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Editorial

The importance of evidence-based and transparent communication to get trust towards vaccination programs

Vaccination programs represent a very effective (and cost-effective) tool for public health. Benefits of vaccination are witnessed by many success stories: smallpox has been eradicated; fight against polio is coming to an end; measles and rubella have been eliminated from the Americas and dramatically reduced all over the world; deadly diseases like tetanus and diphtheria have virtually disappeared in large areas of the world. Without any doubt, vaccination has been the major contributor — together with overall improvement of hygiene and life conditions, as well as effective use of antimicrobial drugs — to reduce the overall burden of infectious disease and to provide substantial economic growth in the world[1,2].

On the other hand, such large reduction of infectious disease burden has led in parallel to a significant reduction of awareness of the risks related to infectious diseases among the public. As a consequence of lack of awareness people adopt risky behaviors including refusing vaccination. Re-establishing the correct perception of risk related to infectious diseases compared to risk of adverse events caused by vaccination is a public health priority. But, how to achieve that?

It is common knowledge that in communication science 'one-size-fits-all' approach does not work; risk perception is very much related to local culture, historical traditions, even personal experience. However, few simple rules can be taken into account as a common ground to build effective communication, reset a correct risk perception and, consequently, restore people's trust in public health and vaccine prevention.

VACCINATION IS NOT A RELIGION. SCIENTISTS SHOULD NOT SAY THEY "BELIEVE IN VACCINATION"

Fideistic approach to vaccination is as counter-productive as vaccine scepticism. Modern vaccines as well as current vaccination strategies are the result of thorough scientific reasoning; scientific approach involves doubting, questioning, and challenging theories and paradigms. Vaccination champions that approach the public showing blind confidence towards vaccination and demonstrating complete absence of doubts on vaccines safety and effectiveness provide an immediate feeling of being either biased or affected by conflict of interest. Never say 'I believe in vaccination.' Much better "Evidence shows that protection provided by this vaccine is X%" or "Evidence shows that this adverse event is reported in X cases", etc.

PROVIDE EVIDENCE ON THE BENEFIT OF VACCINATION

There is a popular cliché circulating among the scientific community, according to which vaccines, besides clean water, are the most effective measures to reduce mortality[3]. It is hard to affirm that without providing a full picture of the contest where to apply that statement; it is, again, a sign of fideism more than science. In fact, that statement can be referred either to the past or to specific settings in the developing world where it is still completely true; on the contrary, someone can argue that today in the developed countries the highest impact on people's mortality could be achieved by fighting obesity and promoting healthy lifestyle. Exaggerating the impact of vaccines can provoke immediate reaction to disprove such absolute statements. Moreover, the real impact of vaccine is so evident that there is no need for exaggeration. Showing historical trends of infectious diseases targeted by vaccination can be a good option. In addition, strong evidence can be provided on potential impact of newly introduced vaccines on the burden of diseases showing effectiveness data — if available — and possibly good modelling studies.

VACCINES, LIKE ANY OTHER DRUG, CAN ELICIT ADVERSE EVENTS

Being asked 'Vaccines are safe?' the answer should be 'Vaccines on the market have a very good safety profile', or alike. Nobody can say 'vaccines are safe' without provoking strong reactions by anti-vaccine activists listing all vaccine accidents reported during the history of vaccination[4-6]. Adverse events are a natural companion of any therapeutic or preventive measure; on the other hand, we all know that safety assessment of vaccines is carried out very carefully using all available methodological and analytical tools and vaccines are marketed only after evidence of good safety profile[7]. Risk-benefit ratio is always favorable when vaccines receive marketing authorization. Then, transparent communication should include risk-benefit analysis, safety profile, but also information on known adverse reactions and uncertainties on unknown, possible, rare adverse events that might be revealed by the means of post-marketing surveillance.

DO NOT BE AFRAID TO SHOW UNCERTAINTIES

Communicating uncertainties is a complex skill. While communicating on vaccine safety and effectiveness of 'old' vaccines is fairly easy, as we can support our communication with a large amount of evidence provided by long experience, on the other hand we must be careful when talking about newly introduced vaccines. Implementation of a new vaccination program is supported by pre-marketing studies that can be variously extensive, but data on effectiveness are usually scarce and very rare adverse events cannot be ruled out. In such case, public health decision

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on starting a vaccination program is based on the best available evidence, but needs to be further supported by active monitoring of both effectiveness (impact studies) and safety. Post-marketing monitoring is integral part of the vaccine lifecycle and is gaining more importance today when technology is providing public health with more vaccines in a shorter development period. Transparent communication about the available evidence on vaccine benefits is the best way to gain people's trust. On the other hand, acknowledging the level of uncertainties should be followed by an effective monitoring plan aimed at filling the knowledge gaps in a reasonable timeframe[8].

RULE OUT ANY POTENTIAL CONFLICT OF INTEREST

Conspiracy theories are one of the strongest arguments of anti-vaccine activists. Conflict of interest is the best fuel for conspiracy theories. In the past, most of the vaccine production was in the hands of governmental agencies; the societal benefit of vaccination was evident to everybody and conflict of interest was not a major issue. Nowadays, vaccine production is in the hands of few large multinational companies that are, in fact, partners of government in the implementation of priority vaccination strategies. Such proximity between public health officials and vaccine producers must be carefully managed with the only purpose to serve the public good. In addition, there is the paradoxical situation that the best experts in vaccines are those that carried out vaccine research, including vaccine trials sponsored by the industry. In such case, transparency and clear declaration of potential conflict of interest is paramount. Those scientists, more than others, should be extremely careful in communicating the benefit of this or that vaccine and should make an extraordinary effort to mitigate the enthusiasm caused by a positive vaccine trial; to be on the safe side, their communication should be as much as possible limited to the scientific community. Public health agencies should use the precious advice of those experts in a transparent framework of collaboration, always assuring independency.

FINAL CONSIDERATIONS

Understanding the determinants of vaccine acceptance is paramount for the success of any vaccination strategy. A model recently developed by the WHO Strategic Advisory Group of Experts (SAGE) working group dealing with vaccine hesitancy shows how complex this problem is[9]. Nevertheless, it is clear that trust in health care providers and good understanding of risk/benefits are important components of the model.

Today, much more than in the past, people's short memory for what the situation was in the pre-vaccine era requires extra efforts in terms of health education and communication. Triumphalist messages, lack of transparency, suspect of conflict of interest are the worst enemies of effective communication. Basing communication on the best available evidence is the only solution to gain people's trust. To achieve that, very good monitoring systems should be put in place to assess safety, effectiveness and impact of vaccines in the post-marketing phase.

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Hepatic changes in abortions and infants from HIV-positive mothers

Alterações hepáticas de abortos e lactentes de mães com HIV

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ABSTRACT

Introduction: There are a few works in the literature concerning pathological and anatomical alterations of hepatic lesions in necropsies of aborts, stillbirths and children from HIV-positive mothers. **Objective:** To report pathological and anathomical hepatic alterations in fetus and infants from HIV-positive mothers, correlating them with HIV infections, etiologic agents of opportunistic infections and drugs used in different treatments. **Methods:** necropsy material from 15 children and 5 aborts was obtained from the Department of Pathology, Hospital Universitário Antônio Pedro, Fluminense Federal University, from 1986 to 2007. Aborts, stillbirths and children definitions followed World Health Organization criteria. Macro- and microscopic studies were performed after parafin inclusion with hematoxilin-eosin and other methods (periodic acid-Shiff, reticulin, Gomory's trichrome, silver methenamine, and Sudan stains). All necropsies were completed. **Results:** Results showed macroscopic changes in 13 cases, at least in one category, and microscopic changes compatible with esteatosis in 12 cases, necrosis in 7 cases, and colestasis in 4 children and stillbirths. Out of five abortions, two were due to mothers using zidovudina. All patients showed opportunistic infection. **Conclusion:** Macroscopic and microscopic hepatic changes are important in these patients and may not be related to the high frequency of the opportunistic infections. This study will provide subsidies for understanding the pathogenesis of hepatic problems caused by HIV virus, opportunistic agents and drugs used in therapy.

Keywords: HIV, opportunistic infections, antiretroviral treatment, hepatic changes, infants.

RESUMO

Introdução: São poucos os trabalhos relacionados à investigação das alterações anatomopatológicas das lesões hepáticas em necropsias de abortos, natimortos e crianças procedentes de mães HIV positivas. **Objetivo:** Descrever as alterações hepáticas em fetos e lactentes procedentes de mães HIV positivas, sob o ponto de vista anatomopatológico, correlacionando-as ao HIV, aos agentes etiológicos causadores de infecções oportunistas e às drogas utilizadas nos diferentes esquemas terapêuticos. **Métodos:** O material utilizado foi proveniente de 15 necropsias de crianças e 5 abortos realizadas pelo Serviço de Anatomia Patológica do Hospital Universitário Antônio Pedro, da Universidade Federal Fluminense, no período de 1986 a 2007. As definições de aborto e lactentes seguem os critérios adotados pela Organização Mundial da Saúde. Foram realizados estudos macroscópicos e microscópicos de fígado, após inclusão em parafina utilizando os corantes hematoxilina e eosina e outros métodos de coloração especial (ácido periódico de Schiff, reticulina, trinômio de Gomory, prata metanamina e Sudan). As necropsias foram completas. **Resultados:** Foram observadas alterações macroscópicas em 13 casos, em pelo menos um critério, alterações microscópicas compatíveis com esteatose foram observadas em 12, necrose em 7 e colestase em 4 das crianças e natimortos. Dos cinco casos de abortos, dois foram procedentes de mães em tratamento com zidovudina. Todos apresentaram agentes de infecções oportunistas. **Conclusão:** As alterações hepáticas macroscópicas e microscópicas são importantes nesses pacientes, e parecem não estar relacionadas à alta frequência de infecções oportunistas. Este estudo fornecerá subsídios para a compreensão da patogenia dos acometimentos hepáticos causados pelo vírus HIV, agentes oportunistas e drogas utilizadas na terapia.

Palavras-chave: HIV, infecções oportunistas, tratamento antirretroviral, alterações hepáticas, lactentes.

INTRODUCTION

The liver is the largest organ in the abdominal cavity and acts both as exocrine gland (releasing secretions) and as endocrine (releasing substances in the blood and lymph system), playing important functions in the sustaining of life, such as participation in the metabolism of carbohydrates (blood glucose control), lipids and proteins, in the processes of synthesis, degradation, detoxification, excretion of substances, conversion of ammonia to urea synthesis and the majority of plasma proteins synthesis[1].

Other liver functions consist in the storage of vitamins (A, B_{12}, D, E and K), and minerals (iron and copper) and in the regulation of blood volume, having significant antitoxic action against harmful substances to the organism, such as caffeine and alcohol, and in the processing of drugs[2,3].

The liver tissue, in theory, is not an organ by which the human immunodeficiency virus (HIV) has a predilection, as have for other organs and cells, however, in the early stage of HIV infection, the epatocytes are infected and become reservoirs of the virus, allowing its dissemination, with consequent development of acquired immunodeficiency syndrome (AIDS). We know that the presence of HIV in the liver causes minimal effects in healthy individuals, but in immunocompromised, opportunistic infections and cancers, as well as the induction of lesions by anti-retroviral drugs, cause the most diverse symptoms and signs of aggression[4,5].

There are few reports of liver abnormalities in HIV positive children in the literature. Few studies have shown that the liver of patients exhibits a broad spectrum of histologic similarity to those found in adults changes. Morphological abnormalities of injuries vary by specific opportunistic infections to malignancies. Other lesions, although not specific, are probably related to immunosuppression or HIV positive host or iatrogenic causes[6].

Few works have a non-specificity of histological findings including focal necrosis, portal lymphocytic infiltration, hyperplasia of Kupffer cells and hepatic steatosis[7,8]. The significance of steatosis does not seem to be related to the use of antiretroviral drugs used in the therapeutic regimen, but rather to malnutrition and infection.

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Some authors suggest that of the histological alterations, the macrovesicular steatosis is the most common microscopic finding in the liver of HIV positive children[6,7].

Other inducer of hepatic injury is the presence of infections by opportunistic agents, being the most common in HIV positive patients: presence of tubercle bacilli (*mycobaccterium tuberculosis, mycobacterium avium intracellulare*), fungi (*Cryptococcus neoformans, Histoplasma capsulatum*) and viruses (*cytomegalovirus, mainly*). Viriyavejakul P *et al*.[7], through the study of 117 necropsies of adult HIV-positive patients, observed opportunistic infections in 47% of cases, cryptococcosis, tuberculosis and cytomegalovirus in 21.4; 16.2 and 5.1%, respectively. The authors call attention to the absence of hepatic pathological changes in the infection by *cryptococcus neoformans*.

Viriyavejakul *et al*.[9] found the presence of severe hepatotoxicity, liver failure or exacerbation of the different hepatitis viruses in co-infected HIV positive in 755 patients. In this work was observed a direct correlation between increased alanine aminotransferase and increased T $CD4^+$ cells counted in patients with severe hepatotoxicity, as well as a higher incidence of severe liver injury after antiretroviral treatment.

In hepatic histological alterations induced by the use of zidovudine in HIV positive patients, we observe the occurrence of intracellular edema, degeneration of vacuolar and fat microvacuolar with homogeneous distribution by the hepatic lobules. These lesions were progressively larger as the treatment time extention[10].

Now the effects of antiretroviral Indinavir were evaluated in a study on pregnant test subjects, which showed that, according to the dose of the drug, the epatocytes showed heterocromados cores, and some fatty infiltration, congestion of the sinusoids and portal swelling[11].

All the inhibitors of reverse transcriptase nucleoside analogues (abacavir, didanosine, lamivudine, stavudine and zidovudine) cross the human placenta, reaching levels similar to those observed in umbilical cord and maternal blood at first reach the liver parenchyma[12]. From the observations of the aforementioned study and others[13-15], the review of autopsies of abortions from HIV positive mothers became important research with respect to antiretroviral therapy in these patients and its implications in the analysis of factors related to vertical transmission, and emphasize the effectiveness of certain interventions to decrease of the incidence of vertical transmission, such as maternal antiretroviral therapy in breastfeeding populations and early cessation of breastfeeding[15-17].

Viral diseases transmitted by sexual contact are a serious public health problem worldwide. We must remember that pregnancy does not confer immunity against these diseases, instead, they are most prevalent during pregnancy. The immune system during pregnancy is altered, so infections are a major risk to both mother and fetus. It is essential we take into consideration the potential for vertical transmission from infected mothers, for transmission to the fetus or newborn occurs during the prenatal period (through the placenta), intranatal (contact with blood and secretions) and postnatal (via lactation)[16,17].

As important as the maternal risk is the potential impact that these diseases have on the development of pregnancy, not infrequently resulting on miscarriage, fetal death in utero and premature birth, among other complications for both mother and fetus.

Some authors have reported the importance of amniocentesis and breastfeeding on vertical transmission, and suggest that race and Rh blood factor type may be genetic markers of the susceptibility to infection[18].

In a study in which 51 placentas from HIV positive mothers treated with zidovudine, nevirapine and untreated were evaluated and compared, there were no significant gross lesions and no significant decreases were found in the dimensions of the placental disc. The mot commonly found inflammatory lesion was corionamnionite and noninflammatory was cytotrophoblastic hyperplasia[19]. Currently, it is assumed that deaths from HIV have decreased as well as deaths from opportunistic infections. On the other hand, there was an increase in the number of deaths unrelated to HIV disease such as liver, heart and kidney diseases[20].

Just as there are few studies addressing the pathological changes in HIV positive children, little is known about miscarriages or studies with stillbirths of HIV positive mothers. Given the difficulty in finding reports in the literature on the subject, this work had as its general objective to describe, from the anatomopathological point of view, the hepatic alterations in necropsies of abortions and stillbirths coming of HIV-positive mothers and children with AIDS.

OBJECTIVE

We have aimed to: register hepatic lesions from the point of view of macro and microscopic; correlate the hepatic changes to infection by HIV or their respectives opportunistic agents; examine the relation between the drugs used in different therapeutic regimens with hepatic changes; and correlate hepatic abnormalities found in autopsies of HIV positive children with abortions from HIV positive mothers.

METHODS

A retrospective study was performed in 15 autopsies of livers coming from HIV positive children and 5 autopsies of abortions from HIV positive mothers were performed at the Department of Pathology, at the Hospital Universitario Antonio Pedro (HUAP), at the Universidade Federal Fluminense, in the period of 1986 to 2007.

The material selection was made from clinical and laboratorial data obtained from medical records in the hospital archives. The macroscopic study of the liver was obtained from autopsy findings, including photographical documentation. The microscopic analysis was performed after selection of slides stained with hematoxylin-eosin and other special staining techniques filed in the Department of Pathology, HUAP.

Clinical and laboratory diagnosis

The definition of AIDS cases is based on clinical and laboratorial data. Clinically, it is based on the diagnostic criteria according to the standards of the Centers for Disease Control (CDC)[21] for the evaluation of HIV infection in children (**Tables 1 and 2**).

The child is considered HIV infected if:

1. Has less than 18 months old, is seropositive for HIV or child of a HIV-positive mother, with positive results in two samples (excluding cord blood) of at least one of the following tests: culture for HIV, Polymerase chain reaction (PCR) to HIV[22], p24 antigen; or
2. Meets the diagnostic criteria for AIDS by the case definition of the CDC 1987[23], namely:
   - Age greater than or equal to 18 months old and HIV positive mother or acquired HIV through blood products or have other form of transmission known (eg., Sexual contact). Also, are seropositive for HIV, with confirmation by repeated enzyme immunoassays and confirmatory test (*Western blot* or immunofluorescence); or
   - Meets any of the criteria described in Section 1.

Asymptomatic children and who do not obey the diagnostic criteria for HIV infection were classified as:

a) With perinatal exposure (E): younger than 18 months old HIV-seropositive, asymptomatic, do not meet the above criteria for HIV infection;
b) Seroconverter (SR): if the child born to HIV-infected mother is HIV positive, that is, two or more negative enzyme immunoassays (ELISA test) between 18 months or a negative test after 18 months, with no other laboratory evidence of infection symptoms of HIV or AIDS.

Necropsies

The autopsies were complete. After the macroscopic study, the material was fixed in a formol solution at 10%, and subsequently the fragments received the usual histological processing until the paraffin embedding.

The prepared paraffin blocks were cut with a five microns thickness and the slides were prepared for routine staining with hematoxylin-eosin.

Other special methods of staining were used for microscopic analysis of liver changes: periodic acid-Schiff (PAS), reticulin, Gomori trichrome, methenamine silver and Sudan.

RESULTS

The main macroscopic and microscopic changes observed in liver tissue obtained from pediatric autopsies performed in HIV positive patients are summarized in **Tables 3 and 4**, respectively.

The opportunistic infection associated with HIV more prevalent among the cases studied was the Cytomegalovirus (CMV disease), been observed in all 15 postmortem cases evaluated. Then, histoplasmosis was found in 2 of 15 cases and finally tuberculosis in only one case (**Table 5**).

Five autopsies of abortions from HIV positive mothers, in which was reported the clinical and histopathologic analysis of each case (**Table 6**) were performed. Of the five cases evaluated, three were from HIV positive mothers. In one case (Case 2) with ongoing clinical diagnosis of AIDS, cytomegalovirus, accompanied by severe steatosis was observed. In another case (Case 4), the mother was HIV positive in retroviral treatment for two months, and hospitalized for toxinemia. The histopathological analysis of this case showed the presence of cholestasis. In the last case (Case 5) of HIV positive mother investigated, a evidence of steatosis, cholestasis and hepatitis was observed.

The **Figure 1** portrays the main hepatic microscopic changes found in 1 of 15 cases studied of autopsy from HIV-positive infants. Loss of lobular structure (**Figure 1A**) in presence of vacuoles (**Figures 1B and 1G**) was observed deflecting the core to the periphery of the cell and increased cell volume (**Figure 1B**); Cholestasis was

Table 1 – Classification of pediatric AIDS, modified of Centers for Disease Control and Prevention[21]

Immunodepression	Clinical categories			
	N = no symptoms	A = mild symptoms*	B = moderate symptoms#	C = severe symptoms&
1. Absent	N1	A1	B1	C1
2. Moderate	N2	A2	B2	C2
3. Severe	N3	A3	B3	C3

*Category A: lymphadenopathy, hepatosplenomegaly, dermatitis, parotid gland enlargement, recurrent upper respiratory infection; #Category B: anemia, neutropenia or thrombocytopenia for more than 30 days, meningitis, pneumonia or sepsis (single episode), oral candidiasis for more than two months in children older than six months, cardiomyopathy, chronic or recurrent diarrhea, hepatitis, stomatitis herpetic (more than one dermatome), nephropathy, norcadiose, fever for more than a month, disseminated varicella, toxoplasmosis, HSV or CMV under one month of age; &Category C: Children with any of AIDS defining illnesses.

Table 2 – Immunodepression associated with levels of CD4, Centers for Disease Control and Prevention[22]

Immunodepression	< 12 months old		1–5 years old		6–12 years old	
	CD4		CD4		CD4	
	Total	%	Total	%	Total	%
1. Absent	> 1500	> 25	> 1000	> 25	> 500	> 25
2. Moderate	750–1499	15–24	500–999	15–24	200–499	15–24
3. Severe	< 750	< 15	< 500	< 15	< 200	< 15

Table 3 – Macroscopic alterations found in the anatomopathological study of the liver of pediatric autopsies in HIV positive patients (n = 15)

Parameters	Macroscopic alterations
Weight	Variation of 76 to 1300 g in the 15 cases
Limits	Exceeding 2 to 9 cm the Border Costal Law in 12 cases, being found a mean of 9 cm
Color	Brownish staining in 14; wine stain in 3; yellowish areas in 12
Capsule	Smooth, bright and transparent in 15 cases
Cut surface	Same coloration of the outer surface in 15, 14 cases of smooth surface and 1 with tiny granulations. Focal area of necrosis with diffuse distribution in 1 case
Consistency	Normal in 7 cases; increased in 2; decreased in 3

Table 4 – Microscopic changes found in the pathologic examination of the liver in pediatric autopsies in HIV positive patients (n = 15)

Parameters	Microscopic alterations
Lobular structure	- Preserved in 8 cases - Altered in 3, one with fibrosis determining nodes and one with multifocal areas of necrosis
Gross cytoplasmic vacuolization	- Present in 13 cases
Hepatocyte necrosis	- Present in 7 cases
Intracellular cholestasis	- Present in 4 cases
Inflammatory infiltrate: location	- Periductal in 1 case - Intralobular in 13 cases - Reaching the liver parenchyma in 1 case - Portal in 6 cases
Inflammatory infiltrate: predominance	- Mononuclear with lymphocyte predominance in 7 cases - Neutrophilic in 5 cases
Kupffer cells	- In 6 cases hyperplastic - Standard 5 cases
Portal space	- Displays necrosis in 1 case - Absence of influx in 1 case - Influx predominantly neutrophilic inflammation in 4 cases
Capsule	**- Areas with inflammatory influx in 5 cases** **- Necrosis in 3 cases**

Table 5 – Opportunistic infections associated with HIV in pediatric necropsies

Opportunistic infections	
Histoplasmosis	2 of 15 cases
Cytomegalic cell disease	15 of 15 cases
Tuberculosis	1 of 15 cases

Table 6 – Necropsies of coming abortions of HIV-positive mothers (n = 5)

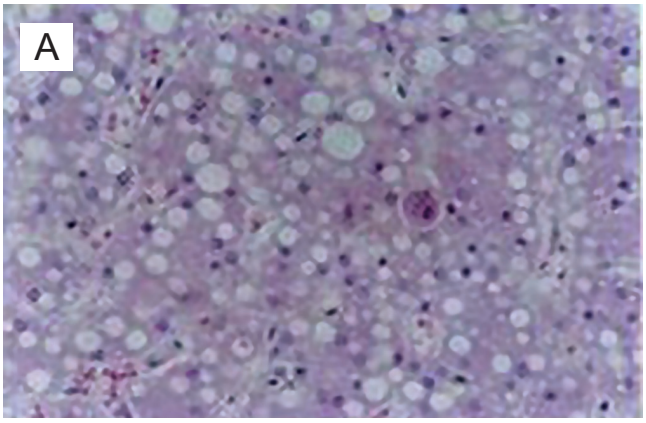
Case	Histopathological analysis
Case 1 (F93.32)	Hepatocytes preserved. Lobular structure preserved. Nuclear vacuolization. Sinusoidal congestion and lobular vein center.
Case 2 (F96.011)	Liver showing intense steatosis, lobular loss of structure. Microvacuolization with core shifted to the periphery. In areas, presence of increased cell size and with clear halo and basophilic intranuclear inclusion. AF occupying the space around the portal vein, being mononuclear. Kupffer cells hypertrophied, congested sinusoids and Disse space invaded by AF. Capsule thickened with mild AF.
Caso 3 (F96.140)	Advanced degree of autolysis.
Caso 4 (F04.32)	Loss of lobular structure. Cholestasis. Hepatocytes autolysed by the advanced degree of fetal maceration. Kupffer cell hypertrophy. Loss of lobular structure. Cholestasis. Hepatocytes autolysed by the advanced degree of fetal maceration. Kupffer cell hypertrophy. Portal space with mononuclear inflammatory influx and marked degree of fibrosis with mononuclear cell influx and marked degree of fibrosis.
Caso 5 (F07.04)	Capsule thickened with increased cellularity with some lymphocytes. The liver parenchyma shows hepatocytes with large cytoplasmic vacuoles deflecting the core to the periphery of the cell. Call further attention, multiple focal areas of lymphocytic inflammatory influx. Sometimes we observed the presence in the cytoplasm of hepatocytes of fine-grained greenish-brown (cholestasis). Massive steatosis, cholestasis and hepatitis.

