICU mortality, while another[24] defined pneumonia associated with mechanical ventilation as an additional independent factor related to ICU mortality.

Importantly, the clinical severity of the infection may be more significant as a prognostic factor than its etiology (whether opportunistic or pathogenic in immunocompetent patients).

CONCLUSIONS

This systematic literature review investigated the factors that determine the short-term prognosis (ICU and hospital mortality) of critically ill HIV patients. Factors associated with the severity of acute disease, such as prognostic scores, albumin, and organ failure (*i.e.*, shock and respiratory failure), seem to be more important determinants of short-term mortality than those associated with HIV (*i.e.*, time of HIV diagnosis, CD4+ lymphocyte count, viral load, pre-admission cART treatment history, or opportunistic infections). The use of cART during ICU hospitalization is controversial, and clinical intervention studies should be performed to clarify its usefulness in reducing short-term mortality.

Conflict of interests

The authors declare no conflict of interests.

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APPENDIX

Table A – Risk factors associated with intensive care unit mortality of critically ill patients with HIV.

Author/ year	Location and type of study	nHIV	M%	Regression analysis (p<0.05)	Main causes of admission	Remarks
Adlakha et al.[37]	London, UK, 1999-2009, retrospective cohort	192	22.39	Multiple: Age, APACHE II, MV, albumin, cART before, cART ICU. Simple: CD4, hemoglobin, PaO2/FiO2 (respiratory failure on admission), hemodialysis	PCP (50%), sepsis (11.45%)	All patients with HIV
Alves et al.[15]	Barcelona, Spain, 1993-1998, prospective cohort	57	40	Multiple: APACHE II, albumin, PCP Simple: Age, CD4, CDC, LDH, cholesterol, acidosis	Pneumonia (52.6%), PCP (36.8%)	All patients with HIV and respiratory failure
Amâncio et al.[38]	Belo Horizonte, Brazil, Jan-Dec 2006, retrospective cohort	125	46.4	Multiple: APACHE II, MV, cART ICU, septic shock during ICU stay (use of amines), TB. Simple: Albumin, gender (male), opportunistic disease other than TB	Respiratory failure (43.2%), shock (20%), coma (24.8%), other causes (12%)	All patients with HIV
Casalino et al.[16]	Paris, France, 1995-1999, retrospective cohort	230	23	Multiple: SAPS II, MV, Omega score Simple: Age, gender (male), heart failure, respiratory failure, cART before	Respiratory failure (31.7%), sepsis/shock (22.6%), coma (23.9%), other causes (19.1%)	All patients with HIV
Coquet et al.[17]	Paris, France, 1996-2005, retrospective cohort	284	13.73	Multiple: Sepsis on admission, time until ICU admission, kidney failure, coma, cirrhosis Simple: cART before, year of ICU admission.	Respiratory failure (58.8)%, shock (20.77%), coma (32.04%)	All patients with HIV
Croda et al.[18]	São Paulo, Brazil,1996-2006, retrospective cohort	278	26	Multiple: Sepsis on admission, CD4 <50, APACHE II, MV, Simple: cART ICU, LDH, albumin, intravenous drug use, year of ICU admission.	Respiratory failure (33.1)%, shock (31.3%)	All patients with HIV with admission > 24h
Dickson et al.[19]	London, UK, 1999-2005, retrospective cohort	102	23	Simple: CD4, APACHE II, MV, anemia	Respiratory infection (48%)%, sepsis (9%), neurological disease (14%)	All patients with HIV, only univariate analysis
Ferrà et al.[20]	Barcelona, Spain, 2000-2010, retrospective cohort	12	83	Multiple: Septic shock during ICU stay (use of amines), MV Simple: Respiratory failure, liver disease	Respiratory failure (33.33%), shock (58.33%), coma (8.3%)	Subgroup of lymphoma patients with positive serology for HIV
Meybeck et al.[21]	Tourcoing, France, 2000-2009, retrospective cohort	85	19	Multiple: SAPS Simple: Age, gender (male), CDC, CD4, Glasgow scale, MV, MV duration, septic shock during ICU stay (use of amines), cART ICU	Respiratory failure (51%), shock (11%), coma (27%), other causes (11%)	All patients with HIV
Miller et al.[22]	London, UK, 1990-2005 retrospective cohort.	59	34	Multiple: Age, MV, pneumothorax, year of diagnosis of PCP (before 1996) Simple: Gender (male), albumin, APACHE II, MV duration	MV (57%)	HIV patients with microbiological diagnosis of PCP
Morquin et al.[23]	Montpellier, France,1997-2008, retrospective cohort	98	36.7	Multiple: Septic shock during ICU stay (use of amines), SAPS, MV, cART ICU Simple: No data	Respiratory failure (38.8%), sepsis (11.2%), coma (25.5%), other causes (24.4%)	All patients with HIV
Pathak et al.[24]	Chapel Hill, NC, USA, Jan-Dec 2009, retrospective case-control	55	44	Multiple: Shock during ICU stay (use of amines), fever, albumin, VAP Simple: Age, gender (male), CD4, CDC, APACHE II, heart failure, sepsis on admission, pneumonia	Acute infection (45.45%), sepsis (16:36%), coma (23.66%), other causes (23.66%)	All patients with HIV and respiratory failure on mechanical ventilation
Rosenberg et al.[25]	Washington DC, USA, 1993-1996, retrospective cohort	(1996) 129	41	Multiple: APACHE II, bacterial infection, pneumonia Simple: cART before, number of granulocytes, bacteremia	Sepsis / shock (75.96%),pneumonia (24%)	All patients with HIV and infectious complications
Sonneville et al.[26]	Paris, France, 2001-2008, retrospective cohort	210	29.5	Multiple: Septic shock on admission, SAPS II, intracranial hypertension Simple: Age, CD4, viral load, respiratory failure, MV, kidney failure, encephalopathy, Glasgow and Knaus scales	Respiratory failure (39%), shock (29%), coma/delirium (84%)	HIV patients with neurological complications
van Lelyveld et al.[27]	Utrecht, Netherland, 2006-2008, retrospective cohort	80	31	Multiple: Age, APACHE II, MV Simple: cART before, cART ICU	Respiratory failure (59%), sepsis/shock (23%), neurological disease (16%)	All patients with HIV, excluding postoperative ones
Vargas-Infante et al.[28]	Mexico City, Mexico,1985-2006, retrospective cohort	90	58.4	Multiple: cART ICU, septic shock on admission Simple: Steroid use, MV, APACHE II	Respiratory failure/MV (83%), shock (26%), neurological disease (15%)	All patients with HIV. Pre-cART era group compared to cART era one.
Vincent et al.[4]	Paris, France, 1995-2000, retrospective cohort	236	25	Multiple: Shock during ICU stay (use of amines), SAPS II, CD4 (<50), MV, PCP with pneumothorax, Kaposi Simple: Age, gender, performance status, cART ICU, tumors related to HIV, bacterial infection	Respiratory failure/MV (38.6%), shock (38.6%), toxo (14%)	All patients with HIV. Pre-cART era group compared to cART era one.

ICU: intensive care unit; nHIV: number of HIV patients; M%: mortality; APACHE: Acute Physiology and Chronic Health Evaluation score; SAPS: Simplified Acute Physiology Score; SOFA: Sequential Organ Failure Assessment score; MV: mechanical ventilation; PaO2/FiO2: ratio of arterial oxygen partial pressure to fractional inspired oxygen; CDC: HIV/AIDS staging system by the Centers for Disease Control and Prevention; CD4: CD4 cell count in peripheral blood; Viral load: HIV viral load in peripheral blood; cART: combination antiretroviral therapy; cART before: use of cART prior to admission to the ICU; cART ICU: onset or maintenance of cART during the ICU stay; PCP:*Pneumocystis jirovecii* pneumonia; TB: tuberculosis; Kaposi: Kaposi sarcoma; VAP: ventilator associated pneumonia.

Table B – Risk factors associated with hospital mortality, following intensive care unit admission, of critically ill patients with HIV.

Author / Year	Location and type of study	nHIV	M%	Regression analysis (p <0.05)	Main causes of admission	Remarks
Adlakha et al.[37]	London, UK, 1999-2009, retrospective cohort	192	30	Multiple: Age, APACHE II, MV, albumin Simple: CD4, hemoglobin, PaO2/ FiO2 (respiratory failure on admission), hemodialysis	PCP (50%), Sepsis (11.45%)	All patients with HIV
Amâncio et al.[38]	Belo Horizonte, Brazil, Jan-Dec06, retrospective cohort	125	68	Multiple: APACHE II, time until ICU admission, opportunistic infection, shock during ICU stay (use of amines) Simple: Albumin, gender (male), age, MV, HIV duration	Respiratory failure (43.2%), shock (20%), coma (24.8%)	All patients with HIV
Barbier et al.[29]	Paris, France,1996-2006, retrospective cohort	192	19.7	Multiple: Shock during ICU stay (use of amines), invasive MV, number of causes of respiratory failure, time until ICU admission Simple: SOFA, ARDS, hemodialysis, Pseudomonas pneumonia, CMV pneumonia, duration of noninvasive MV, time until intubation	Respiratory failure (100%), shock (26.5%), coma (-)	All HIV patients with respiratory insufficiency
Barbier et al.[30]	France, various ICU, 1999-2010, multicenter retrospective cohort	6373	26.9	Multiple: Shock during ICU stay (use of amines), MV, hemodialysis, SAPS II, aspergillosis, cryptococcosis, invasive candidiasis, CMV, heart failure, cancer, liver disease, surgical cause of admission, time until admission (> 24 h) Simple: No data	Respiratory failure (39.8%), sepsis / shock (27.4%), coma (22.7%)	All patients with HIV. The only multicenter study.
Chiang et al.[31]	Taipei, Taiwan, 2001-2010, retrospective cohort	135	48.9	Multiple: Sepsis on admission, CD4 Simple: Age, gender, viral load, MV, time until ICU admission, albumin, cART ICU	Respiratory failure (44.48%), sepsis (33.3%), neurological disease (11.9%)	All patients with HIV
Greenberg et al.[32]	Atlanta, USA, 2006-2009, retrospective cohort	125	42	Multiple: APACHE II, ICU cART Simple: Shock during ICU stay (use of amines), respiratory failure, MV, age, CD4, viral load	MV (80%), sepsis (100%)	All HIV patients with severe sepsis
Japiassú et al.[33]	Rio de Janeiro, Brazil, 2006-2008, prospective cohort	88	49	Multiple: Severe sepsis / septic shock on admission Simple: Nosocomial infection, cardiovascular dysfunction, respiratory dysfunction, cART before	Respiratory failure (29%), shock (20%), coma / torpor (23%)	All patients with HIV. Cox hazard regression - 28 days.
Khouli et al.[34]	New York, USA, 1997-1999, retrospective cohort	242	39	Multiple: MV, AIDS-defining illness during ICU stay (other than PCP) Simple: CD4, PCP, cART before	Respiratory failure (45%), shock (11%), coma (27%), other causes (11%)	All patients with HIV
Morris et al.[10]	San Francisco, USA, 1996-1999, retrospective cohort	354	29	Multiple: albumin, opportunistic disease, APACHE II, PCP, MV Simple: LDH, cART before	Respiratory failure (40.7%) sepsis (12%), neurological disease (12.14%)	All patients with HIV
Morris et al.[35]	San Francisco, USA,1996-2001, retrospective cohort	58	55	Multiple: MV, PCP with pneumothorax, cART ICU, time until ICU admission Simple: APACHE II, albumin	Respiratory failure (100%)	All patients with HIV and microbiological diagnosis of PCP
Powell et al.[36]	San Francisco, USA,2000-2004, retrospective cohort	306	30.7	Multiple: MV, albumin Simple: APACHE II, sepsis x respiratory failure, neurological disease x respiratory failure, PCP x other infections	Respiratory failure (40.3%),sepsis (20.3%), neurological disease (16.3%)	All patients with HIV

ICU: intensive care unit; nHIV: number of HIV patients; M%: mortality; APACHE: Acute Physiology and Chronic Health Evaluation score; SAPS: Simplified Acute Physiology Score; SOFA: Sequential Organ Failure Assessment score; MV: mechanical ventilation; PaO2/FiO2: ratio of arterial oxygen partial pressure to fractional inspired oxygen; CDC: HIV/AIDS staging system by the Centers for Disease Control and Prevention; CD4: CD4 cell count in peripheral blood; Viral load: HIV viral load in peripheral blood; cART: combination antiretroviral therapy; cART before: use of cART prior to admission to the ICU; cART ICU: onset or maintenance of cART during the ICU stay; PCP: *Pneumocystis jirovecii* pneumonia; TB: tuberculosis; Kaposi: Kaposi sarcoma; VAP: ventilator associated pneumonia.

Sexual behavior of students of medicine of Brazil: a multicenter study

Comportamento sexual de estudantes de medicina do Brasil: um estudo multicêntrico

André Luciano Manoel[1], Fabiana Schuelter Trevisol[1]

ABSTRACT

Introduction: Sexuality involves psychological, emotional and cultural factors. **Objective:** Identify sexual habits of Brazilian medical students. **Methods:** A multicenter cross-sectional study was conducted and an electronic questionnaire was used. **Results:** They were interviewed 459 university students. About their sexarche, 76.4% had already had it, 25.2% before 19 years old. From those who have sexual life, 60.0% lost their virginity with their boyfriend or girlfriend, and 54.9% used a condom in this first intercourse; those who did not use it said they trusted in their partners. The median of sexual partners in lifetime was 2, and 12.4% have ever had homosexual intercourses. About alcohol and drugs, 6.2% generally use them before having sex and 18.9% have not used condom because of these substances. **Conclusion:** Even though the sample have more knowledge about vulnerability to sexually transmitted diseases, they show risk factors for having it.

Keywords: sexuality; risk factors; sexually transmitted diseases; sexual behavior; Acquired Immunodeficiency Syndrome.

RESUMO

Introdução: A sexualidade abrange fatores psicológicos, emocionais e culturais. **Objetivo:** Determinar o comportamento sexual de estudantes de Medicina do Brasil. **Métodos:** Estudo transversal multicêntrico com coleta de dados por meio de questionário eletrônico. **Resultados:** Foram entrevistados 459 universitários. Destes, 76,4% já tiveram a sexarca, tendo ocorrido em 25,2% dos indivíduos com idade ≥19 anos. Entre os sexualmente ativos, 60,0% perderam a virgindade com o(a) namorado(a), e 54,9% utilizaram preservativo nesta primeira relação sexual; os que não o utilizaram atribuíram o fato à confiança no parceiro. A mediana do número de parceiros sexuais na vida foi 2, e 12,4% já tiveram relações homossexuais. Com relação ao consumo de álcool/drogas, 6,2% costumam utilizá-los antes do sexo e 18,9% já deixaram de utilizar preservativo por esse motivo. **Conclusão**: Apesar de a amostra ter maior conhecimento sobre vulnerabilidade a doenças sexualmente transmissíveis, apresentou fatores de risco para a ocorrência destas.

Palavras-chave: sexualidade; fatores de risco; doenças sexualmente transmissíveis; comportamento sexual; Síndrome da Imunodeficiência Adquirida.