AF: inflammatory influx.

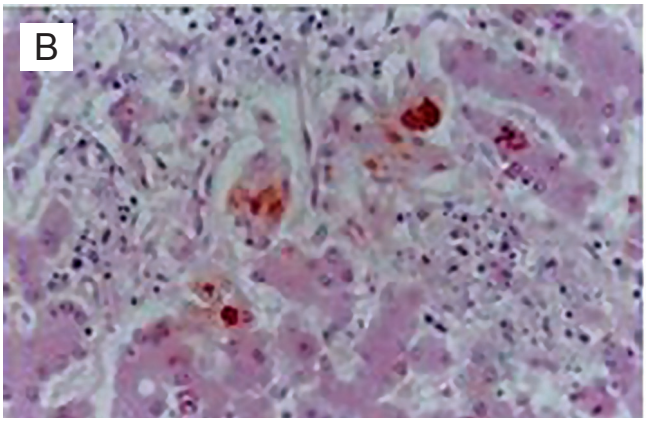
evident (**Figure 1C**), necrotic areas (**Figures 1D and 1E**) with apoptotic cells and presence of numerous *Histoplasma capsulatum* in hepatic parenchyma (**Figures 1D, 1F and 1H**).

The **Figure 2** shows hepatic microscopy of one of the five cases of abortion. In **Figure 2A** the presence of cytomegalovirus cells were observed; in the **Figure 2B** in the focal area of hepatic necrosis has the presence of intense inflammatory influx; and **Figure 2C** there are hepatocytes with intracytoplasmic and intranuclear microvacuolization.

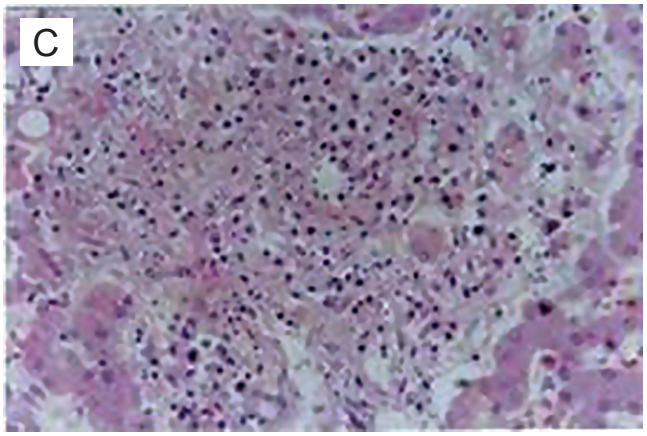
The main macroscopic changes found in the liver of autopsy from HIV positive infants in relation to color are: steatosis, areas of necrosis, cholestasis and the presence of opportunistic infections (**Graphs 1 to 5**). The **Graph 1** shows the macroscopic changes in the liver of autopsy from HIV positive children compared to staining in the 15 cases studied, revealing brownish staining in 14, wine in 3 and yellowish areas in 12 of all cases studied. The results reveal macroscopic changes in 13 cases, in at least one category, and microscopic changes consistent with steatosis in 12 of 15 cases (**Graph 2**). It was evidence the presence of cholestasis in 4 children and stillbirths in the 15 cases studied (**Graph 2**) and areas of necrosis in 7 cases (**Graph 3**). Of the five cases of abortions, two were due to the use of zidovudine by mothers. The opportunistic infections associated with HIV in pediatric autopsies most



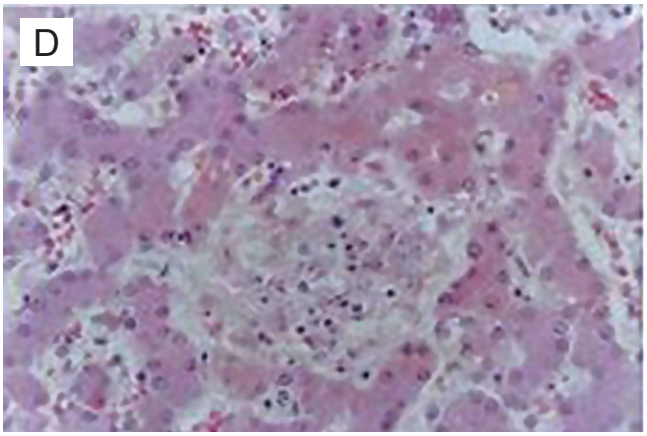
(A) (F95.147) Liver microscopy. Hepatocytes with large vacuoles deflecting the core to the periphery of the cell. Increased cell volume and with intranuclear inclusion circled with a clear halo – HE (40x).



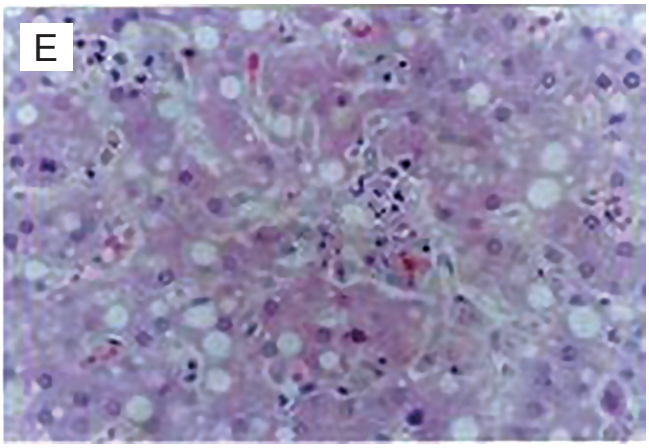
(B) (F95.147) Liver microscopy. Intracellular and intracanalicular cholestasis. Door space with discrete mononuclear influx. lobular necrosis – HE (40x).



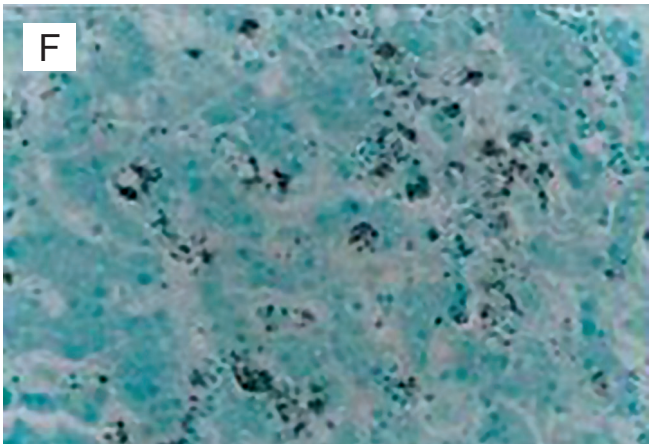
(C) (F95.147) Liver microscopy. Extensive area of periportal necrosis with numerous *histoplasma capsulatum* – HE (40x)



(D) (F95.147) Liver microscopy. Area of lobular necrosis with moderate mononuclear influx. Numerous histoplasmas – HE (40x)



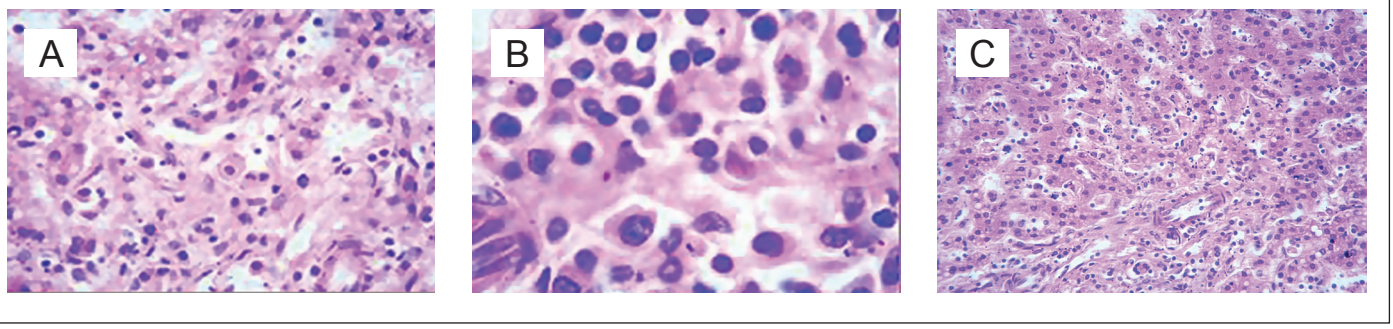
(E) (F95.147) Liver microscopy. Hepatocytes with intra cytoplasmic vacuoles and intranuclear – HE (40x)



(F) (F95.147) Liver microscopy. Hepatic parenchyma showing numerous histoplasmas capsulatum in the cytoplasm of hepatocytes and Kupffer cells - Silver (40x)

**Representation of 1 child of 15 cases.*

Figure 1 – Photographic documentation of hepatic microscopic alterations in child.



(A) (F96.11) Liver microscopy. Disorganization of the lobular structure. Presence of mononuclear cell influx and hepatocytes showing intracytoplasmic vacuolization with deviation from the core to the periphery of the cell. Presence of increased cell volume with basophilic nucleus and perinuclear halo (cytomegalovirus cell) (40x)

(B) (F96.11) Liver microscopy. Focal area of hepatic necrosis with presence of intense inflammatory mononuclear influx (100x)

(C) (F96.11) Liver microscopy. Hepatic parenchyma showing hepatocytes with intranuclear and intracytoplasmic microvacuolization. Door space with discrete mononuclear influx (20x)

**Representation of 1 of 5 cases of abortion.*

Figure 2 – Photographic documentation of hepatic microscopic alterations in abortion.

frequently observed in this study correspond to cytomegalovirus infection, observed in 100% of the 15 cases analyzed, followed by histoplasmosis (13%, n = 2) and tuberculosis (6%, n = 1) (**Table 5 and Graph 5**).

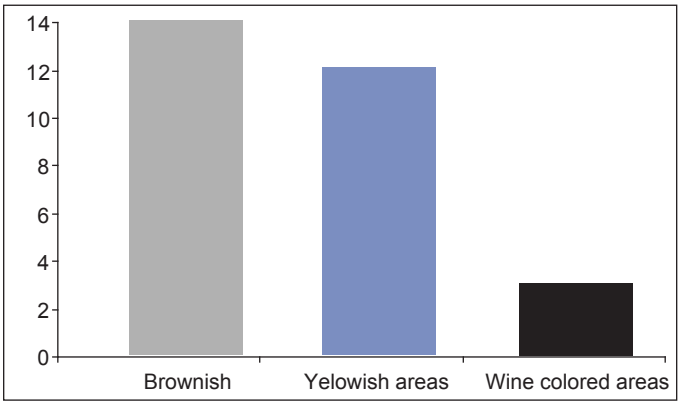
DISCUSSION

Regarding the liver biopsy performed with the aim of clarifying the liver injury, one of the cases studied (n = 15) showed changes consistent with hepatitis whose finding of cytomegalovirus cell enables a conclusive diagnosis of cytomegalovirus hepatitis. This paper draws attention to the usefulness of liver biopsy in clinical suspicion of opportunistic infection.

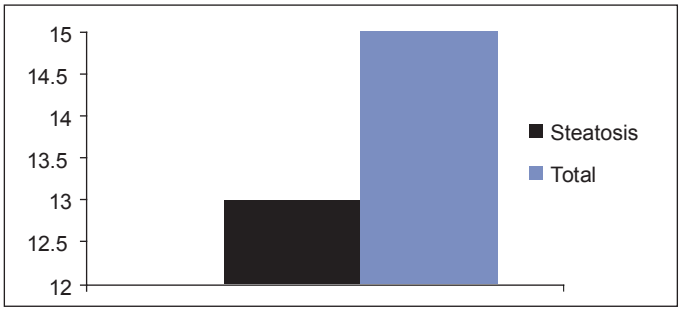
Of the 15 cases studied, only one case of HIV associated to the cytomegalovirus progressed to cirrhosis in a patient not treated with CD4 cells counts below 200 cells/uL.

There are reports in the literature in which, of the histological changes, the macrovesicular steatosis is the most common microscopic finding in the liver of HIV positive infants[2,3]. The steatosis does not seem to be related to the use of antiretroviral drugs used in the therapeutic regimen, but malnutrition and infection. The pathological changes found in the studied cases are not specifically related to HIV, but the opportunistic infections that attacked these immunocompromised patients.

The recent researches on HIV indicate the possible use of the PCR technique due to its higher sensitivity and speed in the detection of viral DNA compared to *in situ* hybridization[20]. Mainly due to its efficiency, both in the analysis of viral DNA as in the active and latent infection[19]. The detection by immunohistochemistry is jeopardized when the protein expression is low or when the protein is exported from the cell quickly. Other authors[4,11-13] highlight the importance of assessing the necropsies of abortions from HIV-positive mothers in the research related to antiretroviral



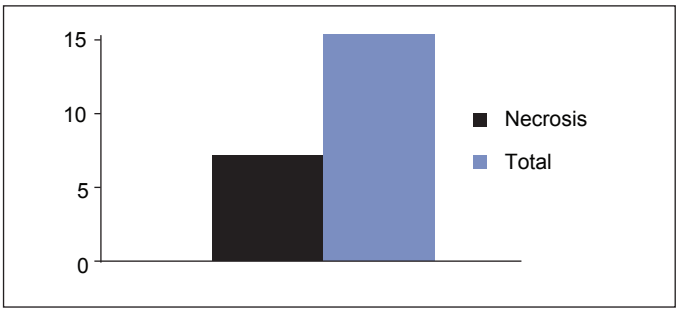
Graph 1 – Macroscopic liver alterations of autopsy from HIV positive infants in relation to staining (n = 15).



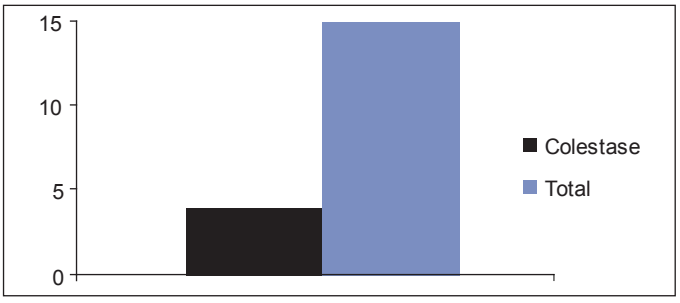
Graph 2 – Macroscopic liver alterations of autopsy from HIV positive infants regarding the presence of steatosis (n = 15).

therapy in these patients, their implications and in the analysis of factors related to vertical transmission.

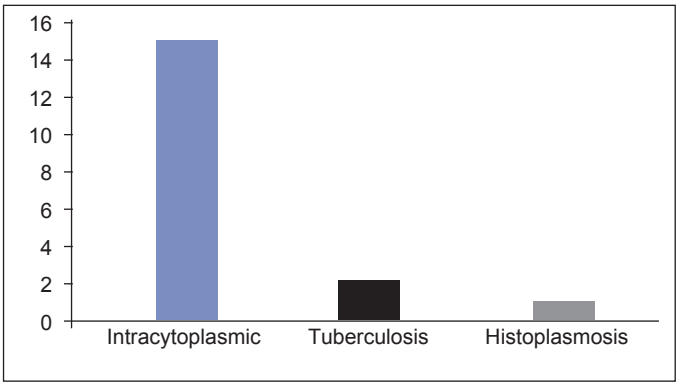
Of the five cases of abortions examined, two were from mothers treated with zidovudine. According Mofenson *et al.*[15], the risks of



Graph 3 – Macroscopic liver alterations of autopsy from HIV positive infants regarding the presence of necrosis (n = 15).



Graph 4 – Macroscopic liver alterations of autopsy from HIV positive infants regarding the presence of cholestasis (n = 15).



Graph 5 – Opportunistic infections associated with HIV in necropsies of infants (n = 15).

perinatal transmission are associated with decreased counts of T CD4+ lymphocytes, of the maternal anti-HIV p24 antibodies and an increase in viral load. In one case studied, the viral load ranged from 65 thousand copies at 22 weeks of gestation with a lower number than the minimum limit (<80 copies) one month after the abortion. For the author, the occurrence of chorioamnionitis increases the risk of vertical transmission, and this change was present in one of our cases to the examination of the placenta.

Among the cases of abortions studied, two patients tested negative during prenatal care for Toxoplasma infection goondi (*T. goondi*). However, in patients followed during the prenatal care that have evolved into abortion at 30 weeks of gestation, the pathological examination of the fetus and placenta revealed the presence of infection by *T. goondi*, this being responsible for the death of the fetus and the interruption of pregnancy. In another case study, although it was not a case of aboirtion, during the prenatal the mother also had undetectable rates for infection with *T. goondi*, however, the puerperium neonatal monitoring revealed chorioretinitis with scar in the left eye in the macular region and congenital toxoplasmosis with intracranial calcifications on computed tomography. The placental examination of this patient showed diffuse villitis with formation of giant cells suggestive of infection by *T. goondi*.

The above observations show that the routine prenatal currently used for HIV positive pregnant women may not be efficient for the detection of toxoplasmosis, which can be reactivated in these women when immunosuppressed or not. Thus, you may need to suggest a new routine prenatal in the screening of congenital infections in HIV positive pregnant women because of the serological altered results in the presence of immunosuppression.

CONCLUSION

The hepatic alterations observed were: brownish and yellowish color, reduced consistency and increased size; the most frequent microscopic encountered was hepatic steatosis; the most prevalent opportunistic infections were cytomegalovirus, followed by histoplasmosis; the hepatic pathological changes found are not specific for HIV.

Conflict of interests

The authors declared no conflict of interests.

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Congenital syphilis neonatal alterations in a university hospital in Niterói - RJ

Alterações neonatais de sífilis congênita em um hospital universitário do município de Niterói, Rio de Janeiro

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ABSTRACT

Introduction: Syphilis is a sexually transmitted disease caused due to bacterium *Treponema pallidum.* The prevalence of this infection decreased significantly by the use of penicillin, but it is observed that it reappears particularly in cases of congenital syphilis (CS). **Objective:** to describe the effects of neonatal CS in newborns (NB) in a public hospital in Niterói - RJ, from January 2005 to June 2006 and to observe the birth weight and serology of newborns with CS notification. The purpose of this study is also to describe the CS treatment in each case. **Methods:** a sample of 35 CS notifications was recorded from the Center for Hospital Surveillance at the Antonio Pedro University Hospital (HUAP), Niterói - RJ, from January 2005 to June 2006. Data from the notifications was used and home visit was done to collect blood samples. **Results:** the study population is comprised of 29 live birth patients, four miscarriages and two stillbirths. Only two cases (6.9%) had evidence of CS bone abnormalities. The VDRL test performed in cerebrospinal fluid (CSF) of the cases proved to be non-reactive for all patients. VDRL serum of newborns at birth was positive for 23 (79.31 %) patients. The crystalline penicillin G was administered in 26 (89.65 % cases,) procaine penicillin G in two (6.9%) and for one individual both crystalline penicillin G and procaine penicillin G was used. **Conclusion:** fetal death and abortion were the most ominous outcome and impact of CS. Long bones alterations were scarcely found in few samples. Low birth weight was observed in a few cases. CSF VDRL was not reactive in all cases. The use of several antibiotic regimens was in disagreement with the proposed protocol issued by the Ministry of Health.

Keywords: congenital syphilis, treatment outcome, penicillin, VDRL antigen.

RESUMO

Introdução: A prevalência da infecção pelo *Treponema pallidum* diminuiu sensivelmente com a penicilina, porém se observa tendência mundial no recrudescimento da sífilis, em particular dos casos de sífilis congênita (SC). **Objetivos:** Descrever as repercussões neonatais da SC nos recém-nascidos (RN) notificados como caso de SC em um hospital público de Niterói, Rio de Janeiro, no período de janeiro de 2005 a junho de 2006; observar o peso ao nascer e a sorologia dos RN com notificação de SC; descrever o tratamento dos casos de SC. **Métodos:** Amostra constituída de 35 fichas de notificação de SC do Centro de Vigilância Hospitalar do Hospital Universitário Antônio Pedro (HUAP). Utilizaram-se dados da notificação e realizou-se visita domiciliar para coleta de sangue. **Resultados:** A população foi constituída por 29 pacientes nascidos vivos, 4 nascidos mortos e 2 abortamentos. Apenas dois casos (6,9%) evidenciavam alterações ósseas de SC. O teste *Veneral Disease Research Laboratory* (VDRL) realizado no líquido cefalorraquidiano (LCR) demonstrou-se não reator para todos os pacientes avaliados. O VDRL do soro dos RN no nascimento foi positivo para 23 (79,31%) pacientes. A penicilina G cristalina (PGC) foi administrada em 26 (89,65%) casos, a penicilina G procaína (PGP) em dois (6,9%) e um individuo utilizou PGC e PGP. **Conclusão:** O óbito fetal e aborto foram o desfecho mais ominoso como repercussão da SC. A alteração dos ossos longos foi pouco encontrada na amostra. O baixo peso ao nascer foi observado em poucos casos. O VDRL do LCR foi não reator em todos os casos. A utilização de diversos esquemas de antibiótico estava em desacordo com o protocolo proposto pelo Ministério da Saúde.

Palavras-chave: sífilis congênita, resultado do tratamento, penicilina, antígeno VDRL.

INTRODUCTION

Syphilis is an infectious disease caused by the bacterium *Treponema pallidum subs. pallidum*, which is exclusively human pathogen, sensitive to heat, dry environments, detergents, and common antiseptics[1]. It can be transmitted either through sexual contact in most cases or transplacentally. Occupational transmission is rarely seen[2,3].

Syphilis is classified as congenital or acquired, and as recent or late. The recently acquired syphilis is considered the first year after infection, the lesions being rich in spirochetes. In late syphilis, lesions whenever present are poor in this parasite. Between these two periods there may be a latent phase[1]. Recent congenital syphilis is found in the first 2 years of life, while the late syphilis occurs after this period[4].

Congenital syphilis results in pregnant woman due to the hematogenous dissemination of *Treponema pallidum* into her fetus, via the placenta, causing direct invasion of fetal tissues. Perinatal infection is identified, secondary due to fetal contact with maternal infectious lesions in the birth canal or during lactation if there are

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syphilis caused breast lesions. There is still the possibility of fetal infection due to ingestion of amniotic fluid, which could explain the late manifestation of congenital syphilis in children who were seronegative shortly after birth[3,5,6].

Perinatal transmission of syphilis is also directly related to maternal treponemia, the higher the number of circulating treponemes, the greater the risk of fetal. Thus, in untreated women the probability of fetus infection is very high[1,7]. Miscarriage and stillbirth or perinatal death occur in approximately 40 % of the children infected from untreated mothers[1,3,5].

Congenital syphilis still remains a major challenge of public health in many countries. Surveillance activities associated with the qualification of prenatal and delivery care as well as strategies to clarify the population regarding syphilis can make an important difference in reducing perinatal mortality in our country[8,9].

Although the prevalence of *Treponema pallidum* infection has decreased significantly with the introduction of penicillin but a worldwide trend has been observed in the resurgence of syphilis among the general population particularly in cases of congenital syphilis[6].

Congenital syphilis is a reportable disease in Brazil, with a self-definition case which is periodically reviewed along with a notification form that must be completed for each case[10].

For the purpose of Epidemiologic Surveillance, four congenital syphilis definition criteria will be considered:

Criterion 1: Every child, miscarriage or stillbirth to a mother with clinical evidence for syphilis and/or non reagent treponemal syphilis serology with any titration in the absence of treponemal confirmatory test performed prenatally or at birth or curettage, which has not been treated or has been improperly treated[10].