INTRODUCTION

Over the last 30 years, deep discussions about sexuality have been held, probably because of the emergence of epidemic Human Immunodeficiency Virus (HIV), followed by Acquired Immune Deficiency Syndrome (AIDS), which was quickly disseminated. The disease indicated the need to better understand sexuality and the factors associated with risky sexual behaviors[1-3]. Pursuing the same goal, the Department of Sexually Transmitted Diseases (STDs), AIDS and Viral Hepatitis of the Brazilian Ministry of Health holds, every three years, the Survey on Knowledge, Attitudes and Practices of the Brazilian Population (PCAP), which has shown an early beginning of sexual activity with a large number of partners, some of the same sex, especially among young people[4].

A study conducted on male university students in Rio de Janeiro, in 2009, showed that they often use a condom at their first intercourse, but its use is being overlooked in subsequent relationships[5]. The study also found that the more partners a person has throughout life, the smaller the adhesion to condom use, and the greater the chances of having contact with etiological agents of STDs[5].

In today's society, sexuality is present everywhere, physical appearance is used to identify a person's HIV seropositivity, and mainly university students are exposed to risky sexual behavior[6,7]. A qualitative study conducted by Guerriero has shown that men consider inappropriate for women to request their husbands to use condoms for STD prevention, which reveals their desire to dominate the sexual act and decide about whether or not there are any risks[8]. This attitude indicates that, 30 years after AIDS was discovered, there is still much misinformation about the disease and their transmission, with a clear concept that there is no risk group, but rather risky behaviors that predispose to infections[8].

This conception of the relationship between sex and risk is in line with studies which have shown a strong association between alcohol use and unprotected sex[9]. Alcohol consumption affects cognitive functions, and, thus, individuals are less able to protect themselves or make decisions about their safety in vulnerable situations. This is the reason why alcohol is considered a predisposing factor for contamination by STDs[9].

There are also studies that indicate the existence of gender inequality as a predisposing factor for unprotected sex. Women living in the patriarchal way of thinking have less access to information and are less prone to empower decision making about condom use[10].

OBJECTIVE

To investigate sexual behaviors of Brazilian medical students enrolled in different universities of the country, and compare our data with the findings of the PCAP study.

METHODS

This study was approved by the Research Ethics Committee of the *Universidade do Sul de Santa Catarina* (Unisul), under registration

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This is a multicenter cross-sectional study supported by the International Federation of Medical Students' Association of Brazil (IFMSA-Brazil), a non-governmental organization formed by medical students from more than 100 countries, and represented in 58 Brazilian universities across the five geographic regions of Brazil.

Electronic contact was made with medical students of the Brazilian universities members of IFMSA-Brazil, inviting them to participate in this study as the representatives of their respective institutions. A data-collection tool based on the PCAP questionnaire of the Ministry of Health was used. An adapted version of that questionnaire was provided for this study[4].

After this contact was established, the number of students of each institution was used to sample calculation. Not all universities interested followed the initial steps, which were performing ethical submission and providing a list of names of all the students. Finally, the sample consisted of individuals from 11 universities: *Faculdade de Medicina de Rio Preto* (FAMERP), *Universidade Estadual do Sudoeste da Bahia* (UESB), *Universidade Estadual do Piauí* (UESPI), *Universidade Federal do Ceará* (UFC) – Campi Sobral and Fortaleza, *Universidade Federal do Pará* (UFPA), *Universidade Federal de Roraima* (UFRR), *Universidade de Cuiabá* (UNIC), *Universidade Iguaçu* (UNIG), *Universidade Nove de Julho* (UNINOVE), *Universidade do Sul de Santa Catarina* – Campus Tubarão (Unisul-Tubarão) and *Universidade de São Paulo* (USP).

The sample size calculation was based on an unknown anticipated frequency (50.0%), an acceptable error of 5.0% and a confidence level of 95.0%. As a result, the final sample size should be composed by 367 subjects. Using proportional stratified random sampling, 6.0% of the students of each of the 11 universities would be necessary. Considering a margin of error, 10.0% of the students were sorted and invited to participated on the study.

To be included in this study, individuals should be aged 18 years old or older, regularly enrolled between the 1st and 12th semester in one of the 11 universities, and should have an e-mail account. Those who did not agree to participate or had not completed more than 20% of the questionnaire were excluded.

In each university, there was a medical student responsible for the study as a local coordinator. After the participants were drawn from the call list, the local coordinators invited them to take part in the study and asked them to sign the consent form. In the sequence, the questionnaire was e-mailed to each student to be anonymously completed using Google Docs Forms.

The electronic version of the PCAP questionnaire had 83 questions divided into 10 parts, as follows: personal identification, sexual initiation, sexual experiences, condom use, sexual behavior and practices, most recent sexual intercourse in the past 12 months, same-sex relationships, life experiences, HIV testing, and use of alcohol and drugs.

Seven independent attitudes were analyzed in order to address the Sexual Risk Behavior variable: early sexarche (<15 years old), lack of condom use at first sexual intercourse, casual partner at first sexual intercourse, lack of condom use in the most-recent sexual intercourse, same-sex practices over lifetime, failure to use a condom because of alcohol and drugs, and having more than 10 sexual partners over their lifetime.

The Open Source Epidemiologic Statistics for Public Health (OpenEpi) software, version 2.3.1, was used to calculate the sample size. The filled out questionnaires were stored in a Microsoft Excel 2007 database (Microsoft Corporation, Redmond, WA, USA). A statistical analysis was performed using the Statistical Product and Service Solutions™ software (SPSS for Windows v 20 Chicago, IL, USA).

Descriptive epidemiology was used to present the data. Qualitative variables were presented as frequencies and proportions, whereas quantitative variables were presented as measures of central tendency and dispersion. The χ^2 test was used in order to verify the association between variables, and the Student's t-test was used for mean comparison. In cases of non-normal distribution, the nonparametric Wilcoxon–Mann–Whitney U test was used to compare medians between two samples. The confidence level was set at 5%.

RESULTS

A total of 459 medical students returned the questionnaires. They were enrolled in one of the 11 Brazilian universities from 9 different states of the 5 regions nationwide. Of the respondents, 244 (53.2%) were women; 284 (61.9%) identified themselves as being white, 136 (29.6%) as brown, and the others as black or indigenous. The mean of age was 22.7 (±3.4), ranging from 18 to 37 years old. The predominant religion was Catholic (230, 50.1%), followed by Evangelical (53, 11.6%).

Table 1 presents factors related to the first sexual intercourse and the distribution of sexual behavior characteristics according to gender. The reasons most commonly mentioned for not having had sex yet were the lack of an appropriate sexual partner (24.6%) and the desire to remain a virgin until marriage (23.9%).

Table 1 – Gender differences of first sexual intercourse among Brazilian medical students (n=459).

	n (%)	Men n (%)	Women N (%)	p-value
Sexarche				
Yes	369 (80.4)	187(50.7)	182 (49.3)	0.001
No	90 (19.6)	28 (31.1)	62 (68.9)	
Age at first sexual intercourse (n=369)				
<15	50 (13.5)	42 (84.0)	8 (16.0)	< 0.001
>15	319 (86.5)	145 (45.5)	174 (54.5)	
First-time sexual partner (n=369)				
Casual	150 (40.6)	117 78.0)	33 (22.0)	< 0.001
Stable	219 (59.4)	70 (32.0)	149 (68.0)	
Sexual practices at first sexual intercourse (n=367)				
Only vaginal sex	193 (52.6)	73 (37.8)	120 (62.2)	<0.001
Only anal sex	4 (1.1)	2 (50.0)	2 (50.0)	
Only oral sex	56 (15.3)	36 (64.3)	20 (35.7)	
Vaginal and anal sex	1 (0.3)	1 (100.0)	0 (0.0)	
Vaginal and oral sex	96 (26.1)	59 (61.5)	37 (38.5)	
Oral and anal sex	13 (3.5)	13 (100.0)	0 (0.0)	
Vaginal, oral, and anal sex	4 (1.1)	2 (50.0)	2 (50.0)	

Table 2 shows information related to condom use among the sexually active participants.

Those who did not use a condom at the first time they engaged in sexual intercourse reported the following reasons:

- they trusted their sexual partner (26.8%);
- they did not have a condom readily available (18.9%); and
- they believed that their sex partner was also a virgin (18.2%).

Table 2 – Gender-related influence on condom use among Brazilian medical students (n=369).

Condom use	n (%)	Men n (%)	Women n (%)	p-value
At first sexual intercourse[a]				
Yes	261 (71.1)	127 (48.7)	134 (51.3)	0.294
No	106 (28.9)	59 (55.7)	47 (44.3)	
Reasons to use				
Prevent contraception	100 (38.7)	36 (36.0)	64 (64.0)	<0.001
Prevent STD	45 (17.4)	33 (73.3)	12 (26.7)	
Both	113 (43.9)	55 (48.7)	58 (51.3)	
Initiative to use				
Interviewee	44 (16.8)	32 (72.7)	12 (27.3)	0.001
Sexual partner	10 (3.9)	6 (60.0)	4 (40.0)	
Both	207 (79.3)	88 (42.5)	119 (57.5)	
Condom use at the last intercourse				
Yes	227 (71.3)	117 (51.5)	110 (48.5)	0.986
No	91 (28.7)	47 (51.6)	44 (48.4)	
Lack of condom use because of alcohol/drugs				
Yes	88 (24.5)	55 (62.5)	33 (37.5)	0.011
No	271 (75.5)	127 (46.9)	144 (53.1)	

[a]Vaginal, anal, and oral sex practices are included.

Table 3 – Gender differences in sexual risk behavior among Brazilian medical students (n=369).

	n (%)	Men n (%)	Women n (%)	p-value
Average number of sexual partners over lifetime	2.0	5.0	2.0	<0.001
Same-sex intercourse				
Yes	53 (14.4)	44 (83.0)	9 (17.0)	<0.001
No	316 (85.6)	143 (45.3)	173 (54.7)	
Alcohol/drug use during sex (n=367)				
Yes	242 (65.9)	130 (53.7)	112 (46.3)	0.105
No	125 (34.1)	56 (44.8)	69 (55.2)	
HIV screening (n=368)				
Yes	198 (53.8)	100 (50.5)	98 (49.5)	0.224
No	170 (46.2)	87 (51.2)	83 (48.8)	
Lubricant in anal sex (n=64)				
Yes	31 (48.4)	23 (74.2)	8 (25.8)	0.885
No	33 (51.6)	25 (75.8)	8 (24.2)	
Sexual assault[b] (n=377)				
Yes	68 (18.0)	32 (47.1)	36 (52.9)	0.643
No	309 (82.0)	155 (50.2)	154 (49.8)	

[b]Forced to have sex with or without penetration. Some participants who reported being a virgin mentioned that they were forced to engage in non-consensual sexual touching (n=8).

Among the sexually active participants, 46.1% stated they generally obtain condoms in drugstores and 14.8% in supermarkets.

Table 3 presents information about the attitudes towards sexual risk behaviors.

With regard to contraceptives, 68.3% of the interviewed subjects reported that they had used contraceptive methods other than condoms, 63.6% of them had used birth control pills, and 20.4% had used withdrawal to prevent pregnancy. Women (60.3%) were more likely than men (39.7%) to use contraceptive methods (p=0.010). In addition, 222 (48.4%) of the study's participants reported that they or their partner had taken the morning-after pill.

Figure 1 displays the distribution of the number of risky attitudes presented by the sexually active participants. No one reported all seven risky attitudes investigated in this study.

Table 4 shows a comparison between sexual risk behaviors and the socio-demographic characteristics of the study's participants.

DISCUSSION

To our knowledge, this is one of the first study to focus on sexual behavior of Brazilian medical students. These data are extremely important given that a number of health institutions worldwide are worried about the increased HIV transmission rates. Young people with high levels of education, such as medical students, also need screening for high-risk behavior related to sexual activity, given that they are not even close to be safe from STDs.

Early first sexual intercourse is described as a sexual risk behavior to the contraction of STDs. However, due to various social factors, it is hard to define what would be the ideal age to start having sex. The PCAP survey showed that 26.8% of the Brazilian population have sex before the age of 15, ranging from 36.9% among men to 17% among women[4]. In 2010, Shiferaw et al. investigated the sexual

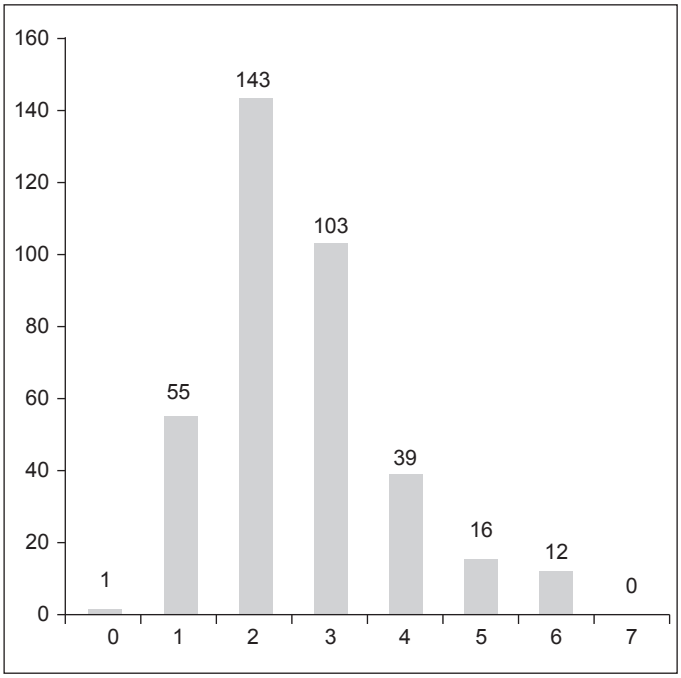

Figure 1 – Number of risk factors for the occurrence of an STD presented by the surveyed medical students (n=369).

behavior of 384 college health students in Ethiopia. They found that 52.5% of the respondents had already gone through their first sexual intercourse, and only 2.5% had done so under the age of 16 years old, 34.6% between 17 and 18 years old, and 62.9% at the age of 19 years old or older[11]. A study conducted among 409 women attending private universities in southern Brazil found that 84.6% had already had their first sexual intercourse. The average age of the first sexual intercourse was 17 years old, ranging between 11 and 24 years old[12].

A study conducted in Colombia among 397 young university students has shown that the average age at the first sexual intercourse was 16 years old[13]. In 2012, 259 teenagers aged between 12 and 19 years old who lived in a southern Brazilian city were inquired about their sexual behaviors. The mean age of sexarche was 14.2 (±1.7) years old, and vaginal penetration was the predominant modality (62.9%)[14]. Similar findings were reported by a study that has evaluated Chinese university students, which indicated that vaginal sex was the most common practice (91.4%)[15]. A study conducted in Mozambique analyzed the sexual behavior of men who have sex with men, and indicated that 5.2% of the sample had their first sexual intercourse with another man before the age of 15[16].

Still, regarding the age of sexarche, this study shows university enrollment numbers similar to those of other countries. Nevertheless, there is indication of less early first sexual intercourse when compared to the Brazilian general population, given that 13.5% of the respondents had sex before 15 years of age. This fact may be explained by the education they receive from their families. The difference between men and women having sexarche before the age of 15 years remains 22.5 and 4.4%, respectively. This study revealed that, on average, 71.1% of the surveyed sample used condom at their first sexual intercourse (68.2% among men and 74.0% among women). The PCAP survey showed that 60.9% of the interviewed used a condom at their sexarche (63.8% among men and 57.6% among women)[4]. In 2011, Faé observed that younger individuals (*i.e.*, closer to their sexarche) used condom more frequently than the older ones[12].

The reasons for wearing condoms were based on both contraception and STD prevention. Women were more knowledgeable about contraception than men, when this was pointed out as the only option. Contrastingly, men were more knowledgeable about STD than women. Both, men and women had similar arguments to take more responsibility in preventing unwanted pregnancy and STD. Perhaps women are more likely to try to prevent an unintended pregnancy because they are the most affected ones in these cases.

A study conducted in China on 1,030 university students, of whom 510 were medical students, showed that some individuals had not yet had sex because of the fear of unwanted pregnancy (46.7%) and the risk of acquiring an STD (38.7%). However, men had higher fear of pregnancy (48.9%) than women (43.5%), which contradicts the findings of the current study[14].

Regarding the initiative of using a condom, in 79.3% of cases, the decision was shared by the couple involved in the sexual intercourse. However, it is noteworthy that 25.3% of men reported having had such an initiative, against only 8.9% of women who did it. This fact reflects a sexist attitude given that women tend to feel less comfortable in taking the initiative of demanding their partners to use condoms. In 2011, a study conducted at the *Universidade Federal da Paraíba*, Brazil, asked 1,131 state school students (aged 16 years old on average) if it was difficult to convince their partners to use condoms. Data showed that 82.0% of boys and 74.0% of girls disagreed with the statement (p=0.005), which indicates that girls have more difficulty than boys to negotiate safe sex[17]. Wells et al. found that 43.2% of male college students in Ethiopia carried a condom with them during the interview, whereas 31.4% of female students did that[18]. Contrastingly, men may be more exposed to unprotected sex because they generally have more sexual partners and casual sex over their lifetime than women, which is confirmed by this study and supported by the findings of Valencia and Canaval[12].

Condom use at the last sexual intercourse can be a good indicator of actual sexual attitudes of the study population. The PCAP survey has shown that 35.1% of the population used a condom the last time they had sex (40.2% men and 29.7% women)[4]. A multicenter study on 4,840 individuals enrolled in various courses of American universities found that 50.5% of those did not use a condom the last time they had sex (30.8% men and 69.2% women)[19]. Another study conducted in Ethiopia examined the adequacy of condom use by university students over the past six months, and found that 55.0% of men and 89.2% of women had insufficient or inadequate use of contraceptives[18]. In the same country, Shiferaw et al. indicated that 71.4% of students used a condom the last time they had sex (74.2%

Table 4 – Risky sexual behaviors according to socio-demographic characteristics (n=369).

	n (%)	PR (95% CI)	p-value	Adjusted PR[c] (95% CI)	p-value
Gender					
Female	182 (49.3)	0.79 (0.72-0.86)	< 0.001	0.79 (0.72-0.87)	< 0.001
Male	187 (50.7)	1.0		1.0	
University					
Public	237 (64.2)	1.10 (1.00-1.21)	0.051	1.13 (1.02-1.25)	0.017
Private	132 (35.8)	1.0		1.0	
Semester enrolled					
1–6	198(53.7)	0.92 (0.84-1.01)	0.093	0.90 (0.82-1.00)	0.052
7–12	171 (46.3)	1.0		1.0	
Religion					
Practitioner	249 (72.2)	0.95 (0.85-1.06)	0.373	1.05 (0.93-1.17)	0.461
No religion	96 (27.8)	1.0		1.0	
Age (years)	$\dot{x}$=23±3.5	1.00 (0.99-1.02)	0.747	0.99 (0.98-1.01)	0.278

[c]Adjusted for gender, type of university, semester enrolled, religion, and age. PR: prevalence ratio.

men and 49.0% women)[12]. These findings are consistent with those of the present study, which indicated high percentage of condom use at their last sexual encounter among the respondents (71.3%). It should be noted that, unlike findings in other studies, there were no significant gender-related differences for this variable in this study.

In 2012, a study conducted in Cyprus among 240 men who had sex with men investigated some risky sexual behaviors. It was found that 59.5% of respondents reported having used alcohol before or during sex, and 39.5% reported never having done it[20]. In Uganda, 1,954 university students answered a questionnaire on sexual behavior in which it was observed that 27.1% of them used alcohol the last time they had sex, ranging from 23.2% among women and 29.3% among men[21]. A study conducted in the United States has revealed that 18.0% of the population had used alcohol or other drugs before their last sexual intercourse (38.2% of them were men, 61.8% women) [17]. In this study, 25.0% of respondents admitted not using condoms during sex because they were under the influence of alcohol or other drugs, which is the most common behavior among men.

Regarding the number of lifetime sexual partners, it is difficult to establish a cutoff point to determine what is acceptable behavior and what is promiscuity. In the present study, a significant variation in numbers was found, and, therefore, the median was taken for data analysis. Among the Brazilian population, 64.0% (74.9% of them men, 53.4% women) had more than one partner over their lifetime, and 25.3% (40.1% of them men, 10.9% women) had more than 10[4]. These figures confirm this study, which found that the median number of sexual partners was 2 among women, and up to 5 among men.

In our sample, 79.5% respondents reported having had more than 1 partner over their lifetime, while 19.6% of them had more than 10 sexual partners. Therefore, having more than 1 but less than 10 sexual partners is a prevalent behavior among medical students. Choudhry et al. asked about the multiplicity of sexual partners within the past 12 months. Of the sexually active respondents, 66.4% of them reported having had between 0 and 1 sexual partner at that time interval (77.5% of them women, 58.5% men), and 33.6% had 2 or more (22.4% of them women, 41.3% men)[21]. In Ethiopia, the average number of sexual partners over lifetime was 2.1±1.9[18]. A study conducted in the United States among 292 students from two Medical Schools found that 35.39% of non-virgin respondents had more than 1 sexual partner in the past 12 months before the survey[22].

Sexual intercourse with people of the same sex, especially among men, has been identified as a risk factor for HIV infection[20]. The PCAP survey found that 7.6% of the Brazilian population reported having had some kind of intercourse with people of the same sex, ranging from 10.0% among men to 5.2% among women[4]. The overall percentage of same-sex relationship in the study population was 14.4% (12.0% among men, 2.4% among women), which is above the national average (7.6%) for homosexual relations.

Adherence to HIV screening was similar between the surveyed sample (53.8%) and the general population, given that 53.8% of them underwent diagnostic tests at some point in their lives, with no significant gender-related differences, whereas 36.5% of the Brazilian population had performed HIV testing (27.2% of them men, 45.6% women)[4].

Although sexual abuse is an atrocity, Palusci and Palusci question whether forced sex can be considered a risky sexual behavior[23]. HIV and other STDs infection through forced sexual relations is low, probably because of the antiretroviral efficacy, except on kids, given that they are more likely to have mucosal lacerations. Sexual assault is alarmingly common across many cultures, and its presence ranges between 20.0 and 60.0% in the American population[23].

According to Zhang et al., 4.6% of the population have already been victims of sexual assault, and 0.9% have had sex under pressure from their partners. Forced sexual relationships were more common among women (6.1%) than among men (3.9%)[15]. In the current study, 18.0% of the participants reported being a victim of sexual abuse, with no significant gender-related differences, a fact that differs from most studies, which show that sexual violence against women is more common than against men[24,25].

Regarding the use of contraceptive methods other than condoms, a prominent aspect is the high frequency of withdrawal, which is overcome only by birth control pills. Withdrawal is a fairly frequent sexual risk behavior among the study population, given that the interruption of intercourse does not protect against sexually transmitted infections[26].

Multivariate analysis of sexual risk behavior among the studied population showed that male individuals enrolled in public institutions are more exposed to STD infection than their counterparts. There were no significant differences in other variables, such as enrollment semester, religion, and age.

One of the limitations to this study was the fact that it used a questionnaire validated by the Brazilian Ministry of Health for the PCAP survey, which prevented comparisons between different studies. Another limitation is the small number of invited universities which decided to take part in the study. Additionally, an inherent fact to every research involving sexuality is that there is the desire of achieving a social sex status, which means that the interviewees may think there is an appropriate answer to be given. Nonetheless, this is an original study and there is scarce literature on this matter in Brazil. The results should prompt additional debates over the issue.

CONCLUSION

Brazilian medical students have a distinct behavior to that observed among other groups. Few individuals have early first sexual intercourse, and condom use is significant. It should be mentioned that this group has relatively good knowledge and awareness about STDs. Even so, almost 30.0% of them are not using condoms properly. Women often use condoms to avoid unwanted pregnancy, whereas men use them primarily to prevent STD. In most cases, men are not reluctant to use condoms and take the initiative in their use.

There was a high percentage of condom use at the last sexual interaction among the participants, which may be a good indicator that preventive measures are present. Men tend to have a larger number of sexual partners over their lifetime than women. Brazilian medical students are engaged in same-sex relations more frequently than the general population.

There was a high prevalence of sexual violence in the sample. Almost all sexually active students had at least one risk behavior for contracting STDs. Male gender and enrollment in public universities were the variables independently associated with the most common sexual risk behavior.

Knowledge about data on medical students' sexuality is important in order to understand who are the future doctors of Brazil, their clinical practice and their medical-patient relationship, in addition to establishing a possible risk group in formation. It is important to remember that there was no study like this in Brazil so far.

Conflict of interests

The authors declare no conflict of interests.

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Sazonal frequency of Bacterial vaginosis and *Candida* sp in Pap smears observed in a private laboratory in Fortaleza, Brazil, from 2012 to 2015

Frequência sazonal de vaginose bacteriana e Candida sp em esfregaços citológicos de laboratório privado na cidade de Fortaleza entre 2012 e 2015

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ABSTRACT

Introduction: The most frequent gynecological complaints are associated with genital infections, which affect the vaginal microbiota, *i.e*., vaginitis and vaginosis. Bacterial vaginosis (BV) is characterized by a change of the vaginal microbiota from aerobic bacteria to anaerobic bacteria. Vulvovaginal candidiasis (VVC) is a disorder caused by the abnormal growth of yeast type fungi in the mucosa of the female genital tract. **Objective:** To identify the frequency of BV and *Candida sp* in Pap (Papanicolaou) smears in a city of Northeastern Brazil, according to the months of the year for a period of four years. **Methods:** Study of the frequency of the identification of BV and *Candida sp* in the oncotic cytology tests carried out in the Professor Eleutério Laboratory database in the city of Fortaleza from 2012 to 2015. **Results:** The average age of the evaluated cases was 34.7 years, varying from 14 to 54 years of age. In 2012, August was the month with a higher frequency of BV (62.96%), and the month of March had the highest frequency of *Candida sp* (42.35%). In 2013, BV was more prevalent in September (61.98%) and *Candida sp* in August (47.26%). In 2014, however, the month of June showed most often BV (60.47%) and September had a higher frequency of *Candida sp* (43.30%). In 2015, it was April the month in which BV was most detected (60.30%), and in June, *Candida sp* (41.85%). **Conclusion:** The frequency of bacterial vaginosis was higher than that of *Candida sp* during four years. The months with the highest frequency of identified pathogens were June, August and September; however, there were no major changes throughout the year.

Keywords: seasons; vaginitis; vaginosis, bacterial; *Candida*.

RESUMO

Introdução: As mais frequentes queixas ginecológicas estão associadas a infecções genitais, que afetam a microbiota vaginal, ou seja, vaginites e vaginoses. A vaginose bacteriana (VB) é caracterizada por uma mudança da microbiota vaginal de bactérias aeróbias para anaeróbias. Já a candidíase vulvovaginal (CVV) é um distúrbio ocasionado pelo crescimento anormal de fungos do tipo leveduras na mucosa do trato genital feminino. **Objetivo:** Identificar a frequência de VB e *Candida sp* em exames citológicos (Papanicolaou) em uma cidade no nordeste do Brasil, conforme os meses do ano em um período de quatro anos. **Métodos:** Estudo de frequência da identificação de VB e *Candida sp* em exames de citologia oncótica do banco de dados do Laboratório Professor Eleutério em Fortaleza entre os anos de 2012 e 2015. **Resultados:** Os casos avaliados tinham entre 14 e 54 anos, média de 34,7 anos. Em 2012, o mês de agosto teve maior frequência de VB (62,96%), e o mês de março teve a maior frequência de *Candida sp* (42,35%). No ano de 2013, VB foi mais prevalente em setembro (61,98%) e *Candida sp* em agosto (47,26%). Já em 2014, o mês de junho teve maior frequência VB (60,47%), e setembro maior frequência de *Candida sp* (43,30%). Em 2015, foi abril o mês em que mais se detectou VB (60,30%) e em junho, *Candida sp* (41,85%). **Conclusão:** A frequência de VB foi maior que a de *Candida sp* nos quatro anos. Os meses com maior frequência de patógenos identificados foram os de junho, agosto e setembro, no entanto não houve grandes modificações entre a distribuição durante todo o ano.

Palavras-chave: sazonalidade; vaginite; vaginose bacteriana; *Candida*.

INTRODUCTION

The most frequent gynecological complaints are associated with genital infections, most of them affecting the vaginal microbiota, *i.e*., vaginitis and vaginoses. Bacterial vaginosis (BV) and vulvovaginal candidiasis (VVC) are the most common causes of them, as microorganisms can grow beyond normal for several reasons and cause signs and indications suggesting the respective symptoms[1].

BV is the most common cause of vaginal discharge among women in reproductive age and it is classified as a change in the local vaginal microbiota from aerobic to anaerobic bacteria[2]. For some reason yet not well understood, a complex change in the vaginal microenvironment, resulting from modifications that reduce the vaginal concentration of *Lactobacillus* producing hydrogen peroxide, may allow the prevailing colonization of the anaerobic *Gardnerella vaginalis*, *Mycoplasma hominis* and *Lactobacillus* not producers of hydrogen peroxide[3-5]. The etiology is not quite understood, but maybe different factors are associated with the development of BV[6]. The main factors explained are behavioral, such as the frequency of intercourse, douches and smoking, increasing the risk of infection[7,8].

Fifty percent of women with BV are clinically asymptomatic[9]. The symptom is usually a fine, smooth, whitish discharge, with the

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smell of rotten fish[10]. It may compromise the function of the vulvovaginal barrier, increasing the susceptibility and transmissibility of sexually transmitted infections (STI), including HIV[11].

Furthermore, as already demonstrated, vaginosis can be associated with some gynecological complications, such as pelvic inflammatory disease, pelvic abscess and infection post hysterectomy. One of the most important clinical aspects of BV is its association with preterm labor, premature amniorrhexis and intra-amniotic infection, potentially compromising the perinatal prognosis[12-17].

Another common cause of discharge is the VVC, a disorder caused by the abnormal growth of the yeast type fungi (*Candida sp*) in the mucosal lining of the female genital tract. VCC is one of the most frequent diagnoses in the daily practice in Gynecology, and its incidence has increased drastically, making it the second most frequent genital infection in the United States and in Brazil. The VCC represents 20.00 to 25.00% of infectious origin discharges, only preceded by the BV[18].

This infection is characterized by itching, burning sensation, dyspareunia and elimination of a vaginal clumpy discharge, similar to skim milk. Frequently, vulva and vagina are swollen and hyperemic, sometimes associated with pain and burning sensation when urinating[19].

Some factors are admittedly associated with immunosuppressive diseases such as VVC, diabetes, pregnancy, chronic use of corticosteroids, use of antibiotics, estrogen therapy, minor traumas (for example, intercourse, habit of wearing clothes too tight or synthetic fibers) in addition to very acidic diet[20,21].