Criterion 2: Any person under 13 years of age with the following serological evidence: ascending titration(nontreponemal tests); and/or nontreponemal test reagents after six months of age (except in situations of ongoing therapy) and / or reactive treponemal test after 18 months of age, and /or securities in treponemal test not larger than the mother[10].

Criterion 3: Any person under 13 years of age with no reagent and non treponemal test, and clinical evidence art or cerebrospinal syphilis or radiological congênita[10].

Criterion 4: Every instance of evidence with *T. pallidum* infection in the placenta or the umbilical cord and /or samples of the lesion, biopsy or child necropsy, coming from miscarriage or stillbirth, through microbiology tests[10].

Not only in Brazil but also in many parts of the world, congenital syphilis remains in the list of priority diseases, with a control level worse than the actual infection of vertical transmission by the human immunodeficiency virus.

Recent Congenital Syphilis

Signs and symptoms appear in the first two years of life but become evident in the first five weeks. The main signs are underweight, bloody serous rhinitis, prematurity, osteochondritis, periostitis, cry handling, hepatosplenomegaly, respiratory distress, hydrops, limb pseudoparalysis, cleft orificial, flat condyloma, palmoplantar pemphigus, condyloma *lata*, bullous rash, jaundice and anemia, and sometimes fever[1,5,11]. When massive invasion of treponemes occurs and /or these are very virulent, the evolution of the condition is severe and lethality high[12]. The placenta is voluminous, with yellowish or whitish injuries and spots.

Late Congenital Syphilis

The signs and symptoms are observed from the second year of life, usually due to less virulent treponemes infection or long maternal evolution infection. The skeletal manifestations assume various forms: tibia saber blade, olympian forehead, saddle nose, Hutchinson's teeth, short mandible, high palatal arch. Interstitial keratitis with blindness, neurological deafness, learning disabilities, hydrocephalus, and mental retardation may also occur[11,13,14].

The clinical diagnosis in the newborn is based on the occurrence of signs and symptoms described in recent congenital syphilis and from the investigation of all children whose mothers presented syphilis in pregnancy, detected during prenatal or delivery[5,15].

Proper treatment is documented in the mother's card, filled out according to disease stage and done with penicillin G benzathine. It must be completed at least 30 days before delivery and there must be a proper lowering of nontreponemal antibodies titers in the maternal serum along with the concomitant partner treatment[5,16].

In view of the epidemiological importance of this disease and its magnitude during the early pregnancy and neonatal cycle, we chose to evaluate the impact of this disease in the cases reported by Antônio Pedro University Hospital (HUAP), Niterói - RJ.

OBJECTIVE

Investigate the early major impact of neonatal congenital syphilis in newborns reported as a case of congenital syphilis at the Surveillance Center at Antônio Pedro University Hospital (HUAP) of the municipality of Niterói - RJ, from January 2005 to June 2006.

Identify the changes observed in neonates such as birth weight and newborn serology with congenital syphilis notification during the study year.

Describe the treatment and management of patients with congenital syphilis during the period of notification and /or diagnosis.

METHODS

Study design

Descriptive, observational, and quantitative study where the researcher listed the early neonatal repercussions in cases notified as CS at the Surveillance Center at Antônio Pedro University Hospital (HUAP) in the city of Niterói - RJ , from January 2005 to June 2006.

This study is part of a larger project entitled "Contribution to the study of the epidemiological surveillance for congenital syphilis in a hospital in Niterói" which was approved by the Ethics Committee on Human Research of the Fluminense Federal University (CEP CMM / HUAP No. 141/06), from which the data for analysis were extracted.

Considerations on the Study Population

The sample consisted of 35 reported forms of congenital syphilis from the Surveillance Center at Antônio Pedro University

Hospital (HUAP) in the city of Niterói - RJ , from January 2005 to June 2006. All participants were users of the Unified Health System (SUS).

Participants

Children who had a diagnosis of congenital syphilis reported at the Surveillance Center at Antônio Pedro University Hospital (HUAP) in the city of Niterói - RJ, from January 2005 to June 2006 whose mothers agreed to participate in the study.

Data Collection

Initial consultation with notification forms for each research subject, reported at the Surveillance Center at Antônio Pedro University Hospital (HUAP) for the formation of a database was performed. Then, telephone calls were made to confirm the address and to schedule a home visit in order to collect the data and peripheral blood samples from the notified patient. In cases where telephone contact was not possible an active search was conducted.

Statistical Analysis

The results were tabulated in Excel and statistically analyzed by SPSS (Statistical Package for Social Sciences) 13.0. For the discrete variables a frequency distribution was used. For comparison between groups, the Fisher exact test considering a significance level of 5% was used.

RESULTS

The target population of this study consisted of 35 cases with 29 patients born alive, four miscarriages and two stillbirths. From these data it was analyzed that only 29 patients were born alive and from whom peripheral blood was collected.

The age of children at the time of the active search, after scheduling, ranged between 2 and 24 months with a mean of 12.93 months. Birth weight ranged from 1,730 to 4,280 g with a mean of 2,966 g. Among these, five patients (17.24%) presented low birth weight (< 2,500 g).

As for the radiographic examination of the long bones from the live births, 26 (89.65%) had tests within normal limits, two (6.9%) had evidence of bony changes consistent with congenital syphilis and only one patient did not perform radiological examination due to unidentified reason.

VDRL performed in cerebrospinal fluid (CSF) of neonates (whose mothers were VDRL positive at delivery) presented no reaction to all patients. VDRL serum of these newborns (also at birth) was positive for 23 (79.31%) patients, the titration of 1:2 for nine patients (31%), 1:4 for six patients (20.68) 1:8 for three patients (10.34%), 1:16 for two patients (6.89%) 1:32 for two patients (6.89%) and 1:64 for patient (3.44%), as described in **Table 1**.

Regarding treatment performed in the study patients, crystalline penicillin G was administered in 26 (89.65%) cases, penicillin G procaine in two (6.9%) newborns, and one individual was used the combination of crystalline penicillin G and G procaine. The duration of treatment performed on newborns ranged from 6–15 days with an average of 12.55 days. This time variation suggests non-uniformity while following the protocols for cases handling (see **Chart 1**).

As noted from **Table 1**, only one patient presented VDRL reagent ≥ 1:16, FTA-Abs, demonstrating the possibility of the patient still being infected. However, although the sample is small, the correlation between the number of patients non-reactive for VDRL and FTA-Abs (82.76%) and the number of patients with VDRL and FTA-Abs reactors (10.33%) was statistically significant by Fisher's exact test ($p = 0.003$).

Table 2 indicates the correlation between the VDRL at birth and FTA-Abs after active search of patients and the results show that when titration of VDRL exceeds 1:8, it suggests that the patient is actually infected.

DISCUSSION

Since the introduction of congenital syphilis among the reported diseases which dates from 1986, several states and municipalities in Brazil have mobilized in carrying it out, although they still face many challenges. These challenges underlie the definition of disease cases, underreporting of cases, the training of health professionals and feasibility of diagnostic tests, inadequate prenatal care, difficulty in making the diagnosis at the child birth, lack of attention and care that reaches out in the identification of the infected partner and its treatment, as well as the follow-up of children born to mothers with syphilis[17].

As stated by Saraceni *et al.*[18], the surveillance of diseases of vertical transmission should be performed, "in the period in which the intervention is still possible", thus all these aforementioned steps include possibilities of intervention, requiring strategies that perform. Brazil established as a goal by the year 2000 and fulfilled the goal of 1/1.000 live births with congenital syphilis. However, this has not happened yet, even 13 years after the establishment of this goal[1].

In this context, it is worth noting that given the number of cases reported by the syphilis epidemiological bulletin, in 2012[19], Rio de Janeiro was the state of the Southeast Region, which showed the highest rate of congenital syphilis, followed by São Paulo and Minas Gerais. For the year 2005, we identified 1,346 cases of C, with an incidence rate of 6.0 for Rio de Janeiro, followed by São Paulo, with 838 cases, with a rate of 1.4, and the Espírito Santo with 241 reported cases, with a rate of 4.6.

In 2006, Rio de Janeiro had a total of 1,198 reported cases of CS with an incidence rate of 5.5 followed by São Paulo, with 786 cases, a rate of 1.3, and the Espírito Santo, with 170 reported cases, a rate of 3,319. The results of this study are in agreement with this reality, although they come from only one health unit of Niterói, state of Rio de Janeiro.

The heterogeneity of the regions of the country particularly in the Southeast region, described above, as well as the rigor of surveillance for the implementation of existing and appropriate monitoring protocols of the cases, makes it necessary to develop an increased attention to congenital syphilis due to its social and neonatal repercussions that may be beyond repair, as in cases of ominous outcome for the binomial mother-fetus[15].

Chart 1 – Description of the relationship between birth weight, VDRL[birth] (at birth) , X-ray of long bones, VDRL in CSF, type and duration of treatment used in patients with congenital syphilis cases at the UFF HUAP from January 2005 to June 2006

Birth weight (g)	VDRL[birth]	Long bones X Rays	VDRL- LCR	Treatment type	Treatment duration	VDRL active search	FTA-Absn Active search
3,100	Non reag	normal	Non reag	Cristalline penicillin G + Procaine penicillin G	6 days	Non reag	Non reag
3,100	Non reag	normal	Non reag	Cristalline penicillin G	10 days	Non reag	Non reag
2,750	Non reag	normal	Non reag	Cristalline penicillin G	10 days	Non reag	Non reag
2,375	Non reag	normal	Non reag	Cristalline penicillin G	14 days	Non reag	Non reag
2,860	Non reag	normal	Non reag	Cristalline penicillin G	15 days	Non reag	Non reag
3,785	Non reag	normal	Non reag	Cristalline penicillin G	15 days	Non reag	Non reag
3,750	1:2	normal	Non reag	Cristalline penicillin G	10 days	Non reag	Non reag
2,080	1:2	normal	Non reag	Cristalline penicillin G	10 days	Non reag	Non reag
2,375	1:2	normal	Non reag	Cristalline penicillin G	10 days	Non reag	Non reag
2,900	1:2	normal	Non reag	Cristalline penicillin G	10 days	Non reag	Non reag
3,420	1:2	normal	Non reag	Cristalline penicillin G	11 days	Non reag	Non reag
3,330	1:2	normal	Non reag	Cristalline penicillin G	14 days	Non reag	Non reag
3,175	1:2	normal	Non reag	Cristalline penicillin G	15 days	Non reag	Non reag
3,020	1:2	normal	Non reag	Cristalline penicillin G	15 days	Non reag	Non reag
3,135	1:2	normal	Non reag	Cristalline penicillin G	15 days	Non reag	Non reag
3,520	1:4	normal	Non reag	Cristalline penicillin G	10 days	Non reag	Non reag
3,560	1:4	normal	Non reag	Cristalline penicillin G	10 days	Non reag	Non reag
2,980	1:4	normal	Non reag	Cristalline penicillin G	10 days	Non reag	Non reag
2,540	1:4	normal	NP	Cristalline penicillin G	14 days	Non reag	Non reag
1,870	1:4	normal	Non reag	Cristalline penicillin G	15 days	Non reag	Non reag
3,000	1:4	normal	Non reag	Cristalline penicillin G	15 days	Non reag	Non reag
1,730	1:8	normal	Non reag	Cristalline penicillin G	10 days	Non reag	Non reag
2,150	1:8	normal	Non reag	Cristalline penicillin G	15 days	Non reag	Non reag
3,500	1:8	normal	Non reag	Cristalline penicillin G	15 days	Non reag	Non reag
3,055	1:16	normal	Non reag	Cristalline penicillin G	15 days	1:2	Reagent
2,870	1:16	altered	Non reag	Cristalline penicillin G	15 days	1:16	Reagent
2,525	1:32	normal	Non reag	Cristalline penicillin G	14 days	Non reag	Reagent
2,840	1:32	normal	Non reag	Cristalline penicillin G	15 days	Non reag	Reagent
2,800	1:64	altered	Non reag	Cristalline penicillin G	11 days	1:2	Reagent

VDRL: Venereal disease research laboratory; CSF: cerebrospinal fluid; NP: not performed; Non reag: nonreactive; PGC: crystalline penicillin G; PGP: penicillin G procaine.

Table 1 – Description of the correlation between the VDRL and FTA-Abs performed in patients reported as congenital syphilis after active search, at the HUAP-UFF, in the period from January 2005 to June 2006

VDRL	FTA-Abs – Non Reagent	FTA-Abs – Reagent
Non Reagent	24* (82.76%)	2 (6.89%)
≤ 1:8	–	2 (6.89%)
≥ 1:16	–	1 (3.44%)
Total	24 (82.76%)	5 (17.24%)

*Fisher exact test (p = 0.003);
VDRL: Venereal disease research laboratory; FTA-Abs: fluorescent treponemal antibody absorption.

Table 2 – Description of the correlation between VDRL[birth] (at birth) and FTA-Abs performed in patients reported as congenital syphilis after active search at the HUAP-UFF, in the period from January 2005 to June 2006

VDRL[nasc]	FTA-Abs Não reagente	FTA-Abs Reagente	Total
Não reator	6	–	6 (20.68%)
≤ 1:8	17 (58.63%)	1 (3.44%)	18 (62.06%)
≥ 1:16	1 (3.44%)	4* (13.79%)	5 (17.26%)
Total	24 (82.75%)	5 (17.24%)	29 (100.00%)

*Fisher exact test (p = 0.003).
VDRL: Venereal disease research laboratory; FTA-Abs: fluorescent treponemal antibody absorption.

In this context, it is noteworthy that out of 35 reported cases of CS in our study, 17.2% had the worst outcome (four stillbirths and two miscarriages). These findings corroborate the literature that syphilis in pregnancy can lead to miscarriage, usually after the first quarter, or later, to stillbirth in about 30–40% of cases, or even to premature labor, since placental infection with consequent reduction in blood flow to the fetus, may be involved in the fetal death[17]. For this reason, early diagnosis (by request routine serological

tests - VDRL) and prompt treatment of infections during pregnancy have great importance in preventing this infection[20].

These findings in our study reported as death from syphilis, portrays the current situation in Brazil, where, according to the Ministry of Health, the number of documented deaths from congenital syphilis was 1.780 , corresponding to a mortality rate of 3.9 per 100,000 live births and 925 deaths (52.0 %) in the Southeast region (with 758 in the state of Rio de Janeiro, which corresponds to 42 % of Brazil)[19].

Regarding children assessed after active search, a total of five of these had low birth weight (< 2,500 g), and only one was confirmed as congenital syphilis after surveillance because she had VDRL 1:8 at the time of birth, VDRL negative CSF and Rx of long bones without change. To Santis[17], this may be the only sign of congenital syphilis.

Regarding the manifestations that can be observed by radiographic examination of long bones, only two newborns showed bone abnormalities compatible with congenital syphilis, one of these had to be born with VDRL titer of 1:16, weight of 2,870 g and VDRL active search 1:16 , with FTA-Abs reactor, indicating the persistence of the infection , in the other, VDRL birth described titration 1:64, weight of 2,800 g and VDRL during the active search with titration of 1:2, with FTA-Abs reactor. The results of this study are equivalent to those reported by Hollier *et al.*[21], who found that out of 24 patients reported with CS, only one had bone changes.

These data confirm the descriptions of other authors that bone changes are rare , do not occur in the usual way and still need to be further clarified when occurrence of CS, including being suggested as a differential diagnosis of trauma, Caffey syndrome, scurvy, and hypervitaminosis D[22,23].

VDRL performed in cerebrospinal fluid (CSF) of neonates (who had mothers with positive VDRL at delivery there was no reaction to all patients. As for the VDRL serum of these newborns (also at birth) was positive for 23 (79.31%) patients, the titration of 1:2 for nine patients (31%), 1:4 for six patients (20.68%) 1:8 for three patients (10.34%), 1:16 for two patients (6.89%) 1:32 for two patients (6.89%) and 1:64 for patient (3.44%) , as described in **Table 1**.

Given the results found as negative for CSF samples, there would be no need for treatment with crystalline penicillin G, however about 26 cases (89.65%) were treated with this drug alone and only one individual used the combination penicillin G and crystalline penicillin G procaine (see **Table 1**). In contrast, all individuals with a positive VDRL in serum (1:2 – 1:64), even without clinical and laboratory signs of infection of the nervous system, were treated with crystalline penicillin G.

These data suggest the following non-uniformity of the proposed protocol by the Health Ministry and a possible fear for monitoring these patients due to the precariousness of public services available. Moreover, as there was no access to maternal treatment data for inclusion in the scenarios proposed by the Ministry of Health, it was not possible to analyze the conformity of the proposed treatments[5,15].

Similarly, a total of six subjects had VDRL negative serum and CSF, but none was treated with penicillin G benzathine, as described above. All data reported in **Table 1** do not allow us to determine the appropriate treatment duration, which ranged from 6 to 15 days, with an average of 12.55 days, because we have not enough maternal data.

Another aspect of this study that deserves to be considered was that , according to **Table 1**, only one patient (3.44 %) had a positive VDRL when active search with FTA - Abs reagent, 8 months after birth. His reporting sheet showed that this patient was investigated and showed bone changes and VDRL birth of 1:16, with negative CSF VDRL, having been treated with crystalline penicillin G for 15 days. This case demonstrates the importance of neonatal repercussions of CS, emphasizing that the priority in the care of newborns should be the presence of cerebrospinal fluid changes, because the Central Nervous System (CNS) may determine different clinical syndromes that pervade from no symptoms to more serious disorders such as progressive general paralysis[24].

In the present study six negative VDRL tests were observed at birth, confirming the findings of Hollier et al.[21] reported that 24 infants with CS found four negative VDRL at birth in Dallas, Texas (United States). This result demonstrates that sometimes the notified case cannot deal with *Treponema* infection in the baby.

The survey of cases from this study occurred from reporting cases of CS, they were chosen as the instrument for data collection, but had limitations such as incomplete filling of fields, letters difficult to read and lack of standardization, that hampered not only the development of research but mainly epidemiological surveillance performed after discharge of patients, so it was recommended that research should be undertaken with the individual still hospitalized in hospital[25].

At baseline in 2005, IBGE estimates describing the Niterói population consisted of 474 048 individuals. Possible data rescue provided by the same entity describing a total of 487,562 individuals for the year 2010, showing an increase of this population. Of these individuals, approximately 53.70% (261,820) are female and of childbearing age, 31.15% (151,874) 26.27. DATASUS pointed out that a total of 48 neonatal and infant deaths occurred from preventable causes, and 21.12% of these were reducible type by adequate attention to women during pregnancy, which fits the CS. This suggests, after this survey these data can be undernotified[26,27]. These numerical values are of concern, since Niteroi was considered, for the year 2011, the third city in quality of life in Brazil, reverberating as a contradiction, because these indicators influence the IDH[26,27].

The SC is a serious public health problem, due to the unfavorable outcomes for the fetus, as can be observed in our study. This fact makes an be considered a fundamental to perform a detailed analysis of cases of congenital syphilis, as well as factors involved in the process, to support the prevention and control of doença[28-30].

Mosque , analyzing prenatal care in Sobral in period of 3 years (2007-2010), noted that the number of prenatal consultations tends to concentrate in the third trimester of pregnancy, promoting a gap in care in the first two quarters pregnancy, denouncing a difficulty for membership and providing inadequate screening of syphilis in pregnacy[28].

Figueiró Filho, evaluating 1,024 coming from the four major hospitals in the city of Campo Grande - MS in two different periods (February 1 to April 30, 2006 and September 2010 to September 2011), found a total of 15 cases (1.46%)[29]. Our study comprising a single hospital, for an investigation period far smaller, detected twice the number of cases (35 cases), showing the importance of the disease in this region and the non-uniformity in the distribution of cases in Brazil

Birth, analyzing deaths from syphilis in a maternity municipality of Nova Iguaçu - RJ, which occur on average 3,000 deliveries per year, observed during the period of 3 years (2005–2008) 48 cases of fetal death by sífilis[31]. During our study, we have identified four fetal deaths from the total of 35 cases of CS. This finding reinforces the importance of the disease in this region.

In the Federal District, according to the 2012 Syphilis Epidemiological Report the detection rate of syphilis in pregnant women per 1,000 live births in 2007 was 2.2 (96 cases) and in 2011 was 2.7 (119 cases) , showing an increase in reported cases , which may promote a worsening epidemiological situation of CS, denouncing the failure of policies to fight the illness[32].

Vertical transmission of syphilis is still showing a serious public health problem and elaborate strategies are not effective in combating the disease. Waiting until the conception to take place to start prevention of CS was not sufficient to eliminate the disease in our country.

The challenge for the control of this disease should not only add policies to cope with the disease during the prenatal and childbirth but mainly committed in the control of acquired syphilis in pregnant women out of the cycle, as well as their sexual partners.

CONCLUSION

- The fetal death and abortion were the most ominous outcome and impact of the CS.
- Although the change of the long bones is the main finding in patients with asymptomatic CS such a diagnosis was found in some samples.
- Low birth weight was observed in some cases.
- VDRL CSF was non-reactive in all cases.
- The use of various antibiotic regimens was at odds with the proposed protocol by the Health Ministry.

Conflict of interests:

The authors declare no conflict of interests.

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Temporal distribution of anti-HIV serologic tests demand and positivity in a Municipal Central Laboratory: are there increased after Carnival?

Distribuição temporal da demanda e positividade de testes sorológicos anti-HIV em um laboratório central municipal: há aumento depois do carnaval?

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ABSTRACT

Introduction: HIV infection can lead to a progressive immunosuppression and result in an AIDS-related infections complex and other manifestations in affected individuals. Data from the AIDS 2012 Epidemiological Bulletin from 1980 to 2010 reported 241,662 deaths from AIDS in Brazil. Niterói, in Rio de Janeiro State, is a medium-sized city, of 500,000 inhabitants approximately and expressive socioeconomic and cultural indicators. **Objective:** To evaluate the relationship between seasonal demand and positivity of anti-HIV tests in the Miguelote Viana Public Health Central Laboratory located in Niterói. **Methods:** This is a temporal series analytical cross-sectional study. Anti-HIV tests demand, positivity and days worked by Miguelote Viana Public Health Central Laboratory were analyzed from a database for the period from 2005 to 2010. Data was then statistically evaluated through a temporal series and hypothesis testing on tendency and seasonality. Miguelote Viana Public Health Central Laboratory is a reference center for the dosage of viral load and CD4 levels for all public health units of Niterói; also attending to the population of cities in Metropolitan Region II. This is an innovative research, since articles that relate anti-HIV tests demand increase/decrease with the respective months of the year have not been found yet. As a result, we present graphs, tables and charts. **Results:** From January 2005 to December 2010, we have registered 64,505 serological tests for HIV, as follows: 17.44% (11,252) in 2005; 16.36% (10,557) in 2006; 17.81% (11,494) in 2007; 17.12% (11,046) in 2008; 16.20% (10,452) in 2009; and 15.04% (9,704) in 2010. In annual average, the days worked per month were as follows: 20 in 2005; 19.5 in 2006; 19.8 in 2007; 19.6 in 2008; 19.7 in 2009 and 19.3 in 2010. The monthly average of days worked in the six years studied was: 21 in Jan; 17.3 in February; 21.6 in March; 17.3 in April; 20 in May; 18.6 in June; 21.6 in July; 22 in August; 20.3 in September; 20.3 in October; 17.3 in November and 18.6 days in December. The annual average of positivity in absolute numbers was as follows: 42.6 in 2005; 44.0 in 2006; 38.3 in 2007; 32.8 in 2008; 24.25 in 2009 and 25.25 in 2010. The average positivity per month in the six years studied was the following: 39.3 in January; 29.3 in February; 40.8 in March; 31.8 in April; 31.1 in May; 34.6 in June; 33.8 in July; 38.6 in August; 35.0 in September; 34.8 in October; 31.5 in November and 33.6 in December. The average percentage of positivity per month was as follows: January (4.35), February (3.85), March (3.95), April (3.88), May (3.56), June (2.34), July (3.54), August (3.80), September (3.79), October (3.60), November (3.92) and December (3.75). In the studied period (2005-2010), Carnival holidays occurred in the month of February, on the following days: 8, 28, 20, 5, 24 and 16, respectively. **Conclusion:** We observed no seasonal relation between demand and positivity of anti-HIV tests carried out at Miguelote Viana Public Health Central Laboratory. A significant statistical decrease occurred in both anti-HIV tests demand and positivity during the studied years of the 2005–2010 series.

Keywords: HIV, seasonality, public health, temporal analysis, carnival.