Would climate be an important factor? There is a suggestion that cases of *Candida sp* can increase in warmer periods, although not properly documented.

The city of Fortaleza, in the State of Ceará, is located in the Northeast Region of Brazil. There the temperature varies very little throughout the year; however, there's a period of more intense heat and humidity, named rainy season. In Ceará, the most significant rains begin in December and can remain until June or July, depending on the operating oceanic and atmospheric conditions[22]. Temperatures are higher from December to February[23].

OBJECTIVE

Identify the diagnosis frequency of BV and *Candida sp* in cytological tests (Papanicolaou) in a private lab of a city in Northeastern Brazil related to the months of the year in a four-year period in order to observe changes in the frequency of these cytological diagnoses during the warmer period.

METHODS

Study of the identification frequency of BV (>20.00% of clue cells) and *Candida sp* morphotypes in cervicovaginal smears in cancer prevention.

All non-specific inflammatory and specific results from 2012 to 2015 were surveyed in the Professor Eleutério Laboratory databases, which is a laboratory that receives several private clinics tests of middle and upper classes people in the city of Fortaleza, Brazil. The results were analyzed month-to-month to identify some kind of seasonality, particularly related to BV symptoms and *Candida sp* presence.

RESULTS

Between 2012 and 2015, 69,606 oncotic cytology results were studied. The population consisted in women with an average age of 34.7 years, ranging from 14 to 54 years old. It was possible to identify some type of microorganism in about 15.00% of them. When microbiology was analysed, it was possible to observe a higher frequency of *Gardnerella vaginalis* (suggesting BV) among the specific pictures, every month, occurring 58.00% in 2012, 55.00% in 2013 and 2014, and 56.00% in 2015. *Candida sp*, on the other hand, was less frequent, but still significant, from 36.00% in 2012, 2013, and 2014, respectively, to 38.00% in 2015 (**Figure 1**).

Considering the months of the year, in 2012, August showed a major BV incidence (62.96%), and March a major *Candida sp* incidence (42.35%) (**Figure 2**).

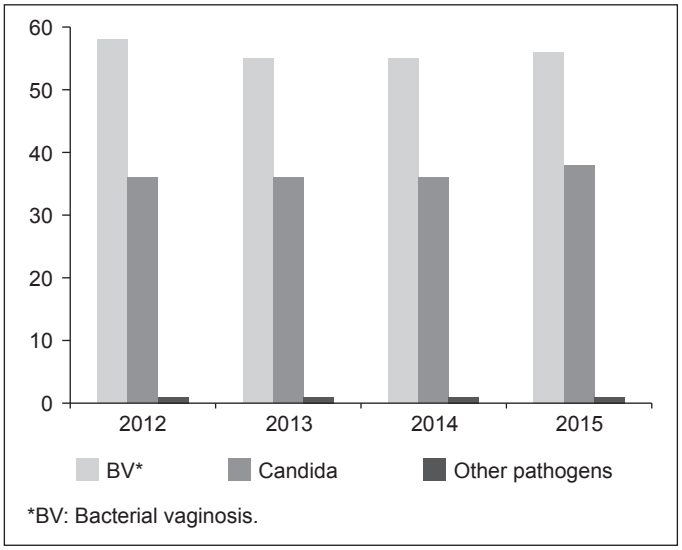

Figure 1 – Identification of bacterial vaginosis, *Candida sp*. morphotype and other microorganisms from 2012 to 2015 in a private lab in Fortaleza, Brasil.

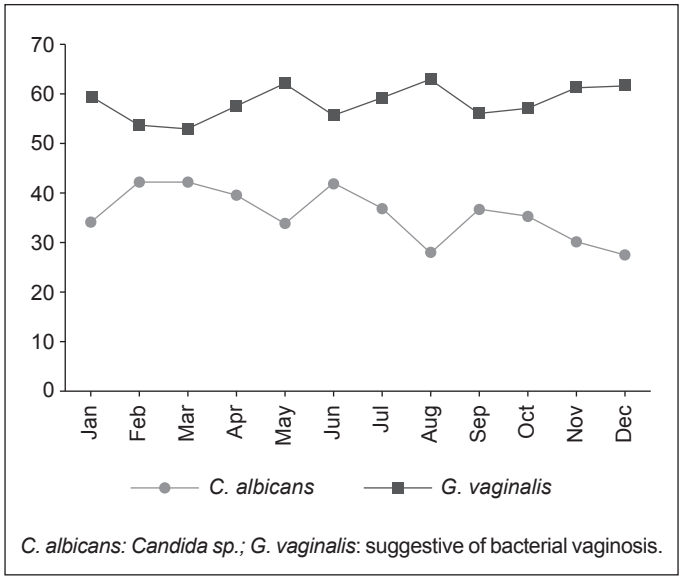

Figure 2 – Identification of bacterial vaginosis and *Candida sp*. morphotype from January to December 2012 in a private lab in Fortaleza, Brasil.

In 2013, the highest incidence of *Gardnerella vaginalis* occurred in September (61.98%), and *Candida sp* in August (47.26%) (**Figure 3**).

In 2014, however, June showed a higher incidence of *Gardnerella vaginalis* (60.47%) and September a higher incidence of *Candida sp* (43.30%) (**Figure 4**).

In 2015, *Gardnerella vaginalis* was more registered in April (60.30%), while *Candida sp* in June (41.85%) (**Figure 5**).

DISCUSSION

Mark et al.[6] analyzed 2,337 low-income and overweight to obese African-American women in every season of the year. The prevalence of BV was as follows: 40.00% in winter, 38.00% in spring, and 41.00% in summer and autumn. The season was not associated with BV in women who presented negative tests at the beginning of the study (*odds ratio versus* winter were the following: 1.0 for spring, 1.0 for summer and 0.9 for fall; p=0.81).

Among women with positive tests at the beginning of the study, the corresponding *odds ratio* observed was 0.9, 1.4 and 1.4 (p<0.001)[6]. According to the results mentioned above, the 69,609 oncotic cytology tests carried out from 2012 to 2015 showed no link between the seasons and the BV incidence.

In 2012, the highest incidence prevailed in the less hot and dry months, which correspond to the winter season in the Northeast of Brazil, reaching the peak of incidence in August, with 62.96%. In 2015, the highest incidence was observed in April (60.30%), which is characteristically a hot and humid climate, corresponding to summer in the Northeast. The variations are not of great importance and, therefore, as seen by Mark et al.[6], there was no association between season and emergence of BV.

Raso and Tarufi[24] studied the incidence of pathogens in 100,000 consecutive routine Pap tests, sent to the Pathology Laboratory Tafuri, in the city of Belo Horizonte, State of Minas Gerais. From 1984 to 1989, 12,475 (12.47%) pseudohyphae and/or spores shape cases were found. The annual incidence ranged from 5.95% (1986) to 15.18% (1988). Most of them occurred in autumn (27.80%) and less incidence in the summer (20.32%)[24]. However, Faria et al.[25], during the evaluation of medical files of patients attended in the Sexually Transmitted Diseases Department of the *Universidade Federal Fluminense* for a period of 12 years, considered that there was no increase in the diagnosis of VVC during the summer. The study shows some limitations as it is a retrospective work that considers the oncotic cytology as a diagnosis method of the symptoms, which is not the gold standard for diagnosis. Other vaginitis, such as trichomoniasis, were not studied due to the extremely low number of observed cases. However, perhaps less sensitive, it is a method quite used in Brazil and in developing countries, and this work reflects the real day-to-day situation of gynecologists. Unfortunately, there are only

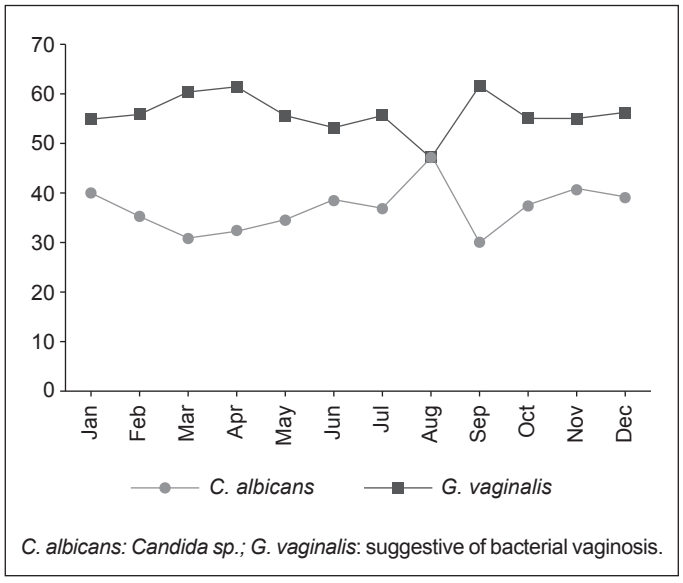

Figure 3 – Identification of bacterial vaginosis and *Candida sp.* morphotype from January to December 2013 in a private lab in Fortaleza, Brasil.

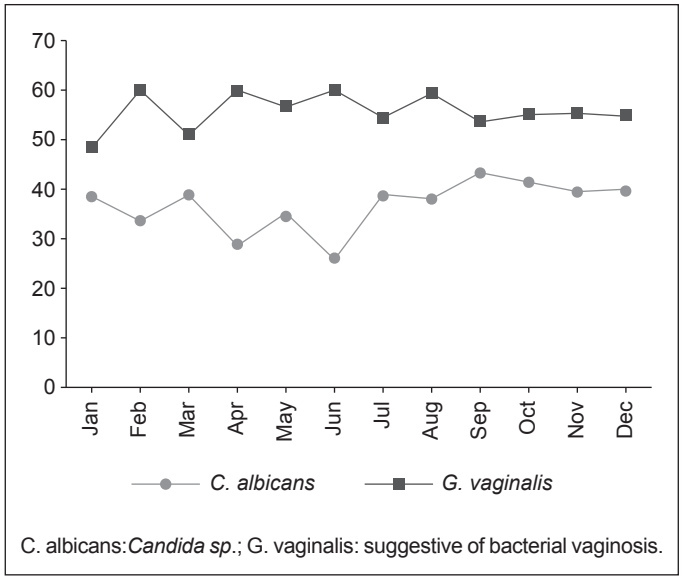

Figure 4 – Identification of bacterial vaginosis and *Candida sp.* morphotype from January to December 2014 in a private lab in Fortaleza, Brasil.

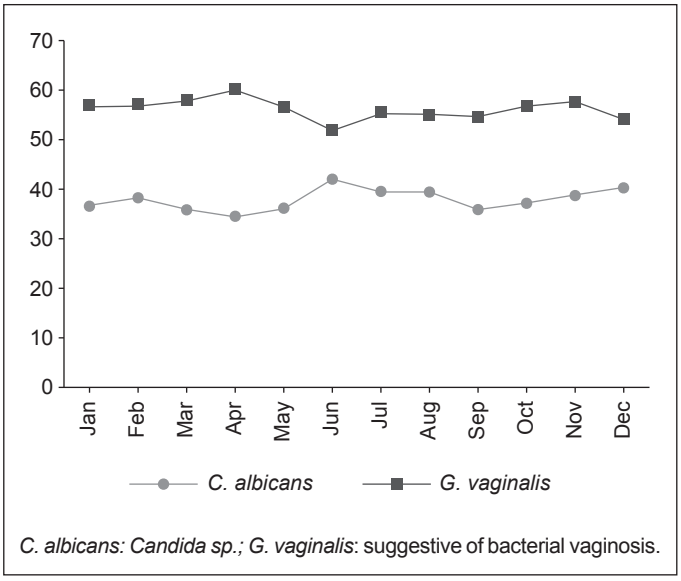

Figure 5 – Identification of bacterial vaginosis and *Candida sp.* morphotype from January to December 2015 in a private lab in Fortaleza, Brasil.

a few studies analyzing the influence of climate on the frequency of vaginal inflammatory symptoms allowing a wider discussion.

CONCLUSION

The frequency of BV results in oncologic colpocytology is greater than that of *Candida sp* during every month of the four years. The months with the highest frequency of pathogens identified were June, August and September; however, there was no significant change throughout the year, strengthened in regions where the four seasons are not explicit, as occurs in northeastern Brazil. Thus, the climate seems to have not much influence on the frequency of diagnoses in oncotic cytology of BV and *Candida sp*.

Conflict of interests

The authors declare no conflict of interests.

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PROFILE OF PREGNANT WOMEN DIAGNOSED WITH SYPHILIS

PERFIL DE GESTANTES DIAGNOSTICADAS COM SÍFILIS

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ABSTRACT

Introduction: Syphilis is a disease that has troubled mankind since the 15th century, and it continues to be a public health problem, especially in developing countries like Brazil. **Objective:** To outline the sociodemographic and gynecological-obstetric profiles of pregnant women diagnosed with syphilis at maternity hospitals in a municipality in the State of Ceará. **Method:** This is a descriptive study with a quantitative approach. The study was carried out in 2013, and the population consisted of 50 pregnant women with a syphilis diagnosis admitted to maternity hospitals. Data collection was obtained from prenatal care cards or booklets that were based on the instrument mentioned in Siqueira (2004). Data were analyzed through descriptive statistics, and were discussed using relevant literature as a basis. **Results:** 46.3% of pregnant women had a common-law marriage, 36% revealed having an incomplete elementary education, 30% were day workers and 86% had a monthly income of a minimum wage or less. With regard to obstetrical data, 36% had had two previous pregnancies, 18% had had an abortion, and 44% had had a diagnosis of a sexually transmitted infection some time in their lifetime. Concerning prenatal care, 88% had six or more appointments with a doctor, and only 32% completed the appropriate treatment. **Conclusion:** The young adult population has the most prevalence of syphilis, because they have little purchasing power and low levels of education. Gineco-obstetrical data revealed previous pregnancies and a history of intercurrence.

Keywords: syphilis; pregnant women; sexually transmitted diseases; vertical transmission of infectious diseases.

RESUMO

Introdução: A sífilis é uma doença que acomete a humanidade desde o século XV, porém continua sendo um problema de saúde pública, principalmente nos países em desenvolvimento como o Brasil. **Objetivo:** Traçar o perfil sociodemográfico e gineco-obstétrico de gestantes diagnosticadas com sífilis nas maternidades de um município do estado do Ceará. **Método:** Tratou-se de um estudo descritivo com abordagem quantitativa. Foi realizado durante o ano de 2013 e a população correspondeu a 50 gestantes com diagnóstico de sífilis admitidas nas maternidades. A coleta de dados deu-se pelo preenchimento de formulário elaborado com base no instrumento de Siqueira (2004), preenchido a partir dos cartões ou cadernetas de pré-natal. Os dados foram analisados por meio da estatística descritiva e discutidos com base em literatura pertinente. **Resultados:** Das gestantes 46,3% possuíam união estável, 36% ensino fundamental incompleto, 30% eram diaristas e 86% tinham renda mensal de um salário mínimo ou menos. Em relação aos dados obstétricos 36% apresentaram 2 gestações anteriores, 18% tiveram aborto e 44% diagnóstico de Infecção Sexualmente Transmissível em algum momento da vida. Sobre o pré-natal, 88% fizeram seis ou mais consultas e apenas 32% realizaram o tratamento adequado. **Conclusão:** A população mais prevalente com sífilis é jovem, com pouco poder aquisitivo e baixa escolaridade. Os dados gineco-obstétricos caracterizaram histórico de gestações anteriores e de alguma intercorrência.