RESUMO

Introdução: A infecção pelo HIV pode levar à imunossupressão progressiva e resultar em um complexo de infecções relacionadas à AIDS e outras manifestações nos indivíduos acometidos. Dados do Boletim Epidemiológico AIDS 2012, relatam, de 1980 a 2010, 241.662 óbitos por AIDS no Brasil. Niterói, no estado do Rio de Janeiro, é um município de médio porte, com cerca de 500 mil habitantes e excelentes indicadores socioeconômicos e culturais. **Objetivo:** Avaliar a possível relação de sazonalidade existente entre a distribuição temporal da demanda e da positividade de testes sorológicos anti-HIV no Laboratório Central de Saúde Pública Miguelote Viana (LCSPMV), de Niterói, Rio de Janeiro. **Métodos:** Trata-se de um estudo transversal analítico de série temporal. Foram analisados os dados de demanda, de positividade dos exames anti-HIV e dos dias trabalhados, coletados de um banco de dados referentes ao período de 2005 a 2010. Os dados foram avaliados estatisticamente por uma série temporal e testes de hipótese para tendência e sazonalidade. O LCSPMV é referência na dosagem de carga viral e níveis de CD4 para todas as unidades de saúde da rede pública de Niterói e também atende à população oriunda dos municípios que fazem parte da Região Metropolitana II. Esta é uma pesquisa inovadora, visto que ainda não foram encontrados artigos que correlacionem aumentos/diminuições das demandas de exames anti-HIV com os respectivos meses dos anos. **Resultados:** No período de janeiro de 2005 até dezembro de 2010, registramos 64.505 exames sorológicos anti-HIV, sendo em 2005, 17,44% (11.252); em 2006, 16,36% (10.557); em 2007, 17,81% (11.494); em 2008, 17,12% (11.046); em 2009, 16,20% (10.452); e em 2010, 15,04% (9.704).

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Os dias trabalhados por mês foram, em médias anuais: 20 em 2005; 19,5 em 2006; 19,8 em 2007; 19,6 em 2008; 19,7 em 2009 e 19,3 em 2010. A média mensal de dias trabalhados nos 6 anos estudados foi: 21 em janeiro; 17,3 em fevereiro; 21,6 em março; 17,3 em abril; 20 em maio; 18,6 em junho; 21,6 em julho; 22 em agosto; 20,3 em setembro; 20,3 em outubro; 17,3 em novembro e 18,6 dias em dezembro. A positividade, em números absolutos, em média anual, foi de 42,6 em 2005; 44,0 em 2006; 38,3 em 2007; 32,8 em 2008; 24,25 em 2009 e 25,25 em 2010. Já a positividade por mês nos 6 anos estudados foi em média: 39,3 para janeiro; 29,3 para fevereiro; 40,8 para março; 31,8 para abril; 31,1 para maio; 34,6 para junho; 33,8 para julho; 38,6 para agosto; 35,0 para setembro; 34,8 para outubro; 31,5 para novembro e 33,6 para dezembro. A média de porcentagem de positividade por mês foi: janeiro (4.35%), fevereiro (3.85%), março (3,95%), abril (3,88%), maio (3,56%), junho (2,34%), julho (3,54%), agosto (3,80%), setembro (3,79%), outubro (3,60%), novembro (3,92%) e dezembro (3,75%). No período estudado, o feriado de carnaval ocorreu no mês de fevereiro, nos seguintes dias: 08, 28, 20, 05, 24 e 16, dos anos de 2005 a 2010, respectivamente. **Conclusão:** Não houve relação sazonal entre a demanda e a positividade de testes anti-HIV realizados no LCSPMV. Houve queda estatisticamente significativa na demanda e na positividade dos exames anti-HIV no decorrer dos anos estudados da série de 2005-2010.
Palavras-chave: HIV, sazonalidade, saúde pública, análise temporal, carnaval.

INTRODUCTION

Sexually transmitted diseases are considered one of the most common public health problems worldwide in both sexes, making the body more vulnerable to other diseases, including AIDS[1].

Since the beginning of AIDS epidemic in 1983, according to the Epidemiological Bulletin of the Ministry of Health, until June 2012 Brazil has registered 656,701 cases of the disease, although the largest number of cases lies in the Southeast (56%). From 2000 to 2011, the incidence rate in that region dropped from 23.4 to 21.0 cases per 100,000 inhabitants. However, it has not occurred in other Brazilian regions, where the incidence rate has increased. Currently, the incidence rate in Brazil is of 20.8 cases per 100,000 inhabitants[1].

Still according to the mentioned AIDS 2012 Epidemiological Bulletin, from 1980 to 2011, 253,706 deaths from AIDS occurred in Brazil. In this period, the State of Rio de Janeiro notified 40,817 deaths from the disease, making it the second State with the highest mortality rate from AIDS[1]. These data reflect the importance of studies on the population at risk and affected by HIV.

Niterói is a medium-sized city, with about 500,000 inhabitants and great socioeconomic indicators. It has the best alphabetization level in the State of Rio de Janeiro and holds one of the richest populations of Brazil, with 30.7% belonging to upper class[2].

In the international extent, we can say that HIV infection remains one of the main priorities when health is concerned. Despite great improvement in preventing new infections and in reducing the number of annual deaths related to the virus, it can be noted that people infected with HIV continues to increase worldwide, thus predicting that AIDS will remain one of the leading causes of death worldwide over the next decades[3].

Approximately, 10% of those infected with HIV progress to AIDS within the first two to three years of infection[4]. In general terms, the average time from infection to AIDS lasts for about 10 years[5]. However, a percentage between 5 and 8% maintains clinical stability without immune disease progression (even in the absence of treatment), maintaining CD4+ cell counts stable showing less chance to transmit HIV to other individuals[6,7].

Demand studies can help detect nosological tendencies and also serve as a tool to guide health planning, including medical education and allocation of financial resources. These goals are usually achieved through methods, such as epidemiological investigations in population samples, household interviews in defined geographic areas and, especially, by mortality analysis[8].

Presently, there are more cases of AIDS among men than among women, but this difference has been decreasing over the years. The age between 13 and 19 years is the only group in which the incidence of AIDS is higher among women in our country.

Concerning the transmission mode in individuals over 13 years, the sexual way was observed to be the prevailing mode, and the heterosexual relations in women are responsible for 83% of cases, while in men 42% of case resulted from heterosexual relations, 22% from homosexual relations and 7.7% from bisexual relations, the remaining occurred by blood transfusion and vertical transmission[9].

In the Brazilian context lies the Carnival, which is considered one of the liveliest festivals in the world. Its origin is the historic Portuguese carnival, in which people used to throw water, eggs and flour at each other. The carnival took place in a period before Quadragesima and had a meaning of freedom, which remains to this day[10].

The strong permissive sex appeal of Carnival times exposes people to a risky behavior that might allow the development of STD and AIDS. For this reason, the Ministry of Health has been releasing strategies, such as media campaigns and distribution of male and female condoms during Carnival festivities and other places of public manifestations to prevent the increase of cases during these periods[9].

We have decided to study the temporal demand distribution and the positivity of anti-HIV tests in a public health reference laboratory of Niterói, Rio de Janeiro, where there is a need for in-depth studies to understand the dynamics of the epidemiology of HIV infection involving Brazilian regions and popular festivals in a better way.

OBJECTIVE

To evaluate the possible seasonal relation between the demand temporal distribution and the positivity of serologic anti-HIV tests at the Miguelote Viana Public Health Central Laboratory (LCSPMV), in Niterói – Rio de Janeiro, from January 2005 to December 2010.

METHODS

This is an analytical cross-sectional study of the temporal series of anti-HIV tests among patients of both genders and different age groups conducted at LCSPMV, located in Niterói – Rio de Janeiro.

Demand and positivity data was analyzed for anti-HIV tests collected in a database and the days worked in the different months of each year from the retrospective survey of archived data dating from January 2005 to December 2010, in the LCSPMV Immunology and Surveillance Service located in Niterói, Rio de Janeiro.

The free consent term was not necessary, as we have used coded tables' data.

Project was approved by CEP under protocol number 244/11, dated September 2nd, 2011, and no conflict of interest was observed on this work.

The LCSPMV is a reference for CD4+ and viral load tests for all units of the public system of Niterói and the municipalities that are part of the Metropolitan Region II, including Niterói, São Gonçalo, Itaboraí, Maricá, Rio Bonito, Tanguá and Silva Jardim.

These samples arrive at the laboratory through the forwarding flow already existing on the system or they are collected in the laboratory by spontaneous demand.

The anti-HIV tests average/month in the LCSPMV is of 1,150, and release time of a negative result varies from 3 to 5 working days.

These samples and the results are forwarded likewise so that tests listed as released are available to every one of the nearly 60 units of Niterói, as well as to the other six neighboring municipalities when viral load or CD4+ are required.

The negativity and positivity criteria for HIV serologic tests used by LCSPMV are standardized by the Brazilian Ministry of Health, according to regulation 151 dated October, 2009[11].

The research hypothesis is the increase of demand and positivity after Carnival in the city of Niterói, State of Rio de Janeiro.

We used our own and standardized forms for the collection of data from our study, containing the following items: number of days worked per month studied; tests collected per day; month and year studied; Carnival period occurred during years studied; and positive tests per month during the years studied.

Sequential graphs, boxplot, frequency histogram and decomposition of classical series described in previous study[12] were used as descriptive methods of a time series analysis.

For the inferential analysis, a linear regression model in time series and a set of indicator variables were adjusted regarding the studied months. The significance of the regression coefficients was used as a test for trend and seasonality. In addition, we use the cross-correlation coefficient followed by a significance test to evaluate the association between positivity and demands occurred in previous months[13,14]. All the hypotheses were tested with the adoption of a 5% level of significance[12,15].

RESULTS

Data was collected from January 2005 to December 2010, and curves graphs and tables were then elaborated. We aimed at discovering possible answers to the discrepancies found, and verify if there was a seasonality relation to the variables of the study.

From January 2005 until December 2010 we have registered 64,505 serological tests for HIV as follows: 17.44% (11,252) in 2005; 16.36% (10,557) in 2006; 17.81% (11,494) in 2007; 17.12% (11,046) in 2008; 16.20% (10,452) in 2009; and 15.04% (9,704) in 2010.

In annual averages the days worked per month were as follows: 20 in 2005; 19.5 in 2006; 19.8 in 2007; 19.6 in 2008; 19.7 in 2009 and 19.3 in 2010. The monthly average of days worked in the six years studied was: 21 in Jan; 17.3 in February; 21.6 in March; 17.3 in April; 20 in May; 18.6 in June; 21.6 in July; 22 in August; 20.3 in September; 20.3 in October; 17.3 in November and 18.6 days in December.

Positivity annual average in absolute numbers was as follows: 42.6 in 2005; 44.0 in 2006; 38.3 in 2007; 32.8 in 2008; 24.25 in 2009 and 25.25 in 2010. The average positivity per month in the six years studied was the following: 39.3 in January; 29.3 in February; 40.8 in March; 31.8 in April; 31.1 in May; 34.6 in June; 33.8 in July; 38.6 in August; 35.0 in September; 34.8 in October; 31.5 in November; and 33.6 in December.

The average percentage of positivity per month was as follows: January (4.35), February (3.85), March (3.95), April (3.88), May (3.56), June (2.34), July (3.54), August (3.80), September (3.79), October (3.60), November (3.92) and December (3.75).

In the studied period (2005–2010), all Carnival holidays occurred in the month of February, on the following days: 8, 28, 20, 5, 24 and 16, respectively.

After the statistical tests application, we observed a significant decrease in the anti-HIV tests' demand and positivity, and noticed that there was no seasonal influence on anti-HIV demand and positivity in the period between January 2005 and December 2010 in a reference laboratory in Niterói, Rio de Janeiro.

We present the results in the following graphs, charts, and tables:

Table 1 – Months with meaningful data over the years of study

Anti-HIV tests	2005	2006	2007	2008	2009	2010
Minimum demand (absolute)	July = 728	May = 412	Nov = 747	Nov = 756	Feb = 695	Feb = 596
Maximum demand (absolute)	Mar = 1.150	Aug = 1.189	Jul = 1.172	Dec = 1.509	July = 1.062	Mar = 1.054
Lower daily demand	July = 34,66	May = 21,68	Aug = 44	Jan = 38,66	Jan = 36,4	Dec = 35,23
Higher daily demand	June = 52,25	Oct = 55,05	Jun = 54,11	Dec = 83,83	Nov = 55,61	Mar = 47,9
Less working days	Feb/Nov = 18	Apr = 16	Nov = 15	Feb/May/June/Nov = 18	Feb/Apr = 17	Feb/Apr = 15
More working days	Mar/Aug = 22	Aug = 23	Mar/Aug = 23	July = 23	Jul = 23	Mar/Aug = 22
Minimum number of positives (absolute)	Jan = 31	May = 10	Sep = 26	Oct = 24	Oct = 12	June = 15
Maximum number of positives (absolute)	Mar = 52	June = 57	Jan = 58	Dec = 1.509	Apr = 31	Mar/July = 32
Lower positivity	Jan = 3,33%	May = 2,42%	July = 2,30%	Dec = 2,05%	Oct = 1,37%	June = 2,34%
Higher positivity	Oct = 5,33%	Jan = 6,6%	Jan = 5,43%	Sep = 4,88%	Apr = 3,94%	Feb = 3,69%

Descriptive analysis of average temporal demand

As a data pretreatment, each observation made on the demand series was divided by the number of working days of the corresponding month. This procedure avoids introducing any vices in the analysis, as there are months, for which amount of tests is inferior to the usual average due to the excess of holidays.

In many statistical analysis procedures such as hypothesis testing and regression models, one works with the supposition that data are normally distributed. However, this does not always occur, and the frequency histogram is a very useful tool to check this assumption.

As observed in the Frequency Histogram in **Graph 4**, there is a tendency of concentrating the observations around the average, and there are values at the margins that correspond to the months of May 2006 and December 2008.

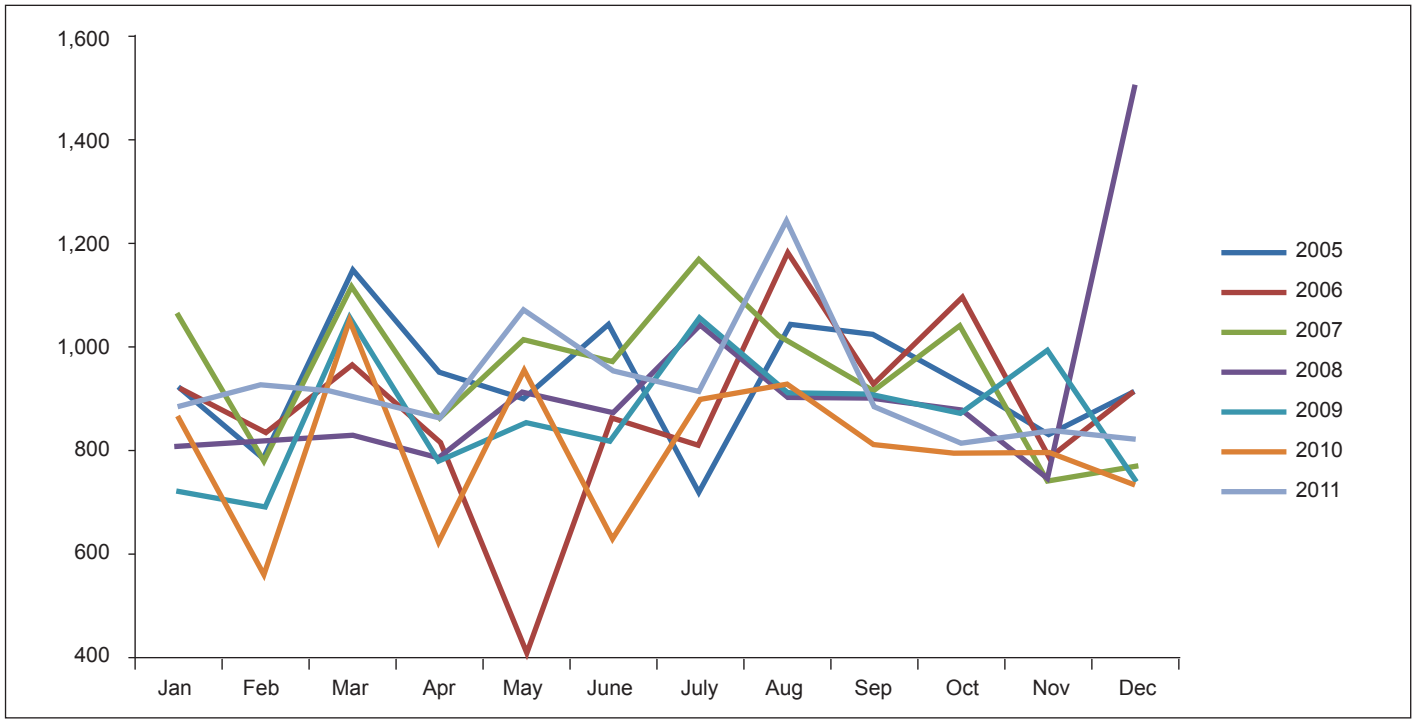
A normal curve was superposed to the graph presented, and the average and standard deviation were obtained through the observations made. The noticed distribution differs from the normal distribution in two aspects: the concentration around the average is above the expected value and the extreme values do not seem compatible with the normal distribution.

For the construction of the normal curve in **Graph 5**, we used the average demand in the period observed equal to 45.53 and standard deviation equal to 7.04.

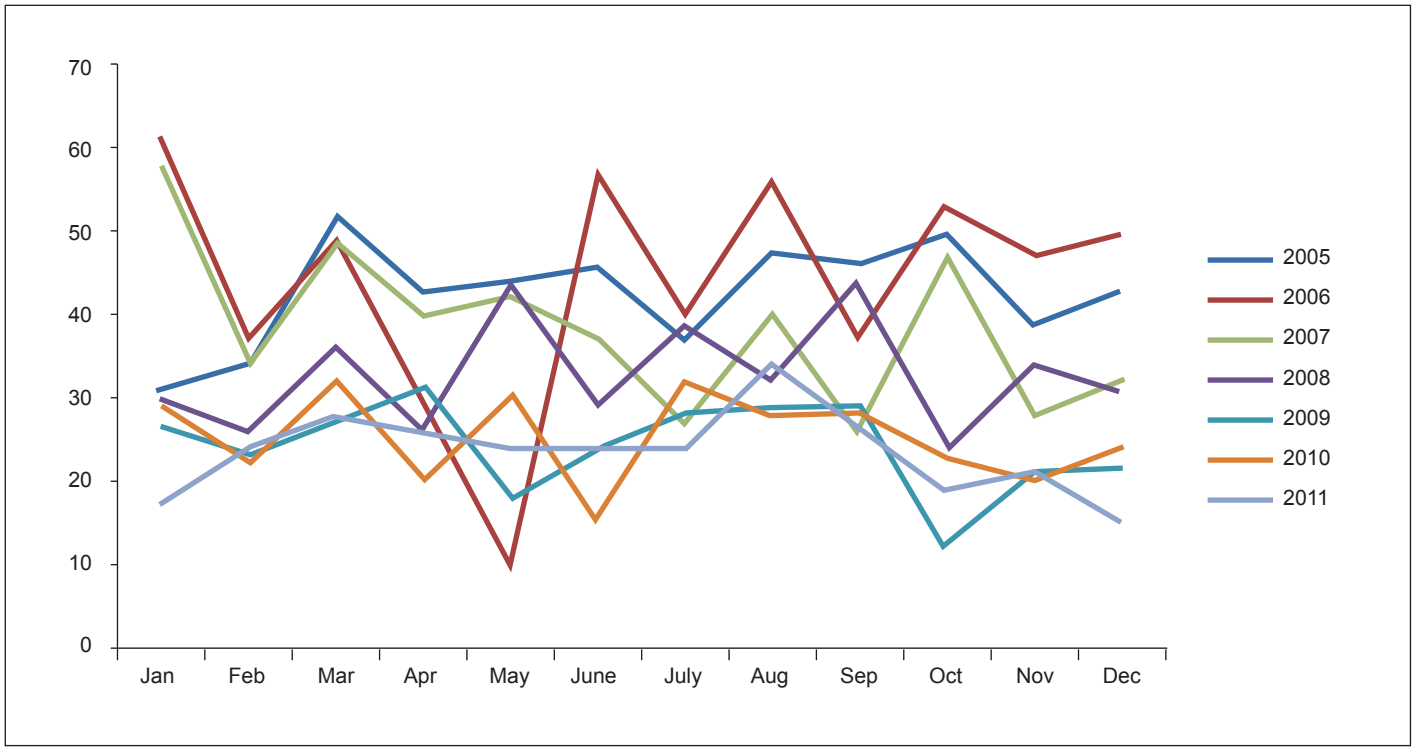
The criterion for identifying atypical points, known in statistics as outliers, uses boxplot chart boundaries. The two atypical points identified

Table 2 – Live births in Niterói of mothers resident in Niterói

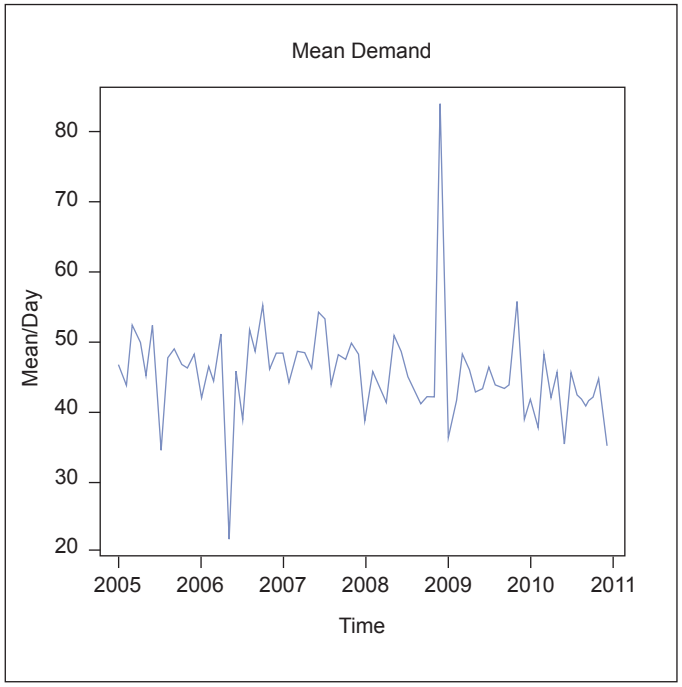
	2005	2006	2007	2008	2009	2010	2011	Total
January	406	366	430	387	466	420	406	2.861
February	400	356	412	357	321	423	396	2.665
March	486	411	438	395	412	432	461	3.035
April	418	406	459	395	463	423	435	2.999
May	450	428	455	429	407	370	425	2.964
June	425	423	430	380	397	401	446	2.902
July	390	395	417	436	402	419	430	2.889
August	381	375	396	395	357	369	421	2.694
September	365	379	388	417	446	386	393	2.774
October	461	403	354	361	394	371	361	2.695
November	369	369	341	379	368	387	399	**2.612**
December	359	352	379	397	396	398	**415**	2.693
Total	4.897	4.663	4.899	4.728	4.809	4.799	4.988	33.783



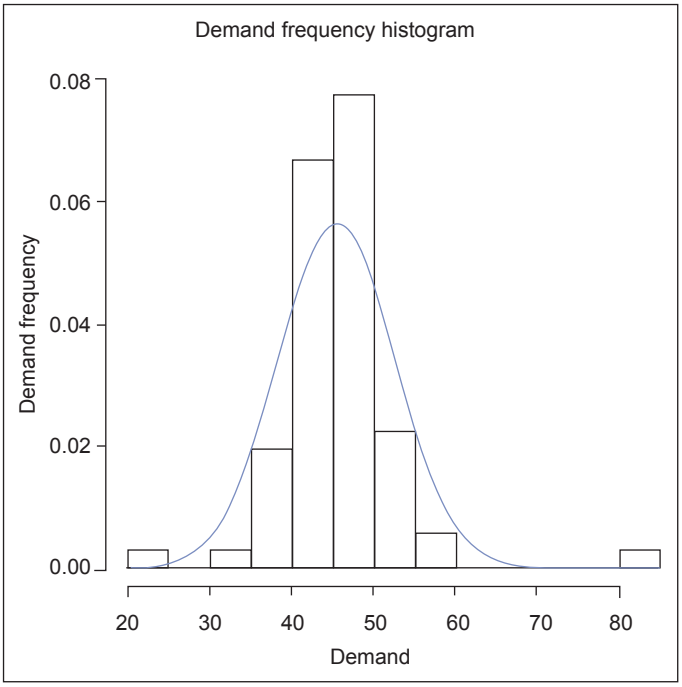
Graph 1 – Monthly absolute demand of years studied.



Graph 2 – Monthly absolute positive over years studied.



Graph 3 – Demand series from 2005 to 2010.



Graph 4 – Distribution of demand frequency from 2005 to 2010.

in the graph above represent the demand observed in May 2006 and December 2008. To avoid the influence of these points in future analyses, we decided to replace them by the corresponding month average calculated in the remaining data, and then perform the analysis again.

As presented in **Graph 6**, the monthly averages (central lines of boxes in boxplots) under visual inspection are not distant. In this graph specifically we did not attribute too much importance to the width of the box (which would represent the

variability of a given month), as there are only six comments in each month.

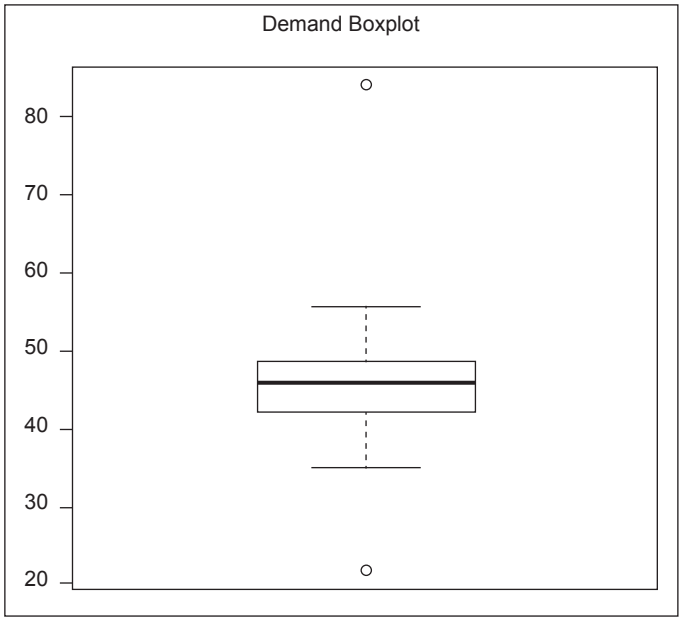
Descriptive analysis of the positivity temporal series

The same analysis was carried out with the demand series. Initially, we show in **Graph 7** the positivity time evolution. It can be noticed in this graph that there has been a strong decrease tendency in the positivity series over the years. This trend is emphasized as from 2007.

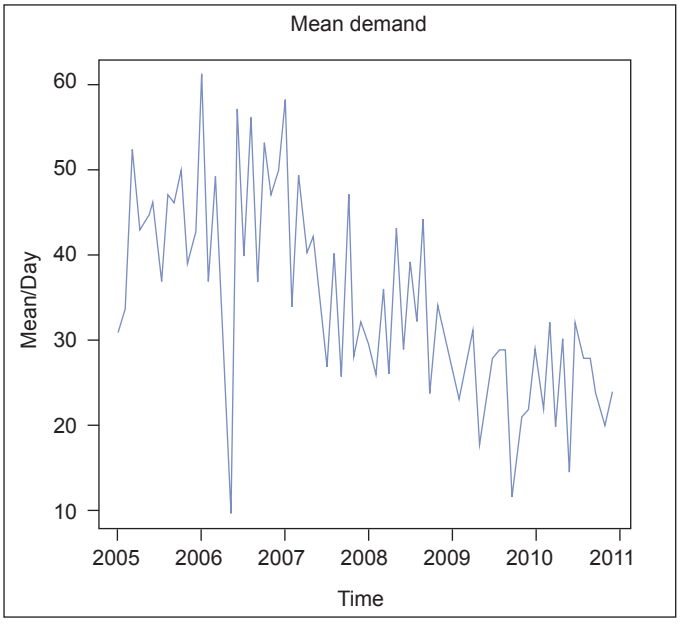
The significant boxplot usefulness during the demand series descriptive analysis is to reveal some outliers, atypical values. We repeat this procedure in **Graph 8** for the positivity series.

The analysis of the positivity series through the boxplot reveals that the comments are in a range varying from 10 to 60 cases with the median around 30 cases (the central line of the box). Contrary to what occurs with the demand series, there is no evidence of atypical observations because no point overflows the borders of the graph.

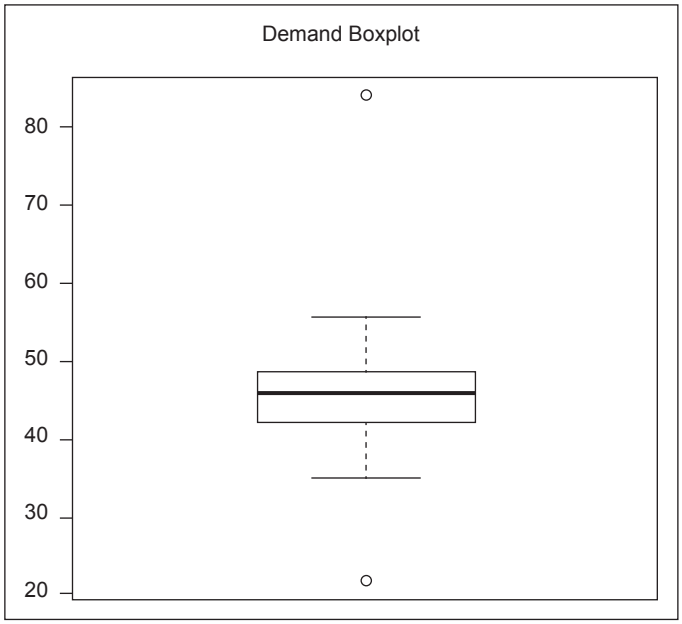
Graph 9 shows that the median of the months of March (3) is above the other months, however, by the size of the box, we realize



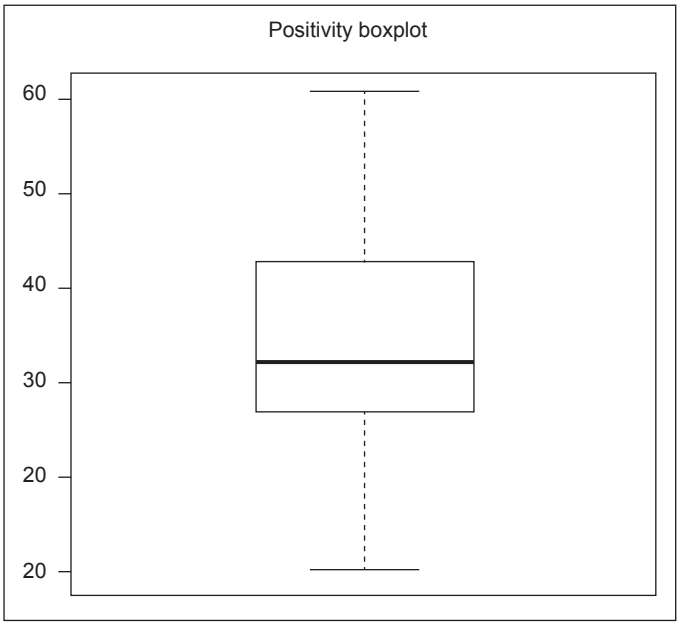
Graph 5 – Demand boxplot from 2005 to 2010.



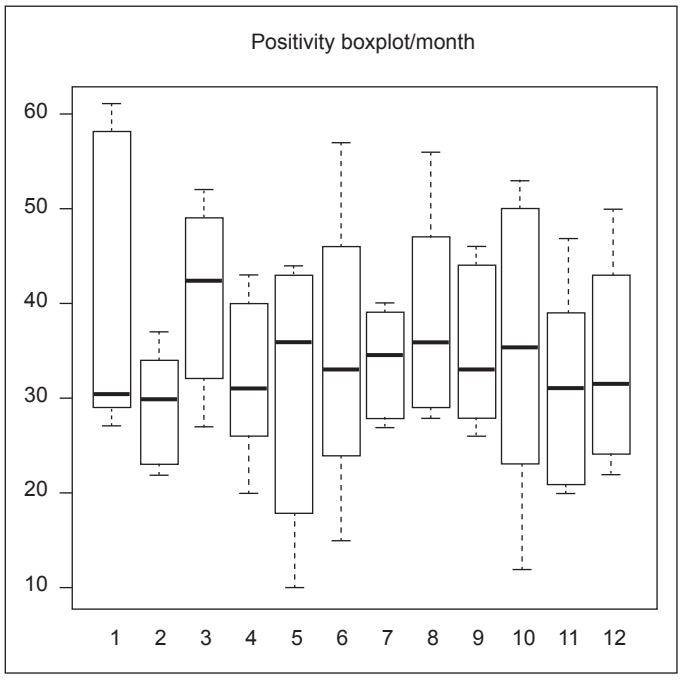
Graph 7 – Positivity series from 2005 to 2010.



Graph 6 – Demand boxplot for HIV tests classified by observation month.



Graph 8 – Positivity boxplot from 2005 to 2010.



Graph 9 – Positivity boxplot classified by observed month.

there is a great data variability, although we emphasize we only have six observations for each month.

Classic decomposition of demand and positivity series in HIV tests

According to Morettin[12], the decomposition model (additive) of the temporal series assumes that the time series can be decomposed into three unobservable components: T(t), S(t) and a(t). These components represent Trend, Seasonality and Randomness, respectively. Therefore, an observation of a time series can be described as follows:

$$Z(t) = T(t) + S(t) + a(t)$$

if these components interact in an additive way or:

$$Z(t) = T(t) \times S(t) \times a(t)$$

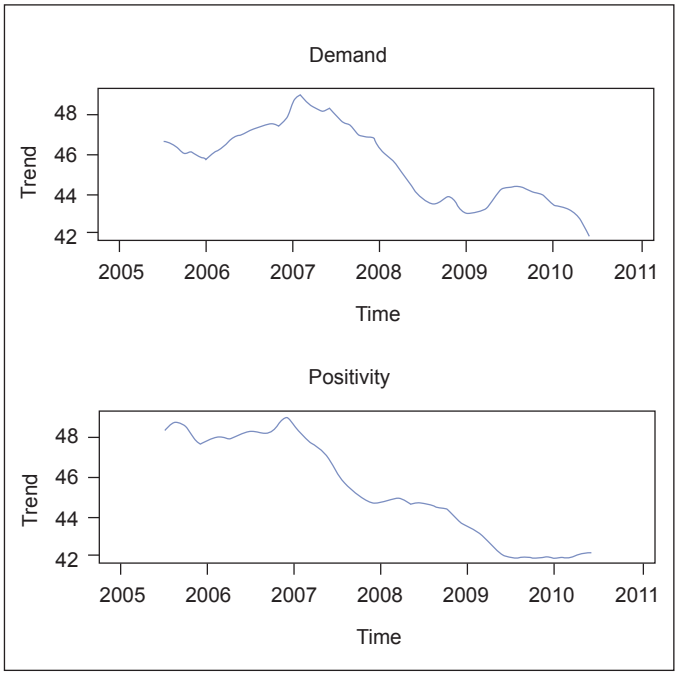
if the relation between them is multiplicative.

In this work, we will use the additive model to verify the magnitude of Trend (T(t)) and Seasonality (S(t)) components and look for an interpretation. We point out that this phase is still exploratory and that no tests of hypotheses about the results will be carried out.

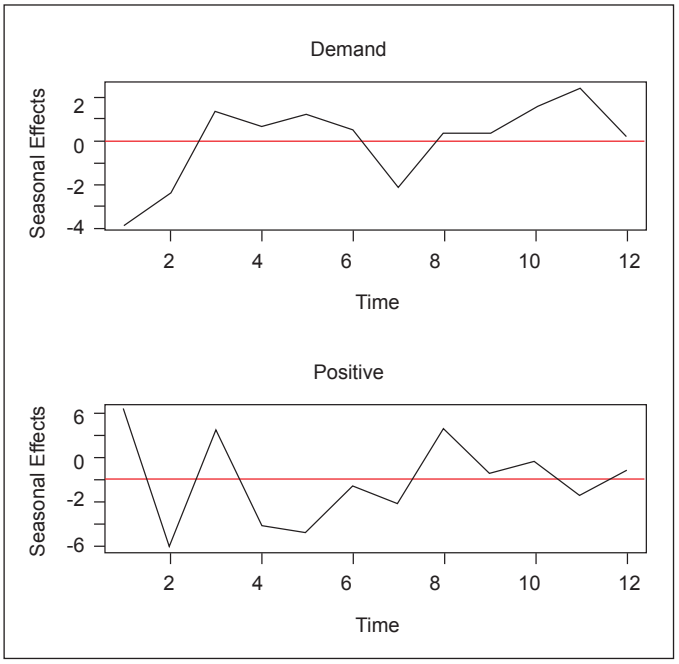
The results were obtained through the *decompose* function, available in the R statistical package. With this function, trend and seasonality are both estimated by the centered moving averages method.

Graph 10 shows the estimated trend of both the demand and positivity series during the data observation period. In both series, it is possible to highlight a decline of values, and this decrease in the positivity series becomes more "accelerated". Apparently, 2007 is the beginning of this behavior change in both charts.

Graph 11 illustrates the seasonal effects estimated for each month. For the interpretation of this graph, consider horizontal line represents the average behavior of the series. There is an estimate of the associated increase or decrease in demand (or positivity) for each month in relation to the global average.



Graph 10 – Estimated trends for demand and positivity series through centered moving means (decompose function of R package).



Graph 11 – Seasonal effects estimated for demand and positivity series through centered moving averages (decompose function of the R package).

Among other facts, we can observe in **Graph 11** that demand in January and February is below the average, while the number of positivity cases in January, March and August is above the average.

Both the analysis of the demand and positivity performed until then had a merely exploratory character. To obtain statistical significance of the results, we will adjust a regression model to both series that includes a term to describe the linear trend series and the months of the year as explanatory variables. The significance of the trend as well as seasonality will be linked directly to the parameters of the regression model.

Linear regression adjustment to verify Trend and Seasonality in Demand and Positivity

To verify the importance of both trend and seasonal component, two linear regression models were adjusted to demand and positivity, respectively. These terms were included in the regression models (intercept and time) to measure the linear trend and indicator variables for each month using the month of December as the reference month.

The adjusted linear regression model for the demand series produced the results presented in **Table 3**.

As expected, there is a significant decrease trend in demand illustrated by the negative sign of the coefficient associated with the variable time. The value –0.0931 indicates the average decrease on demand/day in each month elapsed. The *p*-value for this parameter is below the level of significance of 1%.

Despite the evident trend importance, the effects of months' estimates did not show statistical significance. This fact indicates there is enough evidence in data to support the assumption of a difference in demand due to a given month of the year.

The same model adjusted to the demand series was also adapted to the positivity series as well. The conclusions regarding trend and seasonality significance are similar. According to **Table 4**, there is a significant decrease in positivity (–0.365 per month) and a higher acceleration if compared with the demand series. However, there is no statistical significance on the effects caused by the months of the year.

Cross-correlation analysis between Demand and Positivity Series

In this study, we verify if there is a correlation between demand in a given month and positive cases in future months. For this purpose, we use the cross-correlation function.

The cross-correlation measure requires that two series are stationary, and due to this fact, we use the adjusted models in Section

Table 3 – Adjustment results of multiple linear regression model for the demand series

Coefficients	Estimates	Standard error	*t*-statistics	*p*-value
Intercept	47.6945	1.9825	24.06	0.0000
Time	–0.0931	0.0240	–3.87	0.0003
January	–2.5613	2.4275	–1.06	0.2957
February	–1.6366	2.4250	–0.67	0.5024
March	2.8715	2.4227	1.19	0.2407
April	1.9862	2.4207	0.82	0.4152
May	1.5846	2.4189	0.66	0.5150
June	2.2423	2.4174	0.93	0.3574
July	–0.3680	2.4161	–0.15	0.8795
August	1.2734	2.4150	0.53	0.6000
September	1.0615	2.4141	0.44	0.6618
October	2.2012	2.4135	0.91	0.3655
November	3.4559	2.4132	1.43	0.1574

Table 4 – Results of the adjustment of multiple linear regression model for the positivity series

Coefficients	Estimates	Standard error	*t*-statistics	*p*-value
Intercept	48.8500	4.1002	11.91	0.0000
Time	–0.3615	0.0497	–7.27	0.0000
January	1.6901	5.0204	0.34	0.7376
February	–7.9484	5.0153	–1.58	0.1183
March	3.9131	5.0106	0.78	0.4379
April	–4.7254	5.0064	–0.94	0.3491
May	–5.0306	5.0027	–1.01	0.3187
June	–1.1690	4.9995	–0.23	0.8159
July	–1.6409	4.9968	–0.33	0.7438
August	3.5540	4.9945	0.71	0.4795
September	0.2488	4.9928	0.05	0.9604
October	0.4437	4.9916	0.09	0.9295
November	–2.5282	4.9908	–0.51	0.6143

3.4 for the calculation of this measure. We emphasize that when working with residues, the trend components of both series were removed and, therefore, it is reasonable to assume that these series are stationary.

The cross-correlation analysis result is condensed in **Graph 12**.

The limits in blue (dotted line) on **Graph 12** work as critical values for the cross-correlation values. Values exceeding the limits indicate significant correlations between the demand and the positivity in an overdue moment. When the difference (Lag) is in value 0, we evaluate the immediate correlation between demand and positivity. As all values are within limits, we conclude there is no evidence of cross-correlation between the demand and positivity series. Under a practical point of view, the values observed for the demand in a given month do not help predict the positivity in future months.

Chart 1 shows the positivity percentage average by month as well as minimum and maximum per month.

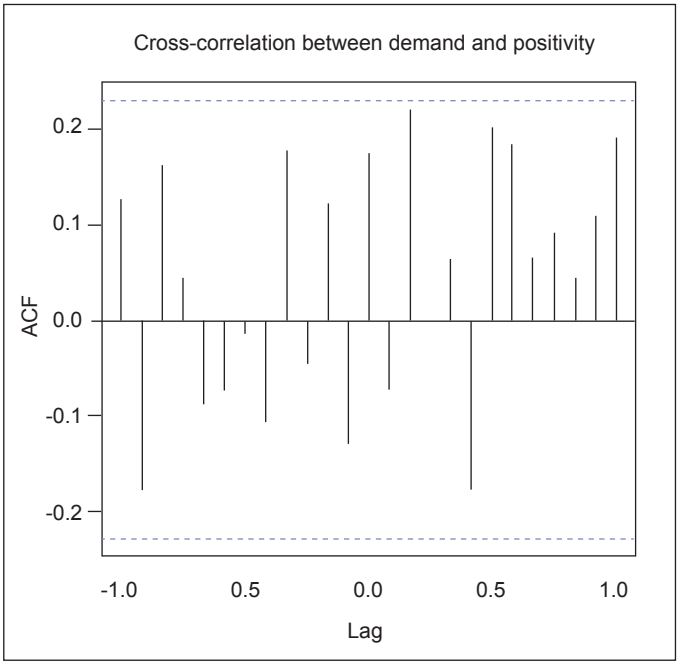
DISCUSSION

After searching in the main database (Lilacs, SciELO, MedLine, PubMed, Scopus, Web of Science) for the past ten years, we noted it was difficult to find articles focused on the relation between anti-HIV tests seasonality, demand and positivity. In fact, we found few publications on the topic, hindering the visibility of the problem, and consequently the implementation of priority interventions and subsequent evaluations of their effectiveness.

The number of working days varies from month to month, as shown in data collection and statistical analysis of the years studied, not only due to the absolute number of days, which can range from 28 to 31, but also to holidays, which occur mostly during February, April and December, and could misdirect our analysis.

In a study about risky behavior during Carnival based on questionnaire filled in by percussionists (men) of a samba school from São Paulo, Hughes *et al*. concluded that those who were at risk only during Carnival did not differed from the ones who were at risk other times[16]. This reinforces the understanding that who is at risk in a successful event as Carnival has a huge potential to be at risk throughout the year.

To confirm the hypothesis that anti-HIV tests demand and positivity distribution does not follow a rule, in other words, it does not present a typical temporal distribution, and it does occur at random, Lima *et al*., in a publication on massive campaigns of STD/AIDS released by the federal Government, reinforce that the calendar is fixed, only contributing to build the imaginary of AIDS in the country's scenario[17].



Graph 12 – Cross-correlation between demand and positivity series (ccf function of R package).

Chart 1 – Positivity Percentages 2005-2010

	Positivity								
Year/Month	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Med.**	**Min.**	**Max.**
January	3.33%	6.60%	5.45%	3.69%	3.71%	3.32%	4.35%	3.33%	6.60%
February	4.32%	4.43%	4.28%	3.16%	3.31%	3.69%	3.85%	3.16%	4.43%
March	4.52%	5.04%	4.38%	4.31%	2.54%	3.03%	3.96%	2.54%	5.04%
April	4.50%	3.80%	4.60%	3.31%	3.94%	3.18%	3.88%	3.18%	4.60%
May	4.89%	2.42%	4.13%	4.72%	2.10%	3.14%	3.56%	2.10%	4.89%
June	4.40%	6.56%	3.80%	3.30%	2.92%	2.34%	3.88%	3.30%	6.56%
July	5.08%	4.92%	2.30%	3.73%	2.63%	3.54%	3.7%	2.30%	5.08%
August	4.49%	4.71%	3.95%	3.51%	3.16%	3.01%	3.80%	3.01%	4.71%
September	4.48%	3.99%	2.84%	4.88%	3.18%	3.43%	3.79%	2.84%	4.88%
October	5.33%	4.81%	4.50%	2.72%	1.37%	2.88%	3.60%	1.37%	5.33%
November	4.71%	6.00%	3.74%	4.49%	2.10%	2.49%	3.92%	2.10%	6.00%
December	4.70%	5.44%	4.14%	2.05%	2.97%	3.24%	3.75%	2.05%	5.44%
Med.	4.56%	4.89%	4.01%	3.65%	2.82%	3.10%		2.60%	5.29%
Min.	3.33%	2.42%	2.30%	2.05%	1.37%	2.34%	2.30%		
Max.	5.33%	6.56%	5.45%	4.88%	3.94%	3.69%	4.97%		
Carnival	08/02/05	28/02/06	20/02/07	05/02/08	24/02/09	16/02/10			

As a way to strengthen our argumentation, we have researched the number of live births of mothers of Niterói who gave births in this city[18]. The result shows that the month of November, which comes nine months after carnivals that occurred in February, presents the lower absolute number of total births in the 2005–2010 series. Thus, it is reasonable to suppose that these data weaken the theory that there is a greater number of unprotected sexual intercourse during the Carnival period.

Still in the range of other STDs, there is an important time series study published by our research group, Passos *et al*., in 2010. Along 12 years, our study concluded that no increase of syphilis, gonorrhea and trichomoniasis is associated with Carnival[19].

On the data analysis of **Chart 2**, it can be noted at first that the months of August have greater absolute demands, and the months of May have smaller absolute demands, when compared to the other months of the year, except December 2008. However, these differences do not show statistical significance, a fact verified after analysis through tests of significance.

In fact, the discrepancy in the absolute demand found in December 2008 is explained from an event, by public health activities, such as the "Worldwide Day of Fight against AIDS" (December 1st), known as the governmental campaign "For the Record" (STDs, AIDS and Viral Hepatitis Department of the Health Ministry). This encourages HIV testing by general population[20].

It is important to mention that the second edition of the same campaign, between November and December 2009, did not achieve the repercussions of the 2008 campaign in the city of Niterói. However, we point out that despite the demand increase in anti-HIV tests in 2008, there was no rise in the number nor in the percentage of anti-HIV test positivity in relation to the demand[21].

Although the largest number of AIDS cases in Brazil's Southeast region (56%), the incidence rate in this region has been decreasing over the years[1]. Several factors may be contributing to this decrease. However, we found no publications to help us understand this situation. We believe that more people diagnosed with HIV associated with a large number of people in use of Highly Active Antiretroviral Therapy and the dissemination of information can contribute to the stabilization/reduction of people living with HIV.

The present study shows that our initial hypothesis was not true, and that demand and positivity of anti-HIV test decreased significantly and also there was no seasonal interference throughout the period studied.

It is worth mentioning that the dissemination of useful information on sexuality issues, STD, HIV, will certainly benefit many people. However, this cannot be diffused as the primary factor to impact on the epidemiology of such a complex disease as AIDS and other STDs. Moreover when the information occur more intensely in specific times of the year (December 1st and Carnival).