Palavras-chave: sífilis; gestantes; doenças sexualmente transmissíveis; transmissão vertical de doença infecciosa.

INTRODUCTION

In Brazil, some infectious and parasitic diseases have been reduced and eradicated. However, the control of certain sexually transmitted infections (STI) is still a challenge. Although it is a disease that has troubled mankind since the 15th century, syphilis remains a public health problem, especially in developing countries like Brazil.

Syphilis is caused by *Treponema pallidum* bacteria and is categorized into three stages: primary, secondary and tertiary. The transmission of syphilis occurs due to minor abrasions during intercourse, when bacteria reach the lymph system or the blood, move on to other organs (acquired syphilis). It can also be transmitted via placenta, which is characterized as vertical transmission and occurs with untreated or inadequately treated pregnant women. The disease can happen during any stage of pregnancy, and is transmitted through the birth canal (congenital syphilis) as well. Subsets of congenital syphilis are as follows: early, occurring up until the second year of life, and late, when diagnosed in the second year of life and beyond[1].

The prevalence of syphilis in pregnant women in Brazil, according to the Ministry of Health, is 1.6%. The incidence of the disease in the gestational period in Ceará rises heterogeneously, reaching 58.8 cases per thousand live births in some municipalities of the central region of the State[2].

In Brazil, congenital syphilis and syphilis in pregnancy have been considered notifiable diseases since 1986 and 2005, respectively. According to the Reportable Diseases Information System (Sistema de Informação de Agravos de Notificação - SINAN), 5,324 cases of syphilis were reported in pregnant women from 2007 to 2015, and 8,289 of congenital syphilis were reported in the same period in the State of Ceará[3]. The number of individuals with congenital syphilis is greater than the number of pregnant women with the disease, showing that there is a high level of underreporting during the prenatal period, and undermining the real situation of syphilis in the country.

Approximately 50% of untreated or inadequately treated pregnant women can transmit syphilis to the fetus[4]. Vertical transmission consequences result in 25% of stillbirths and abortions, 11% of newborns, and 13% of premature babies or babies with a low birth weight[5].

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Understanding this reality, the importance of maternity care, from prenatal follow-ups to maternity hospitals is evident, in order to prevent the vertical transmission of syphilis.

Maternal health indicators are considered to be very comprehensive about the social inequalities that reflect living conditions and access to social resources, such as health, education, income, work, security, and participation, amongst various groups of the population, and also show ways in which social class, gender and race/ethnicity are interlaced and operate as social determinants of health[6]. Therefore, it is very important that the professionals are aware and appreciate the profile of these pregnant women observed at health services for the better planning of actions addressed for them.

OBJECTIVE

To outline the demographic profile and gynecological-obstetric services of pregnant women diagnosed with syphilis in maternity hospitals of a municipality in the State of Ceará.

METHODS

This is a descriptive study with a quantitative approach,[7] which was conducted in two maternity hospitals located in a municipality in the northern region of the State of Ceará. These two maternity hospitals are a regional and a State reference for the northern area of the state, which is made up of 24 municipalities. Maternity hospital A runs within a large philanthropic hospital, which is a secondary and tertiary reference. Maternity B is inserted in a midsize hospital, and it is configured as a secondary reference for the aforementioned municipalities.

The survey included women diagnosed with syphilis admitted to these hospitals in 2013. The sample consisted of 50 women.

Data was collected by filling out a form from prenatal care cards or booklets based on the instrument mentioned in Siqueira (2004)[8]. Aspects related to sociodemographic data, gynecological-obstetric and prenatal assistance were investigated.

The software program Statistical Package for Social Sciences (SPSS) for Windows, version 17.0 was used to store and process data organized in tables in order to calculate the frequency of the data. Data were analyzed through descriptive statistics and discussed on the basis of relevant literature.

The ethical aspects of research involving humans were complied in accordance with the nº 466/12 resolution, and approved by Protocol n.º 420,416 by the Research Ethics Committee of the Universidade Estadual Vale do Acaraú.

RESULTS

Thirty-four women diagnosed with syphilis were interviewed at Maternity A, and sixteen in Maternity B, with a total of fifty women. Pregnant women admitted came from various origins. The municipality where the maternity hospitals were located demonstrated a greater occurrence of positive cases for syphilis due to their population contingent and the greater number of admissions.

The sociodemographic data in **Table 1** shows that the average age of pregnant women was 21 to 30 years old. With regard to their civil status, 25 of them had a common-law marriage (46.3%). Concerning education, 18 (36%) pregnant women did not complete elementary school.

Data regarding the pregnant women's occupations were as follows: 15 (30%) daily workers; 9 (18%) housewives; 5 (10%) students; 1 (2%) teacher; 2 (4%) shoe saleswomen; 4 (8%) saleswomen; and 4 (8%) other occupation; 10 (20%) revealed no occupation in the prenatal cards or booklets. Concerning family income, most of them, 43 (86%), earned a minimum wage income or less.

The gynecological and obstetrical history collected in **Table 2** observes that 18 (36%) pregnant women had 2 previous pregnancies and 19 (38%) were young primiparae. Nine cases of abortion were identified (18%), and 2 of the women who had the abortions also had a history of two miscarriages. During pregnancy, 27 (54%) women had a urinary infection and 22 (44%) had a diagnosis of a STI at some point in life.

The data involving prenatal assistance set out in **Table 3** show that 44 pregnant women (88%) attended 6 or more prenatal appointments, and 6 (12%) attended between 4 to 5 appointments during pregnancy. As for the start of prenatal care in the Health Basic Units, 28 (56%) pregnant women started the service within the first quarter of pregnancy.

Table 1 – Distribution of pregnant women diagnosed with syphilis according to sociodemographic variables in the municipalities of the northern zone of the State of Ceará. Ceará, 2013.

Variable	n	%
Age (years)		
15-20	18	36.0
21-29	28	56.0
>30	4	8.0
Marital Status		
Married	9	16.7
Single	20	37.0
Common-law marriage	25	46.3
Education		
Illiterate	1	2.0
Incomplete elementary education	18	36.0
Complete elementary education	11	22.0
Incomplete High School	10	20.5
Complete High School	9	18.0
Complete Higher Education	0	00.0
Incomplete Higher Education	1	2.0
Family income		
≤1 minimum wage	43	86.0
2 minimum wages	5	10.0
Not informed	2	4.0
Occupation		
Day worker	15	30.0
Housewife	9	18.0
Student	5	10.0
Teacher	1	2.0
Worker	2	4.0
Saleswoman	4	8.0
Other	4	8.0
Not informed	10	20.0

Table 2 – Distribution of pregnant women diagnosed with syphilis according to the gynecological-obstetric variables in the municipalities of the northern zone of the State of Ceará. Ceará, 2013.

Variable	n	%
Number of pregnancies		
1	9	18.0
2	18	36.0
3	9	18.0
4 or more	13	26.0
Not informed	1	2.0
Abortion		
Yes	9	18.0
No	41	82.0
Early neonatal death		
Yes	2	4.0
No	47	94.0
Not informed	1	2.0
Intercurrent events history		
Urinary Tract Infection		
Yes	27	54.0
No	23	46.0
Previous hypertension		
Yes	10	20.0
No	40	80.0
STI History		
Yes	22	44.0
No	28	56.0

Table 3 – Distribution of pregnant women diagnosed with syphilis according to prenatal variables in the municipalities of the northern zone of the State of Ceará. Ceará, 2013.

Variable	n	%
Number of appointments		
4 or 5	6	12
6 or more	44	88
Prenatal period		
Up to 1st Quarter	28	56
After 1st Quarter	22	44
High risk prenatal		
Yes	13	26
No	37	74
Exams		
VDRL		
1st Quarter	15	30
1st and 3rd Quarters	35	70
Gynecologial Prevention		
Yes	22	44
No	28	56
Proper treatment of syphilis (up to 30 days before delivery)		
Yes	37	74
No	13	26
Partner Treatment		
Yes	38	76
No	12	24
Filling out cards/booklets		
Complete	16	32
Incomplete	34	68
Health Education		
Yes	13	26
No	37	74

Regarding laboratory tests and imaging, 100% of the prenatal care requested Rh factor blood typing, HIV, TPHA and ultrasonography (US) tests up to the 20th week of pregnancy. Most pregnant women, 31 (62%), undertook complete blood testing only in the first quarter, and the exams completed in the first and third quarters were the following: VDRL 35 (70%); fasting glycaemia, 25 (50%); urine contents, 25 (50%). Only 22 (44%) cards or booklets documented that the women received a pap smear.

Only 38 (76%) partners received adequate treatment. The monthly cure control through VDRL was applied to 28 (56%) pregnant women. However, 13 (26%) of them did not conclude treatment 30 days before delivery. Therefore, only 16 (32%) women were considered properly treated.

With respect to registration information, 34 (68%) of the cards or booklets of the pregnant women were partially completed, and 31 (62%) described explanations concerning the importance of the prenatal booklet or card.

Advice about STIs and AIDS was listed in 22 (44%). There were records of health education activities or lectures in only 13 (26%) of the cards or booklets, and the record of monthly visits to the community health agent was recorded for 38 (76%) pregnant women.

DISCUSSION

The average age range of pregnant women was from 21 to 30 years old. In research conducted in a hospital in the capital of the State of Roraima (Boa Vista) and in the city of Campo Grande, in Mato Grosso do Sul State, the age range is similar to that found in maternity hospitals in the municipality of this study[9,10]. It was also noted that a high number of teenagers are diagnosed with the disease, establishing a connection with studies conducted in other areas[11,12].

As for marital status, most women, 25 (46.3%), had common-law marriages, followed by 20 (37%) single women. Unlike the research carried out in the city of Natal, the capital of the State of Rio Grande do Norte, the marital status of mothers (86.2%) that had their children diagnosed with congenital syphilis, was single[13].

Only one pregnant woman from the survey had a professional occupation that required a higher level of education. Having a low level of education arises as an important factor in the profile of women diagnosed with syphilis, because it influences their sexual behavior. Similar is true with regard to family income. 86% of mothers were identified as having an income that was equal to or less than the minimum wage.

The sociodemographic profile resulting from this study indicates that the population that suffers from the disease consists of young pregnant women with a monthly income of less than or equal to the minimum wage, with a low level of schooling, and an informal occupation. The literature associates these factors with positive serology for syphilis[9,12,14,15].

The negative association between syphilis, pregnancy and abortion history is already known. Studies associate syphilis in pregnancy with fetal losses that occur in the first and second quarters, since abortion is understood to be one of the expected outcomes[9,16].

A history of STI is among the risks for seropositivity for syphilis. Moreover, infections that cause skin ulcers and mucous membranes

encourage HIV infections[17]. Therefore the recurrence of sexually transmitted infections can be caused by having multiple partners or by having one partner that was not treated. Therefore, prenatal assistance strengthens health education activities, such as guidance on syphilis and its treatment.

The interdependence between the unfavorable sociodemographic conditions, low-level of education and low family income, combined with a previous history of clinical reproductive intercurrences and obstetrical diseases, point to risk situations and vulnerability experienced by the pregnant women with these conditions. The conditions may involve the limited access to health services, health education and prenatal care.

The variables related to prenatal care revealed that the booklets were not completely filled out. The card or booklet should contain all information relating to maternal health, child development, test results, treatments and medications. This information is essential for prenatal assistance and can contribute to the promotion of maternal and child health and the reduction of mortality[18].

In this study, 44% of pregnant women had their first prenatal appointment after the first quarter of pregnancy, and 12% attended less than 6 appointments. A research study conducted in Belo Horizonte from 2010 to 2013 showed higher numbers, 51.6 and 34.8%, respectively[16]. The Health Ministry recommends that prenatal consultations should start as early as possible during the first trimester of pregnancy, and should be regular, so that all of the proposed evaluations are carried out. In addition, the total number of prenatal appointments should be a minimum of 6, and should include attention from a health professional, a doctor, and a nurse. It is necessary that both the maternity card as well as the perinatal record are completely filled out[19].

The VDRL tests did not occur according to the proposal from the Ministry of Health. Monitoring the treatment of syphilis in pregnant women should be done monthly with titration[1]. Health professionals must request the necessary exams for the best prenatal follow-up and ensure health services results in a timely manner to facilitate decision-making.

The Clinical Therapeutic and Guidelines Protocol for the Prevention of the Vertical Transmission of HIV, Syphilis, and Viral Hepatitis reveals that the treatment of syphilis in pregnant women is considered to be inappropriate if it is not carried out with benzathine penicillin, if it is incomplete or inconsistent with the clinical stage of the disease, if it is performed after a period of up to 30 days before delivery, or if the partner is not treated or inappropriately treated[1].

74% of pregnant women received treatment properly and 26% were unable to receive treatment in the proper amount of time. In the city of Cascavel, located in the State of Paraná[11], the percentage of women with inadequate treatment was higher, about 43.7%. 76% of the partners were treated. Similar numbers were found in Hildebrand's[10] research, which verified that 72% of partners underwent treatment and 63% of the pregnant women succeeded in treating syphilis.

One of the strategies used to qualify and expand the access to the syphilis diagnosis to pregnant women during prenatal concerns the strengthening of the structuration of assistance networks to STI with the introduction of the rapid diagnosis test for syphilis, allowing the adoption of immediate procedures to the vertical prevention and transmission of the disease[20].

Only 26% of the pregnant women participated in health education activities. It is essential that these women learn about the disease, their condition in addition to their child's condition. Therefore, more educational campaigns should be developed in order to alert the population about the impact of syphilis. Assistance should be more effective, and involve health professionals' multidisciplinary teams, such as the ones at the Family Health Support Center (Núcleo de Apoio à Saúde da Família - NASF) and the Multi-professional Residency in Family Health (Residência Multiprofissional em Saúde da Família - RMSF).

Information involving their experiences with pregnant women and also their knowledge must be shared with professionals in order to create an environment of mutual trust.[19] Having health education centers adopt prenatal care is essential, since pregnant women can listen and talk about their experiences and perceptions regarding pregnancy and other subjects involving children, women and family health.

CONCLUSION

Syphilis during pregnancy remains a public health problem that requires special attention due to its contribution to the promotion of maternal and perinatal morbidity and mortality indicators. In this study, the young adult population had the highest prevalence of syphilis, since they have little purchasing power and a low-level of education. Gineco-obstetrical data demonstrated previous pregnancies and complication history. Some variables with potential for the improvement of prenatal care was found, such as proper filling and strengthening of card records, participation in health education and greater treatment adhesion.

The development of actions aimed at this population is essential. They should focus on the promotion of safe sex, pregnant women health education, awareness of STIs for women in their reproductive age and their partners, as well as to strengthen the link.

Therefore, professionals who provide assistance to this population need to develop other studies that address the profile of women infected with syphilis, so that the results can contribute to the planning of new actions.

Conflict of interests

The authors declare no conflict of interests.