Occasionally intern problems interfere (or hinder) with the dissemination of the "educational campaigns on HIV" promoted by the Brazilian Ministry of Health, which is an additional complication factor, as occurred in the last campaign of the Ministry of Health of Brazil[22–27].

As a limitation of the study, we should mention that it was not possible to separate the repeated tests.

Another limitation of this study is that it is about a single service located in a single city. However, we emphasize that Niterói is a medium-sized city, but it is a reference to several other municipalities in the metropolitan region of Rio de Janeiro. We point out, however, that the laboratory involved in this work is available for a population of more than 1,974,911 inhabitants for viral load and CD4 levels testing. The population distributions of the cities are as follows: Silva Jardim, 21,362; Tanguá, 31,438; Rio Bonito, 56,436; Maricá, 135,121; Itaboraí, 222,618; Niterói, 491,807; and São Gonçalo, 1,016,128 inhabitants[28].

Although our "*n*" has been of 64,505 tests, this is an analysis of only one laboratory, and although it is a reference laboratory in the city, the analysis cannot be amplified for the national level. Our suggestion is to encourage a research with greater scope to compare the results obtained.

Chart 2 – Absolute demand of anti-HIV test: 2005-2010

	Absolute Demand								
Year/month	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Med.**	**Min.**	**Max.**
January	931	924	1063	812	728	873	888,5	728	1063
February	787	835	793	823	695	566	749,8	566	835
March	1150	971	1118	834	1060	1054	1150	834	1150
April	956	815	870	785	787	629	807	629	956
May	900	412	1016	911	857	955	841,8	412	1016
June	1045	869	974	877	821	639	870,8	639	1045
July	728	812	1172	1045	1062	904	953,8	728	1172
August	1047	1189	1012	911	917	930	1001	911	1189
September	1027	927	913	901	910	815	915,5	815	1027
October	938	1101	1044	882	874	797	939,3	797	1101
November	828	783	747	756	1001	802	819,5	747	1001
December	915	919	772	1509	740	740	932,5	740	1509
Med.	937,6	879,75	957,8	920,5	871	808,6		808,6	957,8
Min.	728	412	747	756	695	566	749,8		
Max.	1150	1189	1172	1509	1062	1054	1150		
Carnival	08/02/05	28/02/06	20/02/07	05/02/08	24/02/09	16/02/10			

We recommend the conduction of similar studies in all Brazilian regions, so we can know the reality of this subject in Brazil.

CONCLUSION

We observed no relation of seasonality neither with demand nor positivity of anti-HIV tests carried out in LCSPMV.

We noticed no increase in the anti-HIV serological tests demand and/or positivity for anti-HIV test after Carnival in LCSPMV, in Niterói, Rio de Janeiro.

We found a significant anti-HIV tests decrease in both demand and positivity along the years studied in the 2005-2010 series.

Hence, it follows that the main event setting the rules of variables distribution along the years was randomness and not seasonality, like common sense could think.

Conflict of interests

The authors declared no conflict of interests.

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KNOWLEDGE OF NURSING STUDENTS ABOUT HUMAN PAPILLOMAVIRUS INFECTION AND VACCINATION

CONHECIMENTO DE ACADÊMICOS DE ENFERMAGEM EM RELAÇÃO À INFECÇÃO PELO PAPILOMAVÍRUS HUMANO E SUA VACINAÇÃO

Taciana Magna Feitosa de Andrade[1], Mariana Cavalcante Martins[2], Fabiane do Amaral Gubert[2], Clarice Mendes de Freitas[3]

ABSTRACT

Introduction: Sexually transmitted diseases (STDs) are one of the major health problems in the world. Among STDs, the Human Papillomavirus (HPV) infection is the most prevalent one, since approximately five hundred thousand to one million people are infected with this virus each year. **Objective:** To evaluate the knowledge of nursing students about the HPV and vaccination. **Methods:** A descriptive study with quantitative approach performed in a private higher education institution in Fortaleza, Ceará, Brazil. The sample consisted of students from the 1st and the 7th semester of nursing. Data were collected through a semi-structured questionnaire and analyzed with the SPSS, version 14.0, and descriptive statistics. **Results:** By characterizing the students, it was observed that 50.8% are older than 25 years old, 52.5% of them study and live only with help from their parents, and 80.3% reported having an active sex life. When questioning about what HPV is, there was a significant association (p = 0.008), whereas 42.6% of freshmen and 57.4% of 7th semester students reported what an STD is, 93.3% of students in the first semester and 71.0 % in the 7th semester were unaware of the vaccine. **Conclusion:** Most nursing students at the research institution have not enough knowledge about the virus, its consequences, and preventive forms of treatment, which may negatively influence the vulnerability of this age group.

Keywords: sexually transmitted diseases, papillomavirus vaccines, disease prevention, therapeutics.

RESUMO

Introdução: As doenças sexualmente transmissíveis (DSTs) constituem um dos maiores problemas de saúde do mundo. Dentre as DSTs, o papiloma vírus humano (HPV) é a doença mais prevalente, pois cerca de 500 mil a 1 milhão de pessoas se infectam com o vírus anualmente. **Objetivo:** Avaliar o conhecimento de acadêmicos de enfermagem acerca do HPV e sua vacinação. **Métodos:** Estudo descritivo, de abordagem quantitativa, realizado em instituição de ensino superior, privada, de Fortaleza, Ceará. A amostra foi composta por acadêmicos do 1º e do 7º semestres de enfermagem. Os dados foram coletados por meio de questionário semiestruturado, sendo analisados com auxilio do programa estatístico SPSS Versão 14.0 e estatística descritiva. **Resultados:** Ao caracterizar os estudantes, foi observado que 50,8% tem mais de 25 anos; 52,5% apenas estudam e vivem com ajuda dos pais; e 80,3% referiram ter vida sexual ativa. Ao se questionar sobre o que é o HPV, foi verificada associação significativa (p = 0,008), visto que 42,6% dos alunos ingressantes e 57,4% dos alunos do 7º semestre referiram ser uma DST; 93,3% dos alunos do 1° semestre e 71,0% dos concludentes desconhecem a existência da vacina. **Conclusão:** A maioria dos acadêmicos de enfermagem da instituição pesquisada não possuem conhecimento suficiente sobre o vírus, suas consequências, formas preventivas e de tratamento, o que pode influenciar negativamente na vulnerabilidade deste grupo etário.

Palavras-chave: doenças sexualmente transmissíveis, vacinas contra papillomavírus, prevenção de doenças, terapêutica.

INTRODUCTION

Sexually transmitted diseases (STDs) currently constitute one of the major health problems in the world. Among the main STDs, the human immunodeficiency syndrome (AIDS), syphilis and the human papillomavirus (HPV) stand out. The latter should be especially analyzed due to its connection with the occurrence of uterine cancer, which is the second most prevalent cause of death by cancer among women[1].

The HPV infection is the most prevalent disease in the world, since around 500 thousand to 1 million people are annually infected by this virus. Only in Brazil there are from 3 to 6 million infected people, and 3 to 5% of the world population with an active sexual life developed the disease[2].

Papillomaviruses are DNA viruses from the *Papillomaviridae* family, and they infect the epithelial tissue of human beings and other animals. There are about 500 types of HPV, and about 100 of them have been identified as being able to infect humans[3]. Among high risk HPVs, subtype 16 can be mentioned, since it represents the most prevalent HPV in genital infections, accounting for 66% of the cases, and because it is the most prevalent for the invasive cervical cancer, followed by subtypes 18 (15% of the cases), 45 (9%) and 31 (6%). These four types of high risk HPVs are responsible for up to 80% of the cases[3].

Due to this epidemiological picture, vaccines have been developed in the past years with the objective of reducing the rates of infection by the virus, and, consequently, of reducing the number of cervical intraepithelial neoplasia (CIN) and cervical cancer. Despite the great expectations related to the vaccine against HPV, the efficacy of such an immunization to prevent cervical cancer has not been proved, since the real result should only be revealed in the next decades[4].

In Brazil, two types of vaccines against HPV are commercialized. One is quadrivalent and prevents types 16 and 18 (most common ones for invasive cancer), 6 and 11 (low risk, and mostly

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found in condylomata). The other one is specific for the high risk types, 16 and 18[5].

Health professionals, especially in the nursing field, should be able to give proper advice on HPV, its risks, pathology and vaccination, since their contact with the patients is very close. Therefore, this study aims at contributing with scientific literature related to this subject, especially in the state of Ceará, where the scientific production in this field is still scarce.

OBJECTIVE

To assess the knowledge of nursing students concerning HPV and vaccination and to describe the socioeconomic profile of the participants.

METHODS

This is a descriptive and quantitative study performed in a private higher education institution located in the city of Fortaleza, Ceará. The sample was composed of all of the nursing students who studied in the selected institution for this analysis; thirty of them attended the 1st semester, and 31 of them attended the 7th semester, accounting for 61 students. Inclusion criteria were: being nursing students of both sexes, attending the 1st or the 7th semester in the selected institution, enrolled in the morning period, and being at the institution from February to July, 2011.

Data collection began after the approval by the Research Ethics Committee. Sixty-one students were approached, in a reserved location, and the motives of the study were explained. Afterwards, they signed the informed consent form.

Data were collected with a semi-structured questionnaire. In the questionnaire, there were quantitative and qualitative variables, such as age, socioeconomic situation and semester of attendance. The variables in the questionnaire were: knowledge about HPV, forms of contamination, prevention and anti-HPV vaccine.

Questionnaires were filled out during meetings scheduled according to the availability of the researcher and the participants of study. Data were filled out by the researcher, and there was no need to record them, in a structured questionnaire.

Data analysis and tabulation were performed with the statistical software SPSS, version 14.0, and descriptive statistics was used with absolute and relative frequencies identified by means of graphs and tables.

For the analysis of open questions, the theoretical framework by Minayo was adopted, which defends the idea that the analysis and interpretation of the obtained contents can be adapted to the condition of steps or processes to be followed[6]. The three stages are: pre-analysis, exploration of the material and treatment of obtained results and interpretation. With this information, the investigator proposes his or her inferences and interprets data according to the theoretical framework and the proposed objectives, or by identifying new theoretical dimensions suggested by reading the material.

In order to conduct the study, the project was sent to the selected institution so it could be authorized by the signature of the Consent Form. All of the participants were asked to sign the informed consent form, based on resolution 196/96, of the National Health Council, which established guidelines about studies on human beings.

All of the participants were informed about the objectives of the study and the type of participation, and they were free to choose whether or not to participate. Anonymity was ensured and participants were exempt from any damage for participating. Afterwards, they signed two copies of the informed consent form.

RESULTS

The research involved 61 nursing students; 30 of them (49.2%) were aged between 18 and 25 years old, and 31 (50.8%) were older than 25 years old. Thirty students (49.2%) attending the 1st semester and 31 (50.8%) attending the 7th semester were selected. Among them, 25 (41.0%) lived with their parents, while 19 (31.1%) live with other relatives, 10 (16.4%) live by themselves and 1 (1.6%) did not answer.

Considering the age group of the participants, it was observed that 31 of them were more than 25 years old, and 30 of them were between 18 and 25 years old, which characterized major proportion of non-traditional students.

By analyzing the characterization of nursing students who participated in the study as to socioeconomic aspects, it was possible to observe that, among the interviewees, 29 students (47.5%) already occupy paid positions, due to the need to maintain themselves financially and with the objective of gaining professional experience; at the same time, 32 (52.2%) only study and live with their parents' resources.

As to the income declared by the participants, 5 of them (8.2%) survive with less than 1 minimum wage, while 13 (21.3%) receive 1 to 2 wages; 5 of them (8.2%) dispose of 3 or more minimum wages; 32 (52.5%) claimed they did not have a defined income.

Out of the students, 18 (29.5%) have worked in the health field; however, 4 (6.6%) work in the administrative sector; 1 (1.6%) works with education; 32 (52.5%) do not work; 3 (4.9%) work in other fields; 3 (4.9%) did not mention the field of work.

According to the characterization of the analyzed nursing students as to sexual history, 49 of them (80.3%) referred having an active sexual life, while 12 (19.7%) have not had sexual intercourse yet.

Among those with an active sexual life, 22 (36.1%) initiated sexual activities when they were younger than 18 years old, while 26 (42.6%) initiated it between the ages of 18 and 25 years old; 1 (1.6%) reported having initiated in sexual life after the age of 25. Three of the interviewees (4.9%) still have not had sexual intercourse, and 9 (14.8%) did mention it. Out of the interviewees with an active sexual life, 48 (78.8%) claimed to have a single partner, while 11 (18%) do not have a partner; 2 (3.3%) did not mention it.

About the use of contraceptives, 39 interviewees (63.9%) claimed to use some method. However, 22 of them (36.1%) did not use any contraceptive method. From the ones who use it, 15 students (24.6%) use the oral contraceptive pill; 14 (23%) use a male condom; 4 (6.6%) use more than one method simultaneously; 2 (3.3%) use an intrauterine device. Even though 12 interviewees claimed not to have an active sexual life, 23 of them (37.7%) reported not using any contraceptive method, which means that,

out of these, 11 (18%) had intercourse using no kind of prevention. It was observed that women prefer to use the oral contraceptive pill (24.6%), or other methods apart from the male condom.

When they were questioned about what HPV was, a significant association was observed (p = 0.008). Out of the 47 participants who mentioned it was an STD, 42.6% were in the 1st semester and 57.4% attend the 7th semester. Empirically, 6 of them showed that HPV is 'something that causes cancer', and 66.6% of these are students in the 7th semester. This shows that students attending the 7th semester of the nursing course are more aware about this disease. These data are statistically significant (p = 0.008).

With regard to forms of treatment, which also had significant results (p < 0.001), two (100.0%) responses that referred to the vaccine were given by the students in the 1st semester, who also mentioned the intake of antibiotics. Cauterization was mentioned by 15 students, being 6.7% from the 1st semester and 93.3% from the 7th semester, which shows that the latter are more aware of the disease. This was also observed when they mentioned the application of trichloroacetic acid (TCA), being mentioned by only 8 students in the 7th semester (100.0%). Surgical treatment was mentioned by one student in the 7th semester, who also mentioned HPV is incurable. It is worth to mention that the response "is not aware of treatment forms' was prevalent in both semesters (1st semester – 74.1% and 7th semester – 25.9%).

As to the form of preventing HPV, 47 interviewees mentioned the use of a male condom (rubber), and, from these, 66.0% attended the 7th semester and 34% studied in the 1st semester. Only three participants said that prevention should be made by means of the Pap test, and all of them attended the 1st semester in the nursing course. Vaccination was mentioned by two participants, and 100.0% of them attended the 1st semester. However, it was observed that only students in the 1st semester (100.0%) did not know how to avoid contamination.

About the knowledge of the vaccine to prevent agains the HPV infection, 11 students claimed to know it, and 18.2% of them attended the 1st semester (81.8% attended the 7th semester). Fifty students claimed to not know the vaccination, out of whom 56.0% were in the 1st semester, while 44.0% already attended the 7th semester, and this was also statistically significant (p = 0.023).

DISCUSSION

With the findings in this study, it is observed that the analyzed institution has more students aged more than 25 years old. Studies show that in private universities, many nursing students (about 70.3%) are older than those in public institutions, where the percentage of younger students is high[7].

The fact that most students in this research only studied and lived with the assistance of family resources is in accordance with the results in another research, according to which most students in a private nursing school (48.8%) works and lives by their own wage, while 48.4% of students attending the public school receives an allowance from their parents, and 20.7% of those in private schools have education credit. Students who work do so due to the need for payment and experience, which is also in accordance with the findings of a study conducted with nursing students[7].

Therefore, based on this reality, these students cannot always find jobs or internships in the health field. So, they are forced to take positions that are completely different from their field of study. Young adults need to work to survive and wish to study to progress, so they need to sacrifice other things they are interested in, such as leisure, outings and, sometimes, the graduation itself[8].

The high number of young students with an active sexual life observed in this study is a result of the current tendency that has been transforming the sexual behavior of adolescents. The early initiation in sexual life, which was mainly observed among boys at first, is now a reality also among girls.

According to data from the Ministry of Health, in 1984 the mean age of sexual initiation among adolescents was of 16 years old among women and 14 years old among men, which accounts for 35.2%. In 1998, the age range decreased to 15 years old among women, and the percentage of adolescents who had their first sexual intercourse before the age of 14 was of 32.3%. In 1984, this percentage was of 13.6%[9].

Fortunately, young people usually have one partner, and the number of people who have sexual intercourse promiscuously is lower. This certainly is a result of the influence of the media, since sexual education and information about contraceptive methods are not transmitted properly, which favors the multiplicity of partners[10].

In this research, it was demonstrated there is still a significant number of young people who are not concerned about contraceptive methods (37.7%), which is in accordance with what has been found by other authors, according to whom adolescents of both sexes tend to use less contraceptive methods when sexual initiation takes place before the age of 15[11].

As observed in this study, the oral contraceptive pill is prevalent among women, which leads to the risk of STD infections, and this is in accordance with the opinion of other authors[12]. It is noticed that young people who use contraceptives have turned to methods that prevent pregnancy, but they forget about the need to prevent against STDs. Despite the numberless AIDS prevention campaigns, and the broad diffusion of knowledge about the use of male condoms, most sexual encounters between young people occur with no sort of protection. It is recommended that intervention strategies with these population groups promote the integration of contents and actions to prevent STDs and be related to sexual and reproductive health care.

By comparing the data in this study, it is observed that all of the approached items were statistically significant, since there was a difference between the level of knowledge between students attending the 1st and the 7th semesters. Because of more advanced studies in the health field, students from the 7th semester are more aware that HPV is an STD, in comparison to the ones who are beginning the nursing course and who have not been prepared by the family and by elementary school with regard to STDs.

The unawareness of young people with relation to STDs, especially AIDS and HPV, is a major public health issue, since some studies have shown that they are little informed in terms of reproductive health[13].

The participants in the 1st semester demonstrated having precarious knowledge about the theme, which leads us to believe that some aspects of the subject are not clear for young people, for instance, the definition of HPV and STD. Therefore, from

the obtained data, it was possible to notice some difficulties with regard to the definition of HPV and some mistakes related to transmission, symptomatology, places of injuries and HPV prevention. It is worth to mention that due to inhibitory factors, such as embarrassment or lack of interest from the participants, some results may have been underestimated.

The treatment for HPV can be performed with several procedures, and each of them presents limitations and different levels of efficacy and acceptance from patients. They can be divided into chemical, chemotherapy, immunotherapy and surgical methods[14].

The most used chemical method is the application of 80–90% trichloroacetic acid, which was mentioned by eight students attending the 7th semester. Chemotherapy methods are conducted with fluorouracil and interleukin[15]. Immunotherapy uses interferon alpha and beta, imiquimod and retinoids. Among surgical methods, there are curettage, scissor excision, scalpel excision and more current ones, which are high frequency loop excision and laser[14].

This study showed that some participants who had just entered a health course knew about the Pap test and considered it was important, however, they were not aware of its real purpose. Therefore, the inadequate or incomplete knowledge of the Pap test may lead to a negative attitude in relation to the demand for this examination and the frequency with which it should be done[16].

Studies confirm the need to perform cervicovaginal cytology to screen for HPV-induced injuries and cervical cancer[17,18]. However, it is necessary to explain to young people that the male condom provides contact protection, since there might be lesions in regions that are not protected by it, thus enabling the contamination by the virus. On the other hand, the female condom may be more protective, one it covers a broader surface[19].

The Ministry of Health also indicates there is no form of prevention that is 100% safe, since HPV can even be transmitted by towels or other objects[20]. Besides, reducing the number of sexual partners decreases the risk of contracting and, consequently, transmitting any STD, including HPV and the virus that causes AIDS.

The vaccine is able to prevent the infection by the two most common types of HPV, 6 and 11, which are responsible for 90% of warts, besides the two most oncogenic types, 16 and 18, responsible for 70% of cervical cancer cases[20]. It is worrisome that most students in advanced semesters are not aware of the vaccine.

The genetic recombination technology enabled the development of prophylactic vaccines against HPV, formulated with viral capsid proteins (L1), which are highly immunogenic and able to rearrange spontaneously, thus forming particles that are similar to the virus, however, without its DNS (virus like particles – VLP). Several phase 1, 2 and 3 studies revealed that the intramuscular injection of VLP of HPVs 6, 11, 16 and 18 are able to stimulate the antibody response, usually superior to the one found after the natural infection, and that the use of vaccines formulated with these VLPs was safe among animals and humans. Therefore, two prophylactic vaccines were developed for HPV: a bivalent vaccine (HPV 16 and 18), produced by the Glaxo Smith Kline laboratory (GSK), and a quadrivalent vaccine (HPV 6, 11, 16 and 18), produced by Merck Sharp & Dohme (MSD)[21].

Data in this study are in accordance with results from other studies, according to which the unawareness of STDs exists because they are part of a set of very complex diseases, once there are more than 20 types[22].

In this sense, it is necessary to explain to adolescents and teenagers about HPV, the risks of contamination, forms of treatment and, especially, to tell them about the vaccine and when it can be efficient. Therefore, it is important that they know it is a genital disease caused by a sexually transmitted virus[23].

It is essential that health education activities be promoted and addressed to sensitize adolescents and teenagers as to the promotion of sexual and reproductive health, since they are more vulnerable when it comes to matters related to STDs.

For that, the school, the family and the society should broadly publicize information about sexual education. However, it demands permanent formation of teachers, so that they can feel safe to perform this task successfully. This action requires subsides about STDs, forms of infection, preventive means and, especially, the domain of more participative and innovative methodologies that involve also families. It is important to mention that the current vaccination campaign against HPV promoted by the Ministry of Health among adolescent girls is a great step when it comes to information and prevention of HPV in Brazil, and it can reverse the situation experienced by young people, including the ones in this study.

CONCLUSION

It was observed that young adults, nursing students of an institution in Fortaleza, Ceará, are still not sufficiently aware of the HPV virus, its consequences, preventive and treatment forms and about the risks affected women have of contracting cervical cancer.

Conflict of interests

The authors declare no conflict of interests.

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Prevalence of HIV infection in parturient women and coverage of HIV testing during prenatal care and delivery in Brasília, Brazil

Prevalência da infecção pelo HIV em parturientes e cobertura do teste no pré-natal e parto no distrito federal, brasil

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ABSTRACT

Introduction: Prevalence of HIV seropositivity among pregnant women in Distrito Federal, Brazil, is unknown. **Objective**: To estimate the prevalence of HIV infection among parturient women and to describe the coverage of serology testing during prenatal care and delivery in the public health system of Distrito Federal, Brazil. **Methods**: Cross-sectional study, in which the variables sociodemographic data, information on prenatal care, and outcomes in HIV serology were collected from prenatal care cards and medical records of pregnant women residing in the Distrito Federal, whose deliveries occurred in public maternities between June 2009 and May 2010. The parturient was considered seropositive if a test was done with a confirmatory technique. **Results**: We studied 3,726 parturient women, of whom 3,627 (97.3%) had information about the outcome of HIV testing. Twelve ones were detected as HIV positive, representing a prevalence of 0.33% (95%CI: 0.19–0.58). The prevalence analysis by race/skin color, education level, and age range variables showed no statistically significant differences. The proportion of parturient women who presented the mother's card was 94.6%. Coverage with two HIV tests in prenatal care was 22.1%. **Conclusion**: The prevalence of HIV seropositivity among pregnant women in public maternities in Distrito Federal is not significantly different from that estimated for Brazil. The coverage of testing for HIV was low.

Keywords: HIV seroprevalence, pregnant women, prenatal care, health services coverage, health services accessibility, hospital records.

RESUMO

Introdução: A prevalência da infecção pelo HIV em gestantes no Distrito Federal é desconhecida. **Objetivo:** Estimar a prevalência da infecção pelo HIV em parturientes e descrever a cobertura da sorologia no pré-natal e no parto na rede pública de saúde do Distrito Federal. **Métodos:** Estudo seccional no qual os dados sociodemográficos, as informações sobre o pré-natal e os resultados da sorologia para HIV foram coletados no cartão da gestante e no prontuário de uma amostra de parturientes residentes no Distrito Federal, cujos partos ocorreram em maternidades públicas, de junho de 2009 a maio de 2010. Foram consideradas soropositivas as que apresentaram resultado confirmadamente positivo para HIV. **Resultados:** Foram estudadas 3726 parturientes, das quais 3627 (97,3%) tinham informações quanto ao resultado da sorologia para HIV. Foram detectadas 12 parturientes soropositivas para HIV, representando uma prevalência de 0,33% (IC95%: 0,19–0,58). A análise da prevalência por extratos de raça/cor, escolaridade e faixa etária não mostrou diferenças estatisticamente significativas. A proporção de parturientes que apresentou o cartão da gestante foi 94,6%. A cobertura com dois testes para HIV no pré-natal foi de 22,1%. **Conclusão**: A prevalência de soropositividade para o HIV entre as parturientes não diferiu significativamente da estimada para o Brasil. A cobertura de sorologia para o HIV durante o pré-natal foi baixa.