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PROMOTION OF SEXUAL RIGHTS AND HEALTH EDUCATION: KNOWLEDGE OF SEXUALLY TRANSMITTED INFECTIONS

PROMOÇÃO DE DIREITOS SEXUAIS E EDUCAÇÃO EM SAÚDE: CONHECIMENTO SOBRE INFECÇÕES SEXUALMENTE TRANSMISSÍVEIS

Denise Alves Guimarães[1], Cândida Amélia Marinho de Oliveira[1], Leandro César da Silva[1], Carlos Alberto Pegolo da Gama[1]

ABSTRACT

Introduction: The Sexually Transmitted Diseases (STD) are recognized throughout the world as an important public health problem due to their impact on people's life quality. **Objective**: To survey the population knowledge of transmission ways, treatment and possible cure of some STDs and AIDS, and compare them with each other as well as with the knowledge of other diseases. **Methods**: An exploratory and descriptive study by the use of a questionnaire in a convenience sample composed of 403 men and women of different age groups, 252 (62.5%) women and 151 (37.5%) men. The results were compiled and analyzed by the IBM SPSS Statistics 22 software. **Results**: A different knowledge degree regarding the ways of transmission and prevention of STD/AIDS was observed. Questions about AIDS had the highest right answers' rates, above 80%. As for the transmission of certain diseases, the ones published by the media, as Aids and dengue fever, are better known and also shown high levels, above 90%. However, there was a high degree of unfamiliarity of the participants regarding those diseases not so well divulged by the health actions and government campaigns, despite their high prevalence, such as gonorrhea and syphilis. **Conclusion**: Information on STD and other widely disseminated diseases by the media and public health campaigns were incorporated by the participants of this research, showing the power and significance of health education campaigns.

Keywords: sexual rights; STD; health education.

RESUMO

Introdução: As Doenças Sexualmente Transmissíveis (DST) são mundialmente reconhecidas como um importante problema de saúde pública devido ao seu impacto na qualidade de vida das pessoas. **Objetivo:** Analisar o conhecimento da população sobre métodos de transmissão, tratamentos e possível cura de algumas DST e da AIDS, e compará-las entre si assim como quanto ao seu conhecimento sobre outras doenças. **Métodos:** Estudo exploratório e descritivo através do uso de um questionário em amostra de conveniência composta por 403 homens e mulheres de diferentes faixas etárias, 252 (62,5%) mulheres e 151 (37,5%) homens. Os resultados foram compilados e analisados pelo *software* IBM SPSS Statistics 22. **Resultados:** Foi observado um diferente nível de conhecimento sobre formas de transmissão e prevenção de DST/AIDS. Perguntas sobre AIDS tiveram o maior número de respostas corretas, acima de 80%. Quanto à transmissão de certas doenças, as publicadas pela mídia, como a AIDS e a dengue, são mais conhecidas e apresentam melhores níveis, acima de 90%. No entanto, houve alta falta de familiaridade dos participantes quanto às doenças pouco divulgadas por ações e campanhas governamentais de saúde, apesar de sua alta prevalência, como é o caso da gonorreia e da sífilis. **Conclusão:** Informação sobre DSTs e outras doenças altamente divulgadas pela mídia e por campanhas de saúde pública foram incorporadas pelos participantes dessa pesquisa, mostrando o poder e a importância de campanhas de educação da saúde.

Palavras-chave: direitos sexuais e reprodutivos; DST; educação em saúde.

INTRODUCTION

Sexually Transmitted Diseases (STD) represent significant public health problems throughout the world, comprising several infectious-contagious pathologies, mainly transmitted through sex, causing consequences such as infertility, miscarriage, and increased risk of infection by the Human Immunodeficiency Virus (HIV), responsible for the Acquired Immune Deficiency Syndrome (AIDS)[1-5]. The World Health Organization (WHO, 2014) estimates that 500 million people acquire a curable STD (syphilis, gonorrhea, trichomoniasis and chlamydia) daily, 530 million people are infected with the genital herpes virus, and more than 290 million women are infected with the Human Papilloma Virus (HPV)[5].

In Brazil, sexually transmitted infections in the sexually active population per year are estimated as: syphilis, 937,000 cases; gonorrhea, 1,541,800 cases; chlamydia, 1,967,200 cases; genital herpes, 640,900 cases; and HPV, 685,400 cases. However, such statistic numbers are lower than the real ones, given the underreporting of such harms[1-4].

The infection with HIV, on the other hand, is a great challenge in the fight against STDs, due to its chronic characteristic and the difficulty to control the epidemic. According to data from the United Nations Programme on HIV and AIDS (UNAIDS), there was a total of 36,700,000 people living with HIV/AIDS in the world in 2016, 18,200,000 of them under antiretroviral therapy. In 2016, there were 1.1 million deaths related to AIDS complications[5].

HIV concentrates on key populations and presents a different epidemiology according to the studied region. In Africa, the virus is concentrated in areas of poverty in the Sub-Saharan region, with the highest incidence of cases in the heterosexual population, especially women. In 2015, UNAIDS data reported 25,500,000 cases in the African continent. In Europe, the USA and Latin America, new cases are particularly concentrated in populations of men who have sex with other men (MSM) and of poor black females in big cities, totalizing 4,400,000 cases[5].

In Brazil, it is estimated that the incidence of the HIV virus in the MSM population is 10.5%, corresponding to 4.9% in sex workers,

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and 0.6% in general adult population[6]. However, there is an epidemic advance among the heterosexual population due to internalization, feminization and poverty[7], and the heterogeneous scenario in which it is inserted is a challenge.

Several aspects related to the social relations of gender, including sexual violence, unequal gender relations; intercourse with older men and the unequal access to education and employment determine the low sexual bargaining power of women, increasing their chances of exposure to HIV[5,7-9].

Moreover, people with STD face the fear of stigmas and discrimination. The prejudice about HIV, for example, leads to less diagnostic tests, secrecy supporting diagnosis — even concerning partners — and the poorly constant link with health units, resulting in greater chance of spreading the disease. Discrimination causes deep psychological damage, including guilt complex and shame, as well as the desire for self-destruction[10-13].

In this context, it is important to note that HIV infection cases show the public policies' weakness in fighting the most frequent STDs. For example, the percentage of cases of syphilis (a curable bacterial STD) in Brazilian women is of 1.6%, which is four times the number of pregnant women with HIV[8]. The following new cases of STDs are registered every year in Brazil: syphilis, 937,000; gonorrhea, 1,541,800; chlamydia, 1,967,200, genital herpes, 640,900; HPV, 685,400[9].

It is worth emphasizing that the prevention policy of STDs in Brazil is anchored to the human rights reference. This is translated into defense of sexual rights dissemination, especially referring to the autonomy of each citizen to fully experience sexuality and access the necessary resources to practice safe sex[11]. To achieve this goal, the provision and dissemination of correct information based on scientific research for the population have been described by the Ministry of Health (MH) as of fundamental importance for STD prevention policies. In this sense, health education strategies play a prominent role for the promotion of sexual rights, prevention of STDs and decreased vulnerability to these diseases. The MH emphasizes the importance of massive health education campaigns promoted by governmental agencies or educational actions promoted by the civil society for the dissemination of correct information for the population[4,12,14]. It is obvious, therefore, the relevance of studies and research that can help health education and public policies planning directed to STDs and HIV/AIDS prevention, considering the degree of knowledge of various population segments, main questions and misconceptions about this subject.

OBJECTIVE

To describe the degree of knowledge of transmission ways, treatment and existence of cure of some STDs/AIDS in a sample of men and women aged between 12 to 80 years old, comparing them to each other and to the knowledge of other diseases.

METHODS

An exploratory research was developed[15,16] by researchers of a Federal educational institution in partnership with the Municipal Health Secretariat in a medium-sized municipality in the State of Minas Gerais, with a population of 213,016 inhabitants[17]. The participants were men and women with ages ranging between 12 and 80 years. The research was developed from an extension project connected to the research entitled "Health education: sexuality and prevention of STD/AIDS", funded by PRO/PET SAÚDE and by the Research Foundation of Minas Gerais State: *Fundação de Amparo à Pesquisa do Estado de Minas Gerais* (FAPEMIG).

In 2014, a questionnaire was adapted from an instrument used in the Research into Knowledge, Attitudes and Practices (*Pesquisa de Conhecimentos, Atitudes e Práticas* – PCAP) related to STDs and AIDS of the Brazilian population with ages varying from 15 to 64 years — by the MH, held in 2011, with contributions from Marinho[18] and Pascom[12]. The adapted questionnaire kept the same basic structure of the original questionnaire and addressed social and demographic data, such as age, sex and marital status, education, monthly income, ethnicity, religion and occupation. In addition, it evaluated and compared participants' knowledge about ways of transmission, treatment and cure of AIDS, syphilis, hepatitis, dengue fever, malaria, gonorrhea and HPV. The adapted instrument consisted of 103 closed questions distributed into topic blocks, and the average application time was 40 minutes. The main change in the adapted instrument was the inclusion of an answer option for each question, so that the participant could express the unfamiliarity with the subject.

A total of 403 questionnaires were analyzed: 252 women and 151 men. A convenience sample[19] was used and the target research regions were jointly defined with the Municipal Health Secretariat, indicating the geographical areas of STDs' highest incidence. These predetermined regions discussed three religious institutions, two public health services, five high schools and vocational education institutions, and one higher education institution. People aged 12 years or more, linked to the institutions covered by the research and who agreed to participate, were considered eligible. Any type of disability, such as self-governance constraint, critical and discriminative capacity, was considered an exclusion criterion. Participants were defined by the institution and there was no intention to submit separate analyses by institution, given the heterogeneity of participants and the impossibility of evaluating their attachment to each institution.

A Microsoft Excel spreadsheet was developed in order to store the database and the filled out questionnaires. The answers were numbered and the participants identified by codes. Data obtained were tabulated in the IBM SPSS Statistics 22 software, analyzed through descriptive statistics and presented in the frequency of the occurrence of each variable expressed in absolute figures and percentages. The questionnaires were applied by scholarship students and researchers involved in the project. The research was approved by the Research Ethics Committee under paragraph 131,321 of 11/07/2012.

RESULTS

Socio-demographic information

Total participants came to 403, as follows: 252 (62.5%) women, and 151 (37.5%) men. As for age, most of them (46.6%) were between 30 and 59 years old, 20.1% between 18 and 29, 18.6% under 18 years of age and 59 participants (14.6%) were elderly; 186 (46.2%) were

single, 135 (33.5%) married, 32 (7.9%) lived with a companion, 28 (6.9%) separated or divorced, 18 (4.5%) widowers and 4 (1.0%) participants answered "other".

Concerning education (**Table 1**), 43.4% of the interviewees had elementary school at the most, and only 12.2% completed higher education. Upon observation of the participants' monthly household income (**Table 1**), not considering the ones who did not inform or did not want to answer, 50.1% declared that their monthly family income exceeded 3 minimum wages. At the time of the application of the questionnaires, the minimum wage was R$ 723.99.

As to ethnicity, 156 interviewees (38.7%) considered themselves white, 43 (10.7%) black, 14 (3.5%) yellow, 177 (43.93%) browns, dark or mulattoes, 2 (0.5%) natives, 1 (0.2%) answered "other" and 10 (2.5%) did not answer. About religion, 292 (72.5%) reported being Catholic, 64 (15.9%) Evangelical, 19 (4.7%), Spiritualists, and 9 (2.2%) declared other religions. There were no responses to "umbanda/candomblé" and 19 (4.7%) answered "not applied".

Considering their occupation, 73 (18.1%) consisted of civil servants, 92 (22.8%) formal employees, 18 (4.5%) informal employees, 29 (7.2%) freelances, 8 (2.0%) employers, 97 (24.1%) students, 37 (9.2%) homemakers, 33 (8.2%) informed no occupation, and 16 (4%) "other occupation".

Knowledge and information about ways of transmission of some diseases and Sexually Transmitted Diseases

The questionnaire presented questions concerning ways of transmission, treatment and cure of Aids, syphilis, hepatitis, dengue fever, malaria, gonorrhea and HPV. **Table 2** only shows data related to right answer/wrong answer/unfamiliarity about STDs, and is divided into male and female participants. **Table 3**, on the other hand, presents the distribution of right answers by age group. The results concerning malaria and dengue fever will be presented later in the present study.

In relation to AIDS, 361 participants declared that it could not be transmitted by the sting of an insect, 28 said it could, and 14 could not opine, resulting in 89.58% of right answers and 6.95% of wrong ones. 304 interviewees considered that AIDS cannot be transmitted through the use of a toilet in a public restroom (77.43% of right answers), 78 considered it could (19.35%), and 5.21% did not know the answer. Most of them, 395 (98.01%), answered correctly when asked whether or not AIDS can be transmitted by sharing syringes or needles, but 7 participants still believed that the disease cannot be transmitted this way. Almost everyone agreed that AIDS can be caught if a person has sexual intercourse without a condom, which means 99.75% of correct knowledge; 43 participants (10.67%) still believe that AIDS has no treatment, but 354 (87.84%) were aware that the treatment exists, and 6 (1.49%) did not know the answer. When asked whether a cure exists, 349 (86.60%) participants answered correctly, *i.e.*, "No"; 44 (10.92%) answered "Yes", and 10 (0.25%) answered "I don't know".

Table 1 – Education and income of participants.

Education	**n (%)**
Illiterate	4 (1.0)
Literate, but not attended Elementary Education	12 (3.0)
Incomplete Elementary Education	125 (31.0)
Complete Elementary Education	34 (8.4)
Incomplete High School/Vocational education	93 (23.1)
Complete High School/Vocational education	59 (14.6)
Incomplete Higher Education	27 (6.7)
Complete Higher Education	25 (6.2)
Postgraduate	24 (6.0)
Income	**n (%)**
Less than 1 minimum wage	23 (5.7)
From 1 to 3 minimum wages	166 (41.2)
From 3 to 6 minimum wages	118 (29.3)
More than 6 minimum wages	70 (17.4)
Does not know/does not want to answer	26 (6.5)

Source: prepared by the authors.

As for knowledge of syphilis, the smallest percentages of correct answers were related to its transmission in public restrooms and sharing needles/syringes; 172 participants (42.68%) knew the disease cannot be contracted through toilet use, and 115 (28.54%) wrote that this way of transmission is possible. However, 116 (28.78%) answered "I don't know" to this question. The information that syphilis can be transmitted through sharing of syringes/needles was shown to having been little divulged, since only 165 participants (40.94%) agreed with this way of transmission, and 107 (26.55%) did not know the answer. In addition, 264 (65.51%) knew that syphilis can be cured, and a high number, 87 (21.59%), did not know whether or not this disease can be cured. More participants, 295 (73.20%), answered correctly when asked if syphilis may or may not be transmitted by the sting of an insect. However, 21 (5.21%) declared that this way of contagion is possible; 321 participants stated that this pathology can be caught by a person who has sex without a condom, corresponding to 79.65% of correctness. On this topic, 30 (7.44%) participants answered incorrectly, and 52 (12.90%) had no opinion. In relation to treatment, 64 (15.88%) did not know the answer, 331 (82.13%) wrote that it exists, and 8 (1.98%), that it does not.

In relation to the eight questions concerning hepatitis, only three of them obtained a correct percentage higher than 70%, which shows the unfamiliarity level about these pathologies. 73 participants (18.11%) had the misconception that hepatitis can be transmitted by the bite of an insect, 58 (14.39%) did not know the answer, and only 272 (67.49%) knew that this way of transmission is not possible. A high number of participants, 148 (36.72%), pointed out that hepatitis B and C can be caught when using public restrooms, and 71 (17.62%) did not opine; 324 (80.40%) knew the correct concept that these viruses can be transmitted through sharing needles/syringes, 35 (8.68%) informed otherwise, and 44 (10.92%) did not have any information about it. Only 237 (58.81%) declared that hepatitis B and C can be contracted by those who do not use a condom during intercourse, 114 (28.29%) responded that this is not a way of transmission, and 51 (12.65%) marked "I don't know". Most agreed that both hepatitises B and C can be cured, showing 55.5 and 63.03% of correct answers, respectively.

The largest number of "I don't know" answers referred to the treatment of hepatitis C (11.91%, against 7.69% for hepatitis B). 254 participants (63.03%) answered correctly concerning the hepatitis B cure, 82 (20.35%) failed to answer, and 67 (12.62%) did not opine. It is known that the cure for hepatitis C is possible, and about this matter, there was 82.13% of correct answers, 26.30% of wrong ones, and 18.36% of "I don't know" answers.

Considering the degree of unfamiliarity about the STD expressed by the sum of wrong and "I don't know" answers, it is possible to verify there are some differences between men and women.

When asked about the chances of transmission of the diseases by the sting of insects, the level of unfamiliarity of men was higher for hepatitis (37.0) and HPV (23.2) than women — (29.8) and (17.5), respectively. Regarding gonorrhea, however, the level of unfamiliarity was higher for women (23.1) than for men (18.5).

About the possibility of transmission by the use of public restrooms (toilet), the level of men's unfamiliarity was higher concerning HPV (55.1) when compared to women's (48.4). Women showed a higher level of unfamiliarity regarding the possibilities of transmission of gonorrhea by the use of public restrooms (73.0) when compared to men (67.5).

Regarding the knowledge of STDs' transmission by syringe or needle sharing, a higher degree of unfamiliarity and errors was observed among women; with regard to syphilis, 55.0 for men and 61.6 for women; and gonorrhea, 37.7 for men and 45.5 for women.

Considering the degree of knowledge reported by men and women in relation to the transmission possibility of STDs through sexual intercourse without a condom, it is not possible to observe significant differences between genders concerning the recognition of condom as a protection factor against syphilis, gonorrhea, and HPV. However, the unfamiliarity to sexual transmission without condoms for hepatitis was higher among men (46.3) than among women (37.8).

On the existence of treatment, women have a higher level of unfamiliarity to this possibility for gonorrhea (18.7) when compared to

Table 2 – Knowledge and information about ways of transmission of some diseases and Sexually Transmitted Diseases.

	Right answer		Wrong answer		Did not inform	
	Men	Women	Men	Women	Men	Women
Transmission by insect sting						
Aids	133 (88.1)	228 (90.5)	15 (9.9)	13 (5.2)	3 (2.0)	11 (4.4)
Syphilis	107 (70.9)	188 (74.6)	13 (8.6)	8 (3.2)	31 (20.5)	56 (22.2)
Hepatitis	95 (62.9)	177 (70.2)	36 (23.8)	37 (14.7)	20 (13.2)	38 (15.1)
Gonorrhea	123 (81,5)	193 (76.6)	12 (7.9)	13 (5.2)	16 (10.6)	45 (17.9)
HPV	116 (76.8)	208 (82.5)	8 (5.3)	9 (3.6)	27 (17.9)	35 (13.9)
Transmission by the use of public restroom (toilet)						
Aids	115 (76.2)	189 (62.2)	26 (17.2)	52 (20.6)	10 (6.6)	11 (4.4)
Syphilis	63 (41.7)	109 (43.3)	42 (27.8)	73 (29.0)	46 (30.5)	70 (27.8)
Hepatitis	68 (45.0)	116 (46.0)	55 (36.4)	93 (36.9)	28 (18.5)	43 (17.1)
Gonorrhea	49 (32.5)	68 (27.0)	82 (54.3)	131 (52.0)	20 (13.2)	53 (21.0)
HPV	76 (50.3)	130 (51.6)	40 (26.5)	72 (28.6)	35 (23.2)	50 (19.8)
Transmission by syringe or needle sharing						
Aids	146 (96.7)	249 (98.8)	5 (3.3)	2 (0.8)	0 (0.0)	1 (0.2)
Syphilis	68 (45.0)	97 (38.5)	54 (35.8)	77 (30.6)	29 (19.2)	78 (31.0)
Hepatitis	114 (75.5)	210 (83.3)	15 (9.9)	20 (7.9)	22 (14.6)	22 (8.7)
Gonorrhea	94 (62.3)	138 (54.8)	37 (24.5)	53 (21.0)	20 (13.2)	61 (24.2)
HPV	74 (49.0)	133 (52.8)	44 (29.1)	69 (27.4)	33 (21.9)	50 (19.8)
Transmission by intercourse without a condom						
Aids	150 (99.3)	252 (100.0)	1 (0.7)	0 (0.0)	0 (0.0)	0 (0.0)
Syphilis	118 (78.1)	203 (80.6)	17 (11.3)	13 (5.2)	16 (10.6)	36 (14.3)
Hepatitis	81 (53.6)	156 (62.2)	55 (36.4)	59 (23.5)	15 (9.9)	36 (14.3)
Gonorrhea	119 (78.8)	194 (77.0)	26 (17.2)	30 (11.9)	6 (4.0)	28 (11.1)
HPV	100 (66.2)	193 (76.6)	25 (16.6)	31 (12.3)	26 (6.5)	28 (6.9)
Treatment existence						
Aids	131 (86.8)	223 (88.5)	16 (10.6)	27 (10.7)	4 (2.6)	2 (0.8)
Syphilis	125 (82.8)	206 (81.7)	5 (3.3)	3 (1.2)	21 (13.9)	43 (17.1)
Hepatitis B	130 (86.1)	228 (90.5)	6 (4.0)	8 (3.2)	15 (9.9)	16 (6.3)
Hepatitis C	126 (83.4)	205 (81.3)	6 (4.0)	18 (7.1)	19 (12.6)	29 (11.5)
Gonorrhea	130 (86.1)	205 (81.3)	4 (2.6)	7 (2.8)	17 (11.3)	40 (15.9)
HPV	122 (80.8)	203 (80.6)	7 (4.6)	16 (6.3)	22 (14.6)	33 (13.1)
Cure existence						
Aids	129 (37.0)	220 (87.3)	18 (11.9)	26 (10.3)	4 (2.6)	6 (2.4)
Syphilis	105 (69.5)	159 (63.1)	19 (12.6)	33 (13.1)	27 (17.9)	60 (23.8)
Hepatitis B	102 (67.5)	152 (60.3)	23 (28.0)	59 (23.4)	26 (17.2)	41 (16.3)
Hepatitis C	95 (62.9)	128 (50.8)	29 (19.2)	77 (30.6)	27 (17.9)	47 (18.7)
Gonorrhea	123 (81.5)	188 (74.6)	9 (6.0)	17 (6.7)	19 (12.6)	47 (18.7)
HPV	104 (68.9)	172 (68.3)	19 (12.6)	34 (13.5)	28 (18.5)	46 (18.3)

*The values listed in parentheses correspond to the percentages in relation to the total of men or total of women.

men (13.9), as well as for syphilis — (18.3) compared to men (17.2). On the cure existence, it is worth noting the higher level of unfamiliarity of women concerning syphilis (36.9), hepatitis C (49.3) and gonorrhea (25.4), when compared to men — whose results were 30.5, 37.1, and 18.6, respectively

The results on the information about dengue fever show more knowledge about the disease in relation to the previously submitted information. A percentage above 90% is reported on the ways of transmission, treatment and cure. With regard to malaria, between 80 and 70% correct answers were observed in most questions involving ways of transmission, treatment and cure. However, the percentage of 81.64% of participants who were not able to answer if this disease might or not be contracted by the use of the toilet in a public restroom stands out.

Regarding gonorrhea, a high rate of unfamiliarity was observed, since an average of 22.28% of "I don't know" answers was obtained, 15.38% about the transmission by insect sting, 18.11% on the infection through the use of toilet in public restrooms, 20.10% of contamination through sharing of needles/syringes, 8.44% about the transmission by sexual intercourse, 14.14% about the existence of treatment and 16.38% of cure. 316 participants (78.41%) answered correctly that gonorrhea cannot be transmitted by the sting of an insect and 25 (6.20%) failed. A high number of participants, 213 (52.85%), declared that gonorrhea can be caught through the use of public toilets, and 117 (29.03%) answered correctly, that this is not possible.

As for the possibility of infection through needles/syringes sharing, 232 marked it was not possible and 90 declared otherwise, corresponding to 57.57% of correct answers and 22.33% of wrong

Table 3 – Knowledge about ways of transmission, prevention, treatment and cure of Sexually Transmitted Diseases – correct answers distribution by age groups.

	Under 18 years	18 to 29 years	30 to 59 years	More than 59 years
Transmission by insect sting				
Aids	66 (88.0)	73 (90.1)	175 (93.1)	53 (89.8)
Syphilis	43 (57.3)	54 (66.7)	159 (84.6)	39 (66.1)
Hepatitis	42 (56.0)	46 (56.8)	147 (78.2)	37 (62.7)
Gonorrhea	45 (60.0)	62 (76.5)	166 (88.3)	43 (72.9)
HPV	56 (74.7)	60 (74.1)	169 (89.9)	39 (66.1)
Transmission by the use of public restrooms (toilet)				
Aids	51 (68.0)	53 (65.4)	162 (86.2)	38 (64.4)
Syphilis	20 (26.7)	35 (43.2)	95 (50.5)	22 (37.3)
Hepatitis	34 (45.3)	39 (48.1)	93 (49.5)	18 (30.5)
Gonorrhea	18 (24.0)	24 (29.6)	66 (35.1)	9 (15.3)
HPV	32 (42.7)	37 (45.7)	117 (62.2)	20 (33.9)
Transmission by syringe and needles sharing				
Aids	74 (98.7)	78 (96.3)	187 (99.5)	56 (94.9)
Syphilis	22 (29.3)	29 (35.8)	77 (41.0)	37 (62.7)
Hepatitis	59 (78.7)	63 (77.8)	156 (83.0)	46 (78.0)
Gonorrhea	26 (34.7)	44 (54.3)	138 (73.4)	24 (40.7)
HPV	23 (30.7)	35 (43.2)	117 (62.2)	32 (54.2)
Transmission by intercourse without a condom				
Aids	75 (100.0)	81 (100.0)	187 (99.5)	59 (100.0)
Syphilis	48 (64.0)	63 (77.8)	160 (85.1)	50 (84.7)
Hepatitis	31 (41.3)	41 (51.2)	125 (66.5)	40 (67.8)
Gonorrhea	40 (53.3)	60 (74.1)	161 (85.6)	52 (88.1)
HPV	46 (61.3)	53 (65.4)	151 (80.3)	43 (72.9)
Treatment existence				
Aids	60 (80.0)	68 (84.0)	177 (94.1)	49 (83.1)
Syphilis	44 (58.7)	57 (70.4)	176 (93.6)	54 (91.5)
Hepatitis B	59 (78.7)	74 (91.4)	172 (91.5)	53 (89.8)
Hepatitis C	52 (69.3)	65 (80.2)	166 (88.3)	48 (81.4)
Gonorrhea	39 (52.0)	64 (79.0)	181 (96.3)	51 (86.4)
HPV	50 (66.7)	60 (74.1)	167 (88.8)	48 (81.4)
Cure existence				
Aids	68 (90.7)	70 (86.4)	166 (88.3)	45 (76.3)
Syphilis	34 (45.3)	50 (61.7)	135 (71.8)	45 (76.3)
Hepatitis B	39 (52.0)	51 (63.0)	128 (68.1)	36 (61.0)
Hepatitis C	36 (48.0)	46 (56.8)	108 (57.4)	33 (55.9)
Gonorrhea	36 (48.0)	53 (65.4)	170 (90.4)	52 (88.1)
HPV	38 (50.7)	49 (60.5)	146 (77.7)	43 (72,9)

*The values listed in parentheses correspond to the percentages in relation to the total by age group.

ones. 313 (77.67%) said correctly that gonorrhea can be transmitted through intercourse without a condom, against 56 (13.89%) who have said that this is not a way of transmission. There were 335 right answers (83.12%) and 11 (2.73%) wrong ones regarding the existence of treatment, and 311 right answers (77.17%) and 26 (6.45%) wrong ones on the occurrence of cure.

The knowledge about the infection by HPV was also scarce. Relating to the transmission by the sting of an insect, 324 participants (80.40%) answered correctly by saying that it is not possible, 17 (4.22%) failed and 62 (15.38%) did not answer. 206 participants (51.12%) recognized that HPV cannot be contracted using public restrooms, but a high number of participants, 112 (27.79%), believed in the possibility of this way of transmission, and 85 (21.09%) answered "I don't know". Only 207 (51.36%) knew that a person cannot be infected by this virus by sharing needles/syringes, 113 (28.04%) did not know, and 83 (20.60%) did not opine.

The main transmission of HPV is sexually, and 293 (72.70%) participants agreed that a person can contract the virus during sex, 56 (13.89%) disagreed and 54 (13.40%) did not know an answer. 325 affirmed there is treatment and 23 said it does not exist, indicating 80.64% of correct answers and 5.71% of wrong ones. 55 (13.65%) didn't know. Considering that HPV cure is possible, there were 68.49% of correct answers and 13.15% of errors. 74 participants (18.36%) did not know the answer.

In this research, it is important to note that the percentage of right answers regarding the ways of transmission, existence of treatment and cure of STDs were lower, generally, among age extremes (under 18 and over 60 years of age).

DISCUSSION

Regarding the transmission of certain diseases, the research data show there is a greater knowledge of those most published by the media and Government health campaigns, as AIDS and dengue fever. Of the 6 questions on AIDS, only 1 of them obtained a percentage of less than 80.0% of correct answer. The findings of this research about the ways of transmission and prevention of HIV infection demonstrate a high level of knowledge on the subject, following the platform aimed at national surveys since 2004 and with rates higher than several developing countries. According to the trend pointed out by national studies[14], the use of a condom is recognized by almost all participants of this research (99.7%) as a protective factor.

The answers on dengue fever also showed relatively high level of knowledge, since most questions showed a correct answers' rate higher than 90.0%. For these two diseases, there were a few "I don't know" answers, and most of them associated with the possibility of transmission of AIDS through the use of the toilet.

It was observed, however, a high degree of unfamiliarity concerning the other diseases, which are not so divulged by health actions and Government campaigns, despite their high prevalence. Knowledge of gonorrhea, for example, was insufficient, although it is an easily treated disease with a higher prevalence than that of HIV infection. The dissemination of information on STDs is essential for the population to know about the prevention ways, but also to recognize signs and symptoms that lead individuals to look for care and have access to early diagnosis and immediate treatment, avoiding aggravations and vulnerability regarding HIV[14].

The research data show unfamiliarity about syphilis information observed not only by the high number of incorrect answers, but also by the high percentage of "I don't know" responses.

Generally speaking, the lack of knowledge causes an impact on the promotion of sexual and reproductive rights, be it the fact that it involves individuals in misconceptions regarding the adoption of prevention measures and search for health care, be it the lack of access to correct and scientifically based information that lead to changes in behavior and break the chain of transmission of STDs. In this sense, considering the degree of unawareness expressed by men and women in relation to the STDs, some aspects deserve emphasis.

Considering the different answers by gender, it is possible to ponder the challenges involving the overcoming of the contexts of women's vulnerability. It occurs not only due to the access to correct information about STDs and to treatment, but also about the need to develop specific strategies for dealing with the violence contexts of organized hierarchical relations between men and women that strike the possibilities of adopting preventive measures for women[5,7].