Palavras-Chave: soroprevalência de HIV, gestantes, assistência pré-natal, cobertura dos serviços de saúde, acesso aos serviços de saúde, registros hospitalares.

INTRODUCTION

In the 1990s, it was proved that chemoprophylaxis done in HIV-seropositive pregnant and parturient women and in their newborns was effective to reduce HIV vertical transmission[1,2]. With the need of appropriately making available medicine that is used for such chemoprophylaxis and of implementing preventive, diagnostic, and therapeutical actions recommended in national level[3], it became essential to health services to know the frequency and distribution of HIV infection cases in pregnant women, and the coverage of diagnostic and prophylaxis actions with regard to opportunity and adaptation.

From Decree 993, from September 4th, 2000[4], the Brazilian Health Ministry (HM) established a compulsory notification of HIV infection cases in pregnant women; therefore, from that time on they had information about the occurrence of such cases.

Between 2004 and 2009, the detection rate of seropositive pregnant women in Distrito Federal (DF), calculated from the Information System of Notification Losses and Information System of

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Live Births, which presents the official records of compulsory notification and births, respectively varied from 0.10 to 0.15% of the live births[5]. However, a serological testing concerning Brazilian parturient women[6] that was performed in 2004, pointed out that 0.413% of them (95%CI: 0.294–0.533) were HIV-seropositive, and it also indicated a 0.425% prevalence for the Midwest area.

We must remember that in DF there were no prevalence studies of HIV infection in pregnant women and the number of notifications with regard to such losses remained beyond estimations for Brazil and for the Midwest area, therefore a hypothesis that such prevalence between parturient women in DF was lower than the one estimated for the Midwest area and for the country was suggested.

We believe that knowledge on the prevalence of HIV infection and of coverage of actions concerning prenatal care and delivery allows a better planning of strategies for prevention, diagnosis, and prophylaxis of this increase in vertical transmission.

OBJECTIVE

To estimate the prevalence of HIV infection among parturient women, and to calculate the coverage of serology testing during prenatal care and delivery in the public health system of Distrito Federal, Brazil.

METHODS

This is a cross-sectional study, in which the variables sociodemographic data, information on prenatal care, and outcomes in HIV serology were collected from prenatal care cards and medical records of pregnant women residing in DF.

The study happened in public maternities from DF, from June 2009 to May 2010. This methodology, with secondary data, was proposed for the State and Municipal Health Secretariats by the Brazilian HM[7].

Mothers that were still hospitalized after birth were asked without scheduling a day or a time to sign the free informed consent to agree to take part in the research, and then data were collected. Only information about self-reported educational level and race/skin color was taken from an interview with the mother, the others were taken from the pregnant women cards and hospital documents. Records about how many women refused to take part in the study could not be found. The inclusion criteria included only women who were residents in DF. For a 0.425% rate of infected pregnant women[8], it was considered a bilateral absolute error established in 0.22% and a 5% level of significance. Thus, a minimum sample of 3,359 parturient women was indicated to be collected. Following the national recommendation to develop this study in a state level[7], we tried to compensate the possible losses due to the inclusion of pregnant women who did not have information concerning serology by stipulating the size of the sample to be studied in 4 thousand pregnant women.

The number of participants in each public maternity was then proportionally established to that of live births residents in DF, registered in 2008, in the Information System on Live Births (SINASC), in the respective institutions. Two public maternities, Unidade Mista de Saúde de São Sebastião and Hospital da Força Aérea de Brasília, whose total was of 1.3% of births recorded in SINASC in 2008, were not included due to the small number of pregnant women care. Other two public maternities, Hospital das Forças Armadas and Hospital Regional de Santa Maria, were not included because they were closed in the beginning of the research. Parturient women from private health institutions were also not included due to operational issues. After the investigation, in the same computerized system, the number of live births by maternity during the data collection period was obtained through the verification of sample representation proportionality as to public maternities. In order to also check similarity of the proportions by age range, distributions by age range were collected both in the sample and also in the SINASC in the same period.

Diagnosis of HIV infection in Brazil can be done by conducting immunoenzymatic tests like ELISA, indirect immunofluorescence, immunoblot, Western blot, and quick tests. Herein, only positive results were considered, i.e. with two reagent stages, one through screening technique and the other through confirmatory technique (IFI, immunoblot, quick immunoblot or Western blot) or two quick tests, according to specific algorithm established by the HM for the country[9].

Data collection was performed in a standardized form that had been previously validated by the HM.

The team of field researchers was composed initially of 19 health professionals, who represented 11 of the maternities included in the study. Among the problems concerning data collection, there were replacements of field researchers and temporary closure of some maternities. There were 24 interviewers in total. For each chosen maternity, there was an investigator in charge to orient the field researcher on how to collect information from parturient women.

Pregnant individuals who agreed to participate in the research signed the Free Informed Consent. The research was approved by the Ethics Committee in Research, from the DF Health State Secretariat, according to protocol number 389/08.

RESULTS

Distribution of the parturient women included in the study, of those that had the serology results, and of the number of live births in the research period per public hospital can be found in **Table 1.** Parturient women from Hospital Regional do Paranoá had lower representation in the sample, while those from Hospitais Regionais de Sobradinho and Asa Norte had a higher one.

Proportions by age range found in the sample and in the records of SINASC in the same period are in **Table 2**. Pregnant women aged 15 to 19 years old had lower representation in the sample.

From the 3,726 pregnant women studied, 3,627 (97.3%) presented information regarding the serological testing result for HIV. Twelve pregnant women were seropositive, representing a 0.33% prevalence coefficient (95%CI: 0.19–0.58). Prevalence by race/skin color, educational level, and age range did not show statistically significant differences with regard to the general prevalence of the sample (**Table 3**).

As to HIV testing, only 22.1% of the studied pregnant women performed the two HIV tests needed during gestation, 57.0% had

only one, and 18.3% carried out one at delivery. A 2.7% rate was found for women that did not have the test results in any moments (**Table 4**).

At delivery, 74.9% of the pregnant women had an indication to do the exam, because there were no records of a result in the last quarter of gestation. 7.2% of the parturient women did not take the test in labor although there was an indication (**Table 4**).

Proportion of parturient women that had the mother's card at delivery was of 94.6%. Only 0.8% reported not having the card. The others did not take it or the information was not collected (**Table 4**).

Coverage to carry out the two HIV tests during gestation varied according to educational level, age range, number of prenatal care appointments, and quarter when the prenatal care started. It was lower in pregnant women with lower educational level, in younger ones, in those who started late the prenatal care and had few consultations. In the race/skin color variable, there were no statistically significant differences of coverage of two HIV tests in pregnancy (**Table 5**).

DISCUSSION

Prevalence of HIV seropositivity among parturient women at delivery in the sample did not present a statistically significant difference in comparison to that estimated for Brazil. This finding indicates that a sub-notification of HIV seropositive pregnant women may exist in DF, since the records of compulsory notification show a highly lower prevalence than the one found in this and in other studies[8,10].

It was not possible to achieve the initial estimation of 4 thousand parturient women for the sample size, due to lack of people to gather data in some maternities throughout the research period. However, the final number was higher than the minimum limit established to calculate the prevalence according to established parameters.

Representation differences in the sample happened more due to alterations in the demand of maternities than to study losses. The number of parturient women who had their deliveries in Hospital

Table 2 – Distribution of parturient women with HIV serological results available and mothers of live births in public maternities during the research period, who lived in Distrito Federal, Brazil, by age range

Age range (years)	Parturient women with serology results	Mothers of live births during research period
	n (%)	n (%)
Younger than 14	15 (0,4)	196 (0,6)
15 to 19	526 (14,5)	5275 (16,9)
20 to 34	2654 (73,2)	22467 (71,9)
35 or older	425 (11,7)	3311 (10,6)
Ign	7 (0,2)	–
Total	**3,627 (100,0)**	**31,249 (100,0)**

Ign: non-reported aged.

Table 1 – Parturient women included in the study, those who had the results of HIV serology, and live births from Distrito Federal, Brazil, recorded during the study period in the Information System on Live Births (SINASC) in public maternities

Hospital / Maternities	Parturient women from the sample		Live births during the research period
	Studied	With serology testing results	
	n (%)	n (%)	n (%)
Hospital Regional de Ceilândia	644 (17.3)	636 (17.5)	5,202 (16.6)
Hospital Regional da Asa Sul	605 (16.20)	580 (16.0)	4,981 (15.9)
Hospital Regional de Taguatinga	508 (13.6)	462 (12.7)	4,244 (13.6)
Hospital Regional do Paranoá	196 (5.3)	195 (5.4)	2,815 (9.0)
Hospital Regional do Gama	334 (9.0)	327 (9.0)	2,795 (8.9)
Hospital Regional de Planaltina	349 (9.4)	348 (9.6)	2,636 (8.4)
Hospital Regional de Samambaia	295 (7.9)	295 (8.1)	2.308 (7.4)
Hospital Regional da Asa Norte	300 (8.1)	292 (8.1)	1,847 (5.9)
Hospital Regional de Sobradinho	269 (7.2)	268 (7.4)	1,561 (5.0)
Hospital Regional de Brazilândia	140 (3,8)	139 (3.8)	1,019 (3.3)
Hospital Universitário de Brasília	86 (2.3)	85 (2.3)	735 (2.4)
Hospital Regional de Santa Maria	–	–	549 (1.8)
Hospital das Forças Armadas	–	–	323 (1.0)
Unidade Mista de Saúde de S. Sebastião	–	–	193 (0.6)
Hospital da Força Aérea de Brasília	–	–	40 (0.1)
Hospital Naval de Brasília	–	–	1 (0.0)
Total	**3,726 (100.0)**	**3,627 (100.0)**	**31,249 (100.0)**

Table 3 – Distribution of seropositive parturient women who presented the serology tests results, and prevalence of HIV-seropositivity, according to race/skin-color, educational level, and age range

Variables*	Number of parturient women		Prevalence	
	Seropositive	With serology results	%	95%CI
Educational level				
Illiterate and incomplete primary school	1	123	0.81	0.14–4.46
Complete primary school and incomplete elementary school	1	847	0.12	0.02–0.67
Complete elementary school and incomplete high school	5	1,027	0.49	0.21–1.14
Complete high school and incomplete superior	5	1,466	0.34	0.15–0.79
Complete superior school or more	–	124	–	–
Race/Skin color				
White	6	895	0.67	0.31–1.45
Black	–	573	–	–
Mulatto	6	1,992	0.30	0.14–0.65
Yellow	–	36	–	–
Indigenous	–	15	–	–
Age range				
< 20	–	541	–	–
20 to 39	11	2,984	0.37	0.21–0.66
40 or older	1	95	1.05	0.19–5.72
Total	**12**	**3,627**	**0.33**	**0.19–0.58**

*Proportion of records with ignored information – educational level: 1.1%; race/skin color: 3.2%; age range: 0.2%.

Table 4 – Distribution of parturient women included in the study according to HIV testing and pregnancy card availability

Variables	n (%)
Number of HIV tests	
Two tests in the prenatal care period	823 (22,1)
Took one test at delivery	581 (15,6)
Did not take a test at delivery	242 (6,5)
One test in the prenatal care period	2,123 (57,0)
Took one test at delivery	1,873 (50,3)
Did not take a test at delivery	250 (6,7)
No results in the prenatal care period	780 (20,9)
Took one test at delivery	681 (18,3)
Did not take a test at delivery	99 (2,7)
Indication to take the test at delivery	
With indication*	2,790 (74,9)
Took one test at delivery	2520 (67,6)
Did not take a test at delivery	270 (7,2)
Card	
Has and took it	3526 (94,6)
Has but did not take it	98 (2,6)
Does not have	30 (0,8)
Information was not collected	72 (11,9)
Sample total	3,726 (100,0)

*There was no HIV test result in the last quarter of pregnancy.

Regional do Paranoá, for example, changed from 1,645 in 2008 to 2,711 in 2009, a 65% raise. Such differences cause some caution as to the result extrapolation for the population of parturient individuals from the public health system. The public maternities that were not included in this sample took care of only 3.5% of the parturient women from public institutions in the DF. Some of them provide services for specific populations, like those from military hospitals that receive servers of the Armed Forces and the Unidade Mista de São Sebastião, which performs only normal deliveries.

On the other hand, the proportion of pregnant women that had some record of HIV testing results was pretty high, therefore the absence of serology results records little influenced on the prevalence calculation.

The analysis of prevalence by race/skin color, educational level, and age range variables did not show any statistically significant differences; however, such analysis was limited due to the reduced size of the sample, which was not sized to carry out prevalence stratified analyses.

As to the number of tests, the most frequent situation was the performance of only one serology testing in pregnancy, so a new test was performed at delivery. More than half of the parturient women were in this situation.

The proportion of pregnant women with indication of serology testing at delivery, due to lack of serology result in the last quarter of gestation, including those that did not perform the test in any previous moments, was very high. Most pregnant women took the test at delivery, but the opportunity of prophylaxis of vertical transmission in the prenatal care was missed. Furthermore, the great demand for testing in maternities overloads the services and may compromise the quality of the result, especially due to late availability after the child's birth. Quick tests in Brazilian maternities

Table 5 – Coverage of HIV testing with two tests in prenatal care by biosocial and prenatal care variables in the studied sample

Variables*	Coverage (%)	Statistical analyses by variable
Educational level		
Illiterate and incomplete primary school	11.5	
Complete primary school and incomplete elementary school	16.6	
Complete elementary school and incomplete high school	21.1	$\chi^2 = 43.4$; FD = 4; $p < 0.001$
Complete high school and incomplete superior school	26.0	
Complete superior school or more	31.0	
Race/Skin color		
White	24.8	
Black	18,9	
Mulatto	22.2	$\chi^2 = 8.8$; FD = 4; $p = 0.067$
Yellow	16.7	
Indigenous	15.4	
Age range (years old)		
< 20	18.2	
From 20 to 39	22.9	$\chi^2 = 6.21$; FD = 2; $p = 0.045$
40 or older	20.0	
Prenatal care appointments (number)		
7 or more	29.8	
4 to 6	16.1	$\chi^2 = 141.6$; FD = 2; $p < 0.001$
1 to 3	3.8	
Quarter of the prenatal care beginning		
First	27.6	
Second	18.6	$\chi^2 = 68.1$; FD = 2; $p < 0.001$
Third	5.7	
Sample total	22.1	

*Proportion of records with ignored information – educational level: 1.2%; race/skin color: 3.2%; age range: 0.3%; prenatal appointments (number): 6.1%; prenatal quarter beginning: 10.3%.
χ^2 = chi-square; FD: freedom degrees.

have some implantation issues, mainly concerning the availability of fast results and the appropriate intervention[11].

Even parturient women who had several prenatal care appointments and those who initiated prenatal care in the first quarter had low coverage of taking two HIV tests during gestation, which are recommended by the Decree from the Health State Secretariat of DF Government (SES-DFG) number 37/08[12]. For those who initiated prenatal care late and had few appointments, coverage with two tests was even lower. The parturient women with lower educational level and the younger ones also had a very low coverage. It is possible that an important condition that created low coverage may be the precarious socioeconomic condition of the parturient, which can cause several other inter-connected factors, such as late prenatal care beginning, with few consultations, low educational level, and pregnancy at a younger age range. National and local experiences have showed this influence and reinforce the condition of higher social vulnerability in the poorest social classes[8,13-16]. Such finding indicates the need of health services that prioritize a solution for the problems associated with the access of such population to health services.

Low coverage of the serology testing found among the youngest women also indicates the need of specific strategies to increase prevention knowledge, opportunities, and options in this populational range[17-19].

Since this research works with a survey of secondary data, which were obtained from the mother's card and from administration records, the possible failures concerning the notes in such documents should be considered as the limitations of this study.

There is a strong possibility that some parturient women have reported a false district address to the health services, since they actually reside in other states, mainly around the DF. A study carried out in 2002 estimated in 3.6 and 8.0% the proportion of mothers that stated living in DF at delivery, but they actually lived in other states[20].

Parturient women from the public health system correspond to 78.9% of DF residents[21], however, since SINASC data indicate that the sociodemographic profile of parturient women who had their children in private maternities is very different from that of public services[21], it was considered that it would not be appropriate to extrapolate the result from this study for all the parturient women who reside in the district region.

CONCLUSION

Prevalence of HIV seropositivity among the studied parturient women was not significantly different from that estimated for Brazil, therefore it is in accordance with the possibility that there may be a sub-notification of HIV seropositive pregnant women in DF.

HIV serology testing coverage in pregnancy in DF with two tests is low.

Prevention guidelines of HIV vertical transmission with respect to the access to previous diagnosis are not being fully complied, because a very high proportion of pregnant women at labor arrive with an indication to take the quick test, both because they do not present the HIV test result from the first quarter or they do not have the result written in their cards.

The main recommendations from this study concern structure of the health system in order to overcome aspects that difficult the access to tests; the efficient flow of laboratorial results; and care of health professionals, especially obstetricians, nurses and pharmaceuticals, to the importance of fully following the screening protocol for HIV in the prenatal care service.

Efficient access to services, correct prophylactic managements, epidemiological surveillance, and other actions that reduce HIV vertical transmission, according to the protocols approved by the HM and the World Health Organization, without a doubt will reflect upon future studies that aim at estimating the HIV prevalence in pregnant women.

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Conflict of interests

There was no conflict of interests to declare.

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Quality of life in the context of HIV/AIDS: a comparative study with the general population

Qualidade de vida no contexto do HIV/AIDS: um estudo comparativo com a população em geral

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ABSTRACT

Introduction: The introduction of antiretroviral therapy has allowed an increase in life expectancy of HIV-positive patients with HIV/AIDS, characterizing it as a disease amenable to control the long-term, thus influencing well-being and quality of life of these subjects. **Objective:** To evaluate the perceived quality of life of people with HIV/AIDS compared with that of people without the diagnosis for HIV. **Methods:** We counted with the participation of 561 people with HIV and 286 people without the diagnosis. Specific socio-demographic and clinical questionnaires, beyond the scale of quality of life WHOQOL-HIV-Bref were applied. **Results:** The quality of life was assessed positively by 59% of seropositive, being the dimensions spirituality and future prospects the better evaluated. Of the participants with no HIV diagnosis, 61% positively evaluated the quality of life, being the dimensions spirituality and independence the better evaluated. Regarding the domains of quality of life, both groups showed positive evaluation for all dimensions. However, the seropositive group evaluated more negatively the domains environmental and independence compared to the group without diagnosis. **Conclusion:** Results suggest that the diagnosis of HIV seropositivity is not a sufficient condition for the perception of quality of life to differ from people in general. Moreover, the less positive assessment on health for HIV-positive group seems to indicate that, for these subjects, health is related to aspects associated with organic etiologies and the psychosocial consequences of living with HIV/AIDS.

Keywords: quality of life, AIDS, soropositivity.

RESUMO

Introdução: A introdução da terapia antirretroviral vem permitindo um aumento na expectativa de vida dos pacientes soropositivos ao HIV, caracterizando a AIDS como uma doença passível de controle a longo prazo, influenciando assim no bem-estar e na qualidade de vida desses sujeitos. **Objetivo:** Avaliar a percepção de qualidade de vida de pessoas com HIV/AIDS comparando-a com a de pessoas sem o diagnóstico para o HIV. **Método:** Contou-se com a participação de 561 pessoas soropositivas e 286 pessoas sem o diagnóstico. Foram utilizados um questionário sociodemográfico e um clínico, além da escala de qualidade de vida WHOQOL-HIV-Bref. **Resultados:** A qualidade de vida foi avaliada positivamente por 59% dos soropositivos, sendo mais bem avaliadas as dimensões espiritualidade e perspectiva de futuro. Dos participantes sem o diagnóstico para o HIV, 61% avaliaram-na também positivamente, sendo mais bem avaliadas as dimensões espiritualidade e independência. Com relação aos domínios da qualidade de vida, ambos os grupos apresentaram avaliação positiva para todas as dimensões. Entretanto, o grupo soropositivo avaliou de forma mais negativa os domínios ambiental e independência em comparação ao grupo sem diagnóstico. **Conclusão:** Os resultados sugerem que o diagnóstico de soropositividade para o HIV não é condição suficiente para que a percepção da qualidade de vida seja diferente das pessoas em geral. Além disso, a avaliação menos positiva sobre a saúde pelo grupo soropositivo parece indicar a ideia de que a saúde para estes sujeitos está relacionada aos aspectos associados às etiologias orgânicas e às consequências psicossociais da convivência com o HIV/AIDS.

Palavras-chave: qualidade de vida, AIDS, soropositividade.

INTRODUCTION

Living with HIV seropositivity (human immunodeficiency virus) deeply affects the lives of individuals afflicted by it, be it in their general health conditions or in their social and family lives, and can cause isolation and social rejection, feelings of losing control of their future and diminished financial resources required to treat the disease[1].

However, advancements in the struggle against the epidemic and in treatments for its symptoms have showed positive responses for seropositive individuals, as is the case with antiretroviral therapy (ART). Since its inception in the 1990's, ART has enabled an increase in life expectancy for seropositive patients (HIV+) and a reduction in the stigma of AIDS as a synonym of imminent death and is now characterized as a chronic disease subject to long-term disease control and social coexistence[2]. In this sense, it is not only necessary to think about the means to fight HIV/AIDS, but also how seropositive living affects the lives and well being of those infected by it. With this in mind, over the last years there has been an increase in academic interest regarding the connection between HIV/AIDS and the quality of life of HIV+ individuals[3–5].

The World Health Organization's[6] definition of quality of life comprises an individual's perception regarding his or her position in life. As such, it comprises a variety of conditions (physical, psychological, environmental, social and spiritual) which can affect the way individuals perceive their daily routines, affecting their feelings and behaviors, and not limited to their health conditions[3,7]. Furthermore, it also takes into account the cultural context and the values by which individuals live, their goals, expectations and concerns.

Some elements are crucial for this analysis, such as: 1) the afore-mentioned *multi-dimensionality*, which comprises diverse areas of human life; 2) the *bi-polarity*, since the perception of quality of life can range from a negative dimension (unsatisfactory) to a

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positive dimension (satisfactory) and 3) *subjectivity*, which is considered from the standpoint of the individuals and the importance of their perception and active role in their own health.

Studies[1,4,5,8] have shown that the analysis of quality of life within an HIV/AIDS context is very important, because it enables HIV+ individuals to express the perception they have regarding their lives and provides health professionals with better means of treating the adversities resulting from the disease.

The emphasis on quality of life for seropositive individuals can comprise, among other things, the manner in which HIV+ individuals perceive and deal with day-to-day situations, as well as their commitment to the treatment and the effect of these treatments in the well being of these individuals, especially regarding their mental health[9,5].

However, despite the relevance of this connection, understanding the factors that affect the quality of life evaluation of HIV+ individuals is quite difficult, especially when considering how the perception of quality of life is determined by the seropositive condition or due to a set of clinical manifestations, or even if it is an association of these factors with other dimensions of life, such as social, psychological or environmental dimensions[10].

OBJECTIVE

Assess the perception of quality of life for HIV+ individuals and compare it to the perception of quality of life of same-age individuals within the general population without the HIV/AIDS diagnosis.

METHODS

Guidelines

This was a cross-sectional study and can be regarded as a descriptive epidemiological study.

Participants

A sample of 561 HIV+ individuals, between 18 and 69 years of age (M = 39.4; SD = 10), where 56% of them were male; and 286 individuals from the general population, with the same socio-demographic characteristics of the former population, with an average of 35 years of age (SD = 12), where 56% of them were female. The selection of the HIV+ participants was non-probabilistic and accidental, and occurred in hospitals treating HIV/AIDS patients in the city of João Pessoa / PB and Campina Grande / PB, and in Specialized Care Services in the metropolitan area of João Pessoa / PB.

Tools

Initially, both groups of participants were subjected to a socio-demographic questionnaire with the purpose of characterizing the participants' profiles. The questionnaire contained variables such as age, gender, education level, family income, marital status, level of religiosity, among others. HIV+ participants were also subjected to a questionnaire containing clinical aspects pertaining to the HIV/AIDS infection, with variables such as: when the diagnosis of the infection occurred, period of ongoing treatment, how the infection occurred, period of ongoing ART, medications used, related diseases, among others.