Studies argue that the major ways of STDs/AIDS prevention are the information and adherence of safe practices during sexual life[4,5,10]. However, the sexually active population in Brazil still lacks practical information about the use of condom, syringes, needles and other sharp materials sharing. This research confirmed the same trend of other national studies which point at and discuss aspects of the population vulnerability situation of young and old people on the information about STDs. In this view, some research indicates that young people believe that the use of methods other than condoms are safe in preventing STDs/AIDS, and that among young people who assume that condom is an effective method, less than half of them make regular use of it[20,21].

With regard to the elderly, national surveys also point out that 50 to 80% of this population has an active sexual life, many of them with multiple partners and who do not make use of preventive methods, which helps to understand the great incidence rate of elderly people infected with the HIV virus.

Nowadays, it is known that the increase of HIV infection cases among elderly people do not go along with sufficient incentives to practice safe sex in this age group. Although the efforts of the MH concerning dissemination of information about STDs/AIDS prevention are recognized, educational activities are primarily targeted to the public considered more vulnerable.

Nevertheless, surveys show that prevention campaigns are not reaching the elderly population, which has also been suffering with STDs and AIDS, especially considering the specificity of the notion of risk exposure and the adoption of safe behaviors among elderly people, according to women's concerns exclusively attached to the prevention of pregnancy, which is not a concern at this time of life[20-26].

A research on knowledge and practices of adolescents in relation to STD/HIV/AIDS held in Brazil with a group of students from 12 to 22 years of age showed some results, such as "knowledge does not imply directly in preventive practices". The vast majority of participants (94.5%) reported being aware that the use of a condom was a method to prevent STDs, however, among those who reported having active sexual life, only 53.3% used a condom during every intercourse[20].

This situation can also be observed among pregnant women in Brazil, following the example of the study of pregnant teenagers in the city of Campinas, which demonstrates that only 54.4% of them used some contraceptive method in the first intercourse, the male condom being the most widely used one. This research shows that most teenagers had adequate knowledge about methods of pregnancy and STD/AIDS prevention, but the information was not directly related to behaviors and attitudes' changes[27].

The research reveals a high degree of unfamiliarity declared by participants referring to the issues presented about syphilis, as follows: ways of transmission of the disease by sharing needles and syringes; possibilities of treatment and cure of the disease; knowledge of the use of condom as a protection factor. Syphilis, a disease considered an STD priority according to the Therapy Based on Clinical Practice Guidelines of Ministry of Health (*Protocolos Clínicos de Diretrizes Terapêuticas* – PCDT)/STD[4], can be evaluated by the detection rate of cases in pregnant women and congenital syphilis. It is worth mentioning that in 2013, data from DATASUS show that the national rate of detection of syphilis in pregnant women was 7.4 per 1,000 live births; the State of Minas Gerais showed 1.35, and the municipality under study unveiled 4.5. In relation to congenital syphilis, the detection rate showed 4.7 per 1,000 of live births; in the State of Minas Gerais the detection was of 0.85, and in the studied municipality, 2.62[28,29].

Such data indicate the urgency of the municipal government's initiatives to establish strategies for the decrease of STDs in general and of congenital syphilis as well, a sensitive indicator of prenatal care quality. In addition, this specific scenery of syphilis indicates the need for further development and continuity of studies which may elucidate knowledge, perceptions and prejudices about sexual practices and ways of prevention that might promote the empowerment of individuals and collectivities concerning sexual and reproductive health.

Finally, it is important to discuss the limits of this work. First of all, enroll the limitations as to the fact that it is not possible to affirm the existence of a direct and linear relationship between knowledge acquisition and behavior change, mainly because this is an educational process that requires reflection on the part of the individuals towards the promotion of their autonomy, including the one related to sexual practices[30]. Therefore, answering correctly a question about a disease transmission does not guarantee that individuals take attitudes towards the prevention of such transmission. New researches addressing this real connection between acquisition of information and behavior change are necessary.

Another limitation of this study, which chose to follow the same cast of investigated diseases in PCAP, refers to the non-inclusion in the instrument of the research of two relevant and neglected STDs: Trichomoniasis and chlamydial infection. The prevalence of trichomoniasis reaches 10% in the general population and up to 60% among sex workers[31]. Chlamydia in Brazil has a prevalence of up to 35%, causing urethritis, cervicitis, Pelvic Inflammatory Disease (PID) and infertility[32]. However, such diseases are neglected by national and international agencies, because it is mistakenly believed harmless or minor. However, in addition to the mentioned damage, these pathologies are additional risk for the acquisition of other STDs, such as Aids and syphilis[31,32].

CONCLUSION

From the data and arguments presented in this study it is possible to conclude that the information about some diseases, which are broadly spread in the media and in public health campaigns, are incorporated by the participants of this survey. On the contrary, the other diseases that have not been a target of health education campaigns are linked to a high degree of participants' unfamiliarity.

The lack of information on the transmission, prevention and treatment of high prevalence diseases demonstrate both the situation of vulnerability of several people who participated in this research, and the lack of public investments in health education actions with a view to promote health and empowerment of the population. As far as STD/AIDS are concerned, many aspects brought up in this research help to understand the risk and vulnerability situations of many segments of the population.

However, the promotion of sexual rights is necessary, as well as understanding the possibilities of each person or group to protect themselves against HIV or other STDs are involved with different contexts of vulnerability. One cannot assume, therefore, there is a direct relationship between access to information and behaviors changes and contexts that would lead to the protection.

These results and discussions demonstrate the importance of both researches on the topic and health education, and can help to plan public policies and practices of professionals focused on sexuality and prevention of STDs with a view to achieving all STDs and all population strata. On the implications for the practice, the knowledge and discussions presented here demonstrate the significance of a proper approach of this theme by health professionals with a view to prevention and health promotion.

Conflict of interests

The authors declare no conflict of interests.

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Buschke-Löwenstein Tumor: report of three cases

Tumor de Buschke-Löwenstein: relato de três casos

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ABSTRACT
The Buschke-Löwenstein Tumor is a rare, sexually transmitted disease, triggered by human papillomavirus, specially the subtypes 6 and 11. It is characterized as a cauliflower-shape exophytic mass, slowly progressive, with high local recurrence rates and high infiltration. The main risk factor is immunosuppression. Surgical treatment is usually preferred, with or without adjuvant therapy. It has a great impact on the patients' life, impairing their life quality. We report three cases of Giant Condyloma with diverse histopathological findings with varying degrees of infiltration and papillomatosis.
Keywords: Buschke-Lowenstein tumor; Condylomata Acuminata; Papillomaviridae.

RESUMO
O tumor de Buschke-Löwenstein é uma doença rara, de transmissão sexual, associada ao papilomavírus humano, principalmente dos subtipos 6 e 11. Caracteriza-se como uma lesão exofítica, em forma de couve-flor, de progressão lenta, com alto poder de infiltração local. O seu principal fator de risco é a imunossupressão e o tratamento geralmente é cirúrgico, com ou sem terapias adjuvantes. O impacto na vida da paciente é grande, com altas taxas de recorrência após excisão cirúrgica. Relatamos 3 casos de condiloma gigante com achados histopatológicos diversos, com graus de infiltração e papilomatose variados.
Palavras-chave: Tumor de Buschke-Lowenstein; Condiloma acuminado; Papillomaviridae.

INTRODUCTION

The Buschke-Löwenstein Tumor (BLT) or Giant Condyloma was first described in 1925. It is a rare sexually transmitted disease associated with human papillomavirus (HPV), most commonly subtypes 6 and 11, observed in 90.0% of cases[1,2]. Incidence is about 0.1% in the general population, more common in underdeveloped countries, and men are the most affected (3:1). The average age of the emergence of the lesion is around 50 years[3].

The disease's pathogenesis and natural history are not well known, but it is characterized by slow development and progression of benign exophilic tumors, cauliflower-shaped, infiltrating locally and destroying the adjacent tissue. The tumor carries high recurrence rates after surgical excision (about 60.0%)[2,4]. The main risk factors are: poor hygiene, promiscuity, alcoholism, diabetes, chronic irritation, immunosuppression, and recurrent genital Condyloma[1,5].

The ideal treatment for BLT is still under discussion, since there is no consensus in the literature, mainly due to the rarity and lack of multicentered studies or randomized trials involving a significant number of participants. We report here cases of three patients with genital BLT and discuss its variable histopathological emergence and the difficulties of handling this rare and mutilating pathology.

CASES REPORT

Patient "A", 17 years old, single, nulliparous, menarche at the age of 15, without active sex life for three months, underwent liver transplantation for autoimmune hepatitis nearly three years. Tacrolimus, prednisone and warfarin were being administered. Patient showed condylomatous lesions in the vulva for approximately one year, when treatment was initiated with the application of trichloroacetic acid (ATA) 85.0%. Initially, the patient showed good response to the treatment, not returning to the service for five months. A lesion progression was observed during patient's return, associated with local bleeding and itching, and difficulty to be seated. Physical examination showed a Giant Condyloma in labia majora and pubic mound, sessile, painful at manipulation, with foul odor from the content, extending to the perianal region (Figure 1). A simple vulvectomy was carried out with good healing of surgical wound. Anatomopathology of the surgical piece was compatible with Condyloma (Figure 2). Patient developed new condylomatous lesions in the first six months, and administration of ATA 85.0% was held, causing the lesions to regress.

Patient "B", 27 years old, nulliparous, single, menarche at the age of 19, without active sex life for one year, in use of immunosuppressants due to kidney transplant about five years ago. Patient presents verrucous vulvar injury for about one year, with local pain at handling. On physical examination, multiple verrucous lesions in labia expanding from the supra-clitoral region to the perianal region were observed. The excision of the lesion with electric scalpel was carried out. Histopathological analysis of the surgical part confirmed the diagnosis of BLT (Figure 3). Patient evolved with good healing, without the emergence of new lesions in a period of six months.

Patient "C", 58 years old, multiparous, widow, no sex life for about four years, poorly compensated type 1 diabetic, and smoker. The verrucous lesion in vulva, of gradual increase, arouse about six years ago, associated with pruritus and local pain. Patient reported weight loss of 5 kg in one month and dysuria. The physical examination showed extensive condylomatous sessile damage, with a base expanding from the lower third of labia majora to perineal and perianal regions (Figure 4). A vulvectomy by skinning was carried out. Patient evolved with severe pain in the surgical wound, edema and drainage of serous and fetid secretion, removal of stitches with

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posterior dehiscence. Antibiotic therapy was initiated, followed by good wound healing after the second procedure. The histopathological result revealed vulvar Condyloma.

DISCUSSION

BLT is a rare clinical formation with a histological pattern similar to Condyloma Acuminata[2,6]. However, it shows a subtle difference in relation to the growth pattern, as it incorporates the adjacent stroma. This growth pattern results in local infiltration and destruction of surrounding tissue, requiring a more extensive resection.

Figure 1 – Giant Condyloma in pubic mound, labia majora and perianal region (Patient "A").

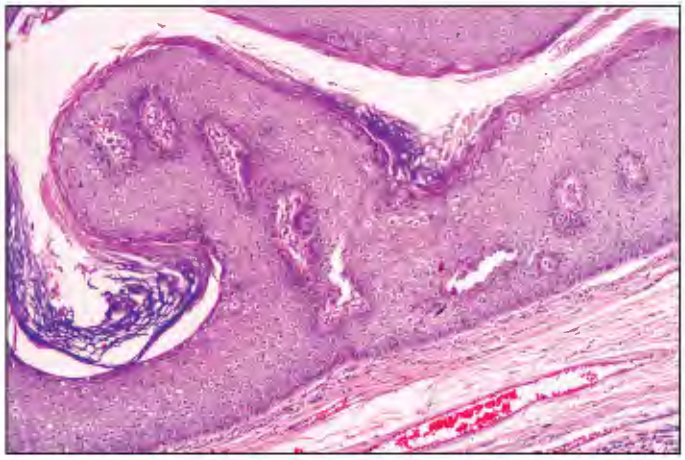

Figure 2 – Histopathology of Patient "A": Note endophytic growth of squamous epithelium and acanthosis (H & E; X40).

Figure 3 – Histopathology of Patient "A": Note condylomatous epithelial surface with koilocytes (H & E; X40).

Figure 4 – Giant Condyloma of the left lower third of the labia majora until perineal region (Patient "C").

One of BLT's features is the benign pattern that might progress to extensive papilomatous proliferation and infiltrate surrounding tissues if not properly treated[7]. It is estimated that 30.0–50.0% of the cases of Condyloma Acuminata have malignant transformation in Verrucous Carcinoma (VC) or squamous cell carcinoma after 5 years on average, but the increase of risk factors is not clear yet. There are no reports of remote metastasis[8,9].

Immunocompromised patients usually present multiple lesions and multiple HPV infections, and a careful examination is required to exclude high-grade coexistent lesion[2,6]. Two of the patients underwent transplants and presented the symptom for about one year. The third one (patient "C") was diabetic and a smoker, and referred to the progressive symptom for six years. All patients reported cessation of sexual activity since the emergence of the disease, local pain, and their extension to the perianal region. Patients showed negative serologies for sexually transmitted infections.

The expansive/infiltrating behavior observed on the histopathological examination is similar to that of well-differentiated VC, causing some controversy. VC is characterized by acanthosis and papillomatosis, such as in BLT, but does not show atypical or HPV-related lesions. It is typically associated with inflammatory diseases of the vulva or lichen simplex chronicus verrucosus. BLT, unlike VC, destroys underlying tissues due to papillary proliferative process compression, but without the growth pattern of classic infiltrating carcinoma[10,11]. One of the reported cases (patient "A") presented a more endophytic growth pattern, with less koilocytes when compared to the other two (patients "B" and "C"). This differentiation between BLT and VC can be difficult considering the histopathological study, as BLT is considered by some authors as an intermediate entity between Condyloma Acuminata and VC[1,9].

The need for a biopsy prior to the treatment is questioned, as most authors concluded that excision is the indicated treatment, not depending on the histological type. A regular follow-up is also important to evaluate the level of the lesion infiltration, both locally and systemically, in order to determine the best type of treatment. This evaluation should be performed during the preoperative period through Computed Tomography (CT) scans and/or Magnetic Resonance Imaging (MRI) of abdomen and pelvis[9,12].

The treatment of choice is usually surgical with a radical wound excision and free margins (20 mm), with or without adjuvant therapies. This treatment shows higher rates of success (53.0–91.0%) and lower risk of recurrence. The surgery may or may not be associated with chemotherapy[2,4,6]. Recent studies do not recommend radiotherapy for BLT, as it can generate the epithelium dedifferentiation[6]. Recurrent tumors usually present significant cytological anomalies and are classified as typical squamous carcinomas. Topical application of podophyllin is not indicated as there are no studies on the subject. The role of topical application of 5-fluoro-uracil is not well defined either, since it is related to poor results in cases of Giant Condyloma[7]. Imiquimod seems to be as effective as the surgical excision in initial anogenital lesions[13]. The three patients described in this study underwent surgical excision and there was no BLT recurrence following.

The overall impact in the life of the patient is huge, and could be avoided with vaccination against HPV. Many of these women end up hiding out due to shame and fear of a malignant disease. In addition, they must adapt to the lesion between their legs, relearning how to walk, sit and sleep[14]. Therefore, it is important to provide psychological support to these patients, in addition to a long-term follow-up maintenance in order to prevent, adequately treat recurrences, and avoid malignant transformation[7].

Conflict of interests

The authors declare no conflict of interests.

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