To evaluate the quality of life in both groups we applied the Abbreviated Scale of Quality of Life for the context of HIV/AIDS – WHOQOL-HIV-Bref[11], developed by the World Health Organization and validated in Brazil by Fleck[3]. This scale has 31 items grouped into six domain scores: physical, psychological, level of independence, social relationships, environment and spirituality. Of the total items of the scale, five of them are related to the context of HIV/AIDS; only two make direct mention of HIV/AIDS and the rest have a more general character. Participants from the general population did not answer these questions and blank answers were calculated as missing values, a procedure applied for questions in which the variable does not apply for the individual. The scale also has two questions related to quality of life in general: the global perception of individuals about their quality of life and their global perception about their own health.

The questions were individually scored in a five-point Likert type of scale, where the lowest value indicates low and negative perceptions and the highest value indicates high and positive perceptions. Therefore, higher scores indicate a better perception of quality of life by participants.

Procedures

After the approval of the study by the Ethics Committee for Research of the Hospital Universitário Lauro Wanderley, at the Universidade Federal da Paraíba (CEP – HULW/UFPB), we contacted the boards of all health institutions involved in the project's development. The questionnaires were conducted individually and according to the ethical procedures of "Resolution #196/96, concerning Research involving Human Beings". Therefore, participants were informed about the research, and the voluntary characteristic of their participation was made clear, and they signed terms of consent. The confidentiality of all responses was properly secured.

Data analysis

The data was analyzed using descriptive statistics (mean, standard deviation and range) and inferential statistics (the Student t test) to check for differences between the averages of the participating groups.

RESULTS

Profile of participants

Of the 561 HIV+ individuals, most of them were male (56%), married (41%), with low levels of education (49% of them with only primary education) and low family incomes (75% with less than two minimum wages). At the time, 57% were employed and reported being moderately religious (44%).

As for the general population participants, most of them were female (56%), single (44%), and had completed high school (45%). They were also employed (71%) and reported being moderately religious (51%).

Assessment of quality of life

Quality of life was positively assessed by 59% (n = 329) of HIV+ participants and 64% (n = 360) reported they were satisfied with their health, with the dimensions of spirituality and future prospects, which for this group had the highest scores, unlike the dimensions related to environment and independence, which had the lowest scores. As for the general population group, 61% (n = 123) had a positive assessment of quality of life and 68% (n= 136) were satisfied with their health, therefore obtaining a better assessment for the dimensions related to spirituality and levels of independence, and a lower score in the dimension related to physical conditions and future prospects within this group. Comparing the averages obtained between the HIV+ participants and the general population participants, we noticed that there were no statistical differences between the groups in relation to their overall quality of life, with differences appearing only in the dimension related to satisfaction with health, which was better evaluated by the general population group (**Table 1**).

In relation to the quality of life dimension, the HIV+ group and the general population group reported positive assessments. Furthermore, there was no statistically significant difference between the averages of these groups in relation to the psychological or spiritual dimensions, but there were significant differences in all other dimensions, as shown in **Table 2**.

Considering only the HIV+ group of participants we noticed that, on a scale of 1 to 5 points, the factors that most contributed to a negative assessment of quality of life were related to the concrete aspects of survival, specifically insufficient financial gains (M = 1.97; SD = 1.97), dependence on medical (M = 2.31; SD = 0.89) and psychological treatments, and a sense of lack of enjoyment in life (M = 2.85; SD = 0.88) and difficulty to concentrate (M = 2.94; SD = 0.06).

Concerning the psychological and spiritual dimensions, although there were no significant differences between the groups, we observed a higher score for quality of life in the spiritual dimension and a lower score in the psychological dimension among the HIV+ participants.

DISCUSSION

Although the majority of HIV+ participants were male, it is important to emphasize the phenomenon of "feminization" of the epidemic, considering that the proportion of men for each woman in this study was below 2:1, confirming national data. Moreover, the larger number of participants with low education levels and low income corroborates the results of former surveys[12,13] that show how AIDS is spreading among the poor. These studies show

Table 1 – Assessment of the overall quality of life and satisfaction with health conditions among groups of participants with HIV AIDS and the general population.

Dimensions and aspects	General population	HIV+	p-value
	M (SD)	M (SD)	
Overall quality of life	72.7 (16.2)	72.0 (17.1)	0.61
Satisfaction with health	74.8 (17.8)	70.2 (20.2)	0.01

M: Mean; SD: Standard deviation; Significance level - $p < 0.05$.

Table 2 – Self-assessment of quality of life among groups of participants with HIV AIDS and the general population.

Dimensions and aspects	General population	Seropositive for HIV	p-value
	M (SD)	M (SD)	
Dimension 1 - Physical (Pain and discomfort; energy and fatigue; sleep and rest; HIV symptoms)	59.8 (11.2)	71.2 (17.2)	0.00
Dimension 2 - Psychological (Positive and negative feelings; cognition; self-esteem; body image)	73.1 (11.7)	71.3 (13.7)	0.07
Dimension 3 - Level of independence (Mobility; capacity for daily chores; capacity for work; dependence on medication/treatment)	76.5 (11.4)	67.1 (13.7)	0.00
Dimension 4 - Social relationships (Social relationships; social support; sexual activity; social inclusion)	76.0 (11.0)	72.8 (11.3)	0.01
Dimension 5 - Environmental (Safety; shelter; finances; access to health services; information; leisure; physical environment; transportation)	64.7 (9.5)	66.4 (11.1)	0.05
Dimension 6 - Future prospects (Sense in life; forgiveness and guilt; concern about the future; death and dying)	62.5 (11.3)	75.8 (18.3)	0.00
Dimension 7 - Spirituality (Spirituality, religion, personal beliefs)	78.7 (12.9)	79.1 (12.0)	0.80

M: mean; SD: Standard deviation; Significance level - $p < 0.05$.

that these variables should be considered determinant factors in contracting HIV/AIDS, as they are directly connected to an individual's health condition, to limited access to material goods, health services, information and to the necessary resources to prevent infection. Taking into account the labour conditions of participants, we observed that the HIV+ group had fewer employed individuals. Furthermore, considering seropositive living, it should be noted that the number of employed HIV+ individuals may be related to advances in antiretroviral therapy, which contributes to greater control of the disease and, consequently, higher capacity for work[14]. For individuals suffering from HIV/AIDS, working is not only a means of obtaining food, shelter, medicine and health, among other things, but also has social and subjective value, especially when taking into consideration a complex and broad perspective of health.

Moreover, it is important to consider the low monthly income observed among participants, with 75% of the individuals sampled with a family income of only 2 minimum wages. In addition to the conditions related to its value and its service region, low incomes may be due to the health and functional status of the individuals, which would hinder their further integration into the labor market.

The lack of differentiation between the averages of the overall quality of life evaluation among HIV + groups and the general population can be explained by the fact that the first group perceives their quality of life beyond complaints or clinical aspects, addressing the construct more comprehensively. The same did not occur when they were questioned about their health, which had a lower score among the HIV+ group. This may be connected to the idea that health is related to factors associated with organic etiologies and the psychosocial consequences of living with HIV/AIDS. With this in mind, Fleck[3] stated that the overall quality of life assessment encompasses global considerations related to the life conditions and perspectives of individuals. Therefore, assessments of specific dimensions for individuals living with HIV/AIDS are, apparently, more sensitive in the differentiation of subjects with similar magnitudes. For example, when comparing symptomatic and asymptomatic patients within the HIV+ group, there was a lower rating (albeit positive) for the overall quality of life in symptomatic patients ($p = 0.05$), with diagnosis time below 2 years ($p = 0.04$) and opportunistic infection already present ($p = 0.05$). This figure shows how the experiences of the illness tend to affect the perception of the quality of life of these subjects.

As for the dimensions shown in **Table 2**, it is important to note the higher negative assessment in the physical dimension by the general population group, unlike the HIV+ group. Due to aspects related to pain and discomfort, energy and fatigue, sleep and rest, and also due to the characteristic symptoms of living with HIV, we expected an inversion in these averages. However, this data corroborates the statement that the HIV+ group evaluates their quality of life beyond the clinical and symptomatic aspects of their lives. This does not mean that these individuals do not suffer or feel, in some degree, a lack of functionality, but that these losses are not perceived as huge problems in their day-to-day lives. This demonstrates that it is not solely the diagnosis of a certain pathology that affects the quality of life assessment, but also the nature of the disease and the social beliefs related to this disease. In the HIV/AIDS context, for example, individuals tend to assess their quality of life taking into account there seropositivity, and this is frequently linked to the idea of imminent death. Therefore, some of these physical symptoms, such as pain, may represent a higher importance if compared to the general population group, and be of greater relevance for this group, since their assessments may be based on their condition as "healthy" individuals.

In the same manner, the future prospects dimension had a lower evaluation by the general population group, which was not the case with the HIV+ group, emphasizing the thesis that HIV+ patients have a better perception of their life conditions, even when facing the difficulties and adversities caused by the disease, especially among those under antiretroviral treatment, since this enables control of the symptoms and increases life expectancy. Therefore, the fact that the majority of HIV+ participants in this study use ART (83%) and are asymptomatic for AIDS (68%), possibly contributed for their positive assessment in the physical and future prospects dimensions.

However, it is known that the impact of the disease for individuals with HIV/AIDS diagnosis is more significantly reflected in the realm of these individual's social lives, in aspects related to autonomy and management of their daily needs, such as food and medication costs, among other things. In this sense, the environmental and independence dimensions had the worst assessment by this group of participants. In this respect, we consider that living with a chronic pathology demands medical care and continued use of medication, which contributes to the necessity for financial support that, when lacking, may become a stress factor for these individuals. In the case of the HIV+ participants we noted that they had low monthly incomes (two minimum wages), which may have contributed to a negative assessment of these factors.

Regarding independence, it enables the inclusion of individuals in social activities, especially within the community, which encourages the exchange of experiences needed to create support networks, capacity for work and autonomy. Therefore, the lack of a job or the fear of losing one, diminished self-esteem and independence may lead to a series of complications for the health-sickness process, which are capable of hindering the quality of life for these individuals[8].

It is possible that these quality of life dimensions are related to the clinical experiences of patients afflicted with diseases, however, this evaluation may vary according to the stage of the health-sickness process. An international study conducted by the WHOQOL SRPB Group[11], in 18 countries, with the goal of analyzing how spirituality, religion and personal beliefs relate to the quality of life of individuals observed that these variables are more connected to the quality of life of individuals with unfavorable health assessments. However, the majority of participants in this survey was under ART and still presented positive health assessments, as formerly discussed.

The results suggest that the seropositive for HIV diagnosis is not enough to affect the perception of quality of life for people in general. However, among the participants with HIV/AIDS, the asymptomatic and symptomatic stages affected their quality of life assessments, especially for the latter group.

The best overall quality of life assessment and the lowest assessment related to satisfactory health conditions among individuals with

HIV/AIDS seems to indicate that the global perception of quality of life is larger in scope than the health status per se, and can be specifically influenced by dimensions such as environment and independence, where the latter is related to work capability and performing chores and tasks. Therefore, we observed that within the HIV/AIDS context the perception of satisfactory health conditions is not necessarily connected to the absence of symptoms, but to the capability for work and performance of activities that an individual can engage in despite the diagnosis. Moreover, autonomy to perform activities is related not only to the symptoms of the disease, but also to the adequacy of the medication according to an individual's routine. This factor also indicates the importance of the participation of health professionals in promoting quality of life for individuals with HIV/AIDS.

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Conflict of interests

The authors declare no conflict of interests.

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Condom use with random partners by users of testing and counseling center in STD/AIDS

Uso do preservativo com parceiros não fixos por usuários do centro de testagem e aconselhamento em DST/AIDS

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ABSTRACT

Introduction: Among the main situations of vulnerability to HIV and other sexually transmitted diseases (STD), the lack of condom use with non-fixed partners is a major problem, which affects men and women, regardless of age or marital status. **Objective:** To characterize the users of the Center for Counseling and Testing STD/AIDS in Juazeiro, Bahia, Brazil, whose have non-fixed partners; and to determine the prevalence of condom use in the year 2011. **Methods:** We developed a descriptive study using secondary data from the health service, using the Entry Form Information System of the Center for Counseling and Testing, with a global number of 408 users. In data analysis, we evaluated the distribution of variables by means of absolute and relative frequency. **Results:** The majority of participants were male, aged between 21–35 years with 8 years or more of schooling and about a third of them had a stable partner. The prevalence of condom use with a non-fixed partner was low (35.29%), increasing according to the schooling years. The customary use was more common among gays and bisexuals. Of those who reported having any type of STD in the past year, about 70% reported using condoms only sometimes or never. **Conclusion**: The use of condoms with non-fixed partners among these users is not common, being observed unsafe sexual practices that expose them and their partners at a greater risk of contamination by DST.

Keywords: sexually transmitted diseases, AIDS, condoms, sexual behavior.

RESUMO

Introdução: Dentre as principais situações de vulnerabilidade ao HIV e outras doenças sexualmente transmissíveis (DST), destaca-se a ausência de uso de preservativo com parceiros não fixos, cujo uso rotineiro é pouco frequente em ambos os sexos, independente da faixa etária ou situação conjugal. **Objetivo:** Caracterizar os usuários do Centro de Testagem e Aconselhamento em DST/AIDS de Juazeiro, Bahia, que possuem parceiros não fixos e verificar a prevalência de uso de preservativo, no ano de 2011. **Métodos:** Foi realizado um estudo descritivo com dados secundários do serviço de saúde, utilizando o Formulário de Entrada do Sistema de Informação do Centro de Testagem e Aconselhamento, totalizando 408 usuários. Na análise dos dados, foi avaliada a distribuição das variáveis por meio de frequência absoluta e relativa. **Resultados:** A maioria dos participantes era do sexo masculino, na faixa etária entre 21 e 35 anos, com escolaridade de 8 anos ou mais e cerca de um terço tinha parceiro estável. A prevalência de uso de preservativo com parceiro não fixo foi 35,29%, elevando-se conforme aumentavam os anos de estudo. O uso rotineiro foi mais frequente entre os homossexuais e bissexuais. Daqueles que relataram ter tido algum tipo de DST no último ano, cerca de 70% referiram usar preservativos somente às vezes ou nunca. **Conclusão:** O uso de preservativos com parceiros não fixos entre esses usuários é pouco frequente, sendo observadas práticas sexuais inseguras que os expõem, e a seus parceiros, a um maior risco de contaminação por DST.

Palavras-chave: doenças sexualmente transmissíveis, AIDS, preservativos, comportamento sexual.

INTRODUCTION

The occurrence of contamination by the human immunodeficiency virus (HIV) and by other sexually transmitted infections (STI) is associated with the practice of unprotected sex, which presents as one of the main situations of vulnerability to these conditions[1]. Still, the use of condoms to prevent STIs is reduced, especially among specific groups of the population, such as younger women or those with stable partners and people with lower schooling[2].

The absence of condom use with non-fixed partners is related to the unequal gender relations, schooling, moral and religious factors, practice of commercial sex, sexual preference, existence of a single partner[2], besides social condition and exclusion situations resulting from adolescence[3], among others. An investigation conducted in Testing and Counseling Centers (TCC) with adults observed that, for both sexes, with no distinction as to marital status, 86.6% used condoms only sometimes in intercourse with non-fixed partners[4]. Sexual risk behavior was also observed among adolescents, since a little more than half of them reported having used a condom in the past three sexual relationships[5]. With regard to gender, it is observed that women are more vulnerable due to the difficulty to negotiate the use of condoms, and also due to the unequal situation in which male dominance is prevalent, especially in stable relationships[6].

Facing the difficulties to adopt the use of condoms and the dissemination of the HIV infection, the TCCs appeared in the 1980s with the objective of improving the access of the general

Study carried out in the Testing and Counseling Center in STD/AIDS of Juazeiro – Juazeiro (BA), Brasil.

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population, and especially of more vulnerable segments, to counseling, preventive actions and diagnosis of HIV, syphilis and hepatitis B and C[7].

We conducted this study in order to contribute with the definition of promotion and protective strategies that can result in the reduced vulnerability to STIs.

OBJECTIVE

To characterize the users of TCC in STD/AIDS in Juazeiro, Bahia, who have more than one partner, and to observe the prevalence of condom use in 2011.

METHODS

A descriptive study was performed with secondary data from health services, developed in the TCC of Juazeiro, in the state of Bahia, which is managed by the Center of STD/AIDS of the Municipal Health Secretariat. It is reference for neighboring cities, and it also includes the Specialized Health Care (SHC) in STD/HIV/AIDS.

The population was comprised of users enrolled in the TCC who filled out the Entry Form Information System of the TCC (FE-SI-TCC) in 2011 and who reported having non-fixed partners. All of the FE-SI-TCCs filled out in that year were considered to be eligible for the study. Blank, duplicated, incomplete or illegible forms were excluded, as well as those of children aged less than 10 years old. Besides the FE-SI-TCC, data from the Procedure Description Sheet, adopted by the health service, were obtained. Out of the 1,227 users registered in the TCC in 2011, 932 met the eligibility criteria. Out of these, 408 (43.78%) reported having more than one partner and were considered as participants in this study.

The studied variables were grouped into sociodemographic and behavioral ones, according to the categorization presented by the response alternatives in the FE-SI-TCC, except for "age" and "reason for not using a condom with a non-fixed partner", which were categorized by the observed frequency. In order to define the prevalence of condom use, only those who reported to always use a condom were considered.

Data were collected in the service by a trained team, in its functioning hours, with previous authorization. Data were directly typed into the software Microsoft Office Excel 2007, and analysis was conducted in the statistical package Stata, version 9.0. Data analysis assessed the distribution of variables by means of absolute and relative frequency. The study used data from the study "Epidemiological survey in the Testing and Counseling Center of the Reference Unit for DST/AIDS of Juazeiro-BA", which was approved by the Human and Animal Research Ethics Committee, at Universidade Federal do Vale do São Francisco (CEEHA/UNIVASF), protocol n. 0006/301111 CEEHA/Univasf, according to the recommendations of resolution 196/96, from the National Health Council.

RESULTS

The prevalence of condom use with more than one partner was of 35.29%, and one third of participants reported to never use it.

Table 1 shows that most users were male, with prevalence for the age group between 20 to 35 years old. Concerning marital status, about one third of those who claimed having more than one partner also had relationships with a stable partner. With regard to schooling, most of them had eight schooling years or more, but there were also some illiterate participants.

As to behavioral features presented in **Table 2**, most participants were heterosexual. With regard to the reason for not using a condom in intercourses with non-fixed partners, 34.56% informed they did not like it use it, followed by 22.06%, who claimed not to use it because they trusted the non-fixed partner. Among participants, 36.27% reported having presented with some STD contamination in the past year, and there was a high percentage of absence of register of this information (33.33%).

Table 3 presents the distribution of TCC users with non-fixed partners, according to sociodemographic characteristics, with regard to the use of condom. The distribution is similar between sexes; however, among women there is higher percentage of those who report never to use condoms. The frequent use of condoms is more frequent among adolescents and elderly people; however, except for the elderly, for all other age groups the frequent use is lower than 50%. Among married/people living together or in a stable relationship, more than 70% claimed to never use a condom with non-fixed partner or only sometimes, against 61% of those who have other types of relationship. With increasing schooling years, the use of condoms also increase in all of the relationships with non-fixed partners.

In **Table 4**, it is possible to observe the distribution of TCC users with non-fixed partners, according to behavioral characteristics, in relation to the use of condoms. It is observed that the frequent use

Table 1 – Sociodemographic characteristics of users in the Testing and Counseling Center with non-fixed partners, Juazeiro (BA), 2011

Variables	n	%
Sex		
Male	300	73.53
Female	108	26.47
Age group		
≤19 years old	72	17.65
20 to 35 years old	238	58.33
36 to 50 years old	71	17.40
51 to 59 years old	20	4.90
≥ 60 years old	7	1.72
Marital status		
Married/living together/stable union	126	30.88
Others (single, divorced, widower)	282	69.12
Schooling		
Illiterate	10	2.45
1 to 3 years	21	5.15
4 to 7 years	100	24.51
8 to 11 years	190	46.57
≥ 12 years	87	21.32

Table 2 – Behavioral characteristics of users in the Testing and Counseling Center with non-fixed partners, Juazeiro (BA), 2011

Variables	n	%
Use of condoms with non-fixed partners		
Always	144	35.29
Never	124	30.39
Sometimes	140	34.31
Sexual preference		
Heterosexual	372	91.18
Homosexual	12	2.94
Bisexual	17	4.16
Not informed	7	1.71
Number of partners in the past year		
Up to 04 partners	87	21.32
05 to 10 partners	206	50.49
50 to 100 partners	83	20.34
≥ 100 partners	32	7.84
Reason for not using a condom with non-fixed partner*		
Does not like it	94	34.56
Partner does not accept it/cannot negotiate/cannot use it	18	6.62
Did not have one at the time	43	15.81
Trusts the partner	60	22.06
Use of alcohol and drugs	19	6.99
Others	38	13.97
Contamination by sexually transmitted disease in the past year		
Yes	148	36.27
No	124	30.39
Not informed	136	33.33

*considering the ones who reported never using a condom or using it sometimes (n = 264).

of condoms is more common among homosexuals and bisexuals – almost 50% –, while only one third of heterosexuals reported the frequent use. Concerning the number of partners in the past year, using it always is not common, and one fact stands out: among those who have between 50 and 100 partners and those who have more than 100 partners, condom use is of about 38 and 34%, respectively. Among those who reported having some type of STD in the past year, about 70% reported using condoms sometimes or never.

DISCUSSION

Facing the identified results, in which only one third of users reported to always use a condom, its inconsistent use is observed, which is still a problem concerning the implementation of an efficient policy to fight STDs/AIDS[3,9,10]. The reference to never using a condom, or only sometimes, is more prevalent in several studies conducted in other TCCs in the country[3,11,12]. The statement by Kaplan *et al.*[13] that there was significant increase in the search for condoms after the 1980s is reaffirmed by Berquó *et al.*[2], who exposes there was an increase, from 63.5% to 78.6%, in the use of condoms among people with occasional partners from 1998 to 2005. A study conducted in Santa Catarina observed that the frequency of non-use of condoms with a non-fixed partner is higher than 50% for both sexes, which shows that such use is below expectations[12].

With regard to the variable sex, several studies demonstrated the highest prevalence of female users in search for support in reference units of STD/AIDS[11,12,14], thus maintaining the common pattern of the search for general health care[12]. However, in this study, we observed the male predominance. But it should be considered that the population counted only on individuals who reported having non-fixed partners, which would be more common among men[15]. Among genders, the use of condom was similar, and only

Table 3 – Distribution of condom use with non-fixed partners among users in the Testing and Counseling Center according to sociodemographic characteristics, Juazeiro (BA), 2011

Variables	Use of condom with no-fixed partner					
	Always		Never		Sometimes	
	n	%	n	%	n	%
Sex						
Male	107	35.67	88	29.33	105	35.00
Female	37	34.26	36	33.33	35	32.41
Age group						
≤ 19 years old	30	41.67	12	16.67	30	41.67
20 to 35 years old	77	32.35	76	31.93	85	35.71
36 to 50 years old	26	36.62	28	39.44	17	23.94
51 to 59 years old	7	35.00	5	25.00	8	40.00
≥ 60 years old	4	57.14	3	42.86	0	0.00
Marital status						
Marital status/living together/stable union	34	26.98	66	52.38	26	20.63
Others (single, divorced, widower)	110	39.01	58	20.57	114	40.43
Schooling						
Illiterate	1	10.00	6	60.00	3	30.00
1 to 3 years	6	28.57	10	47.62	5	23.81
4 to 7 years	32	32.00	37	37.00	31	31.00
8 to 11 years	72	37.89	47	24.74	71	37.37
≥ 12 years	33	37.93	24	27.59	30	34.48

Table 4 – Distribution of condom use among users in the Testing and Counseling Center with non-fixed partners according to behavioral characteristics, Juazeiro (BA), 2011

Variables	Use of condom with non-fixed partners					
	Always		Never		Sometimes	
	n	%	n	%	n	%
Sexual preference						
Heterosexual	128	34.41	118	31.72	126	33.87
Homosexual	6	50.00	1	8.33	5	41.67
Bisexual	9	52.94	3	17.65	5	29.41
Not informed	1	14.29	2	28.57	4	57.14
Number of partners in the past year						
Up to 04 partners	27	31.03	44	50.57	16	18.39
05 to 10 partners	79	38.35	57	27.67	70	33.98
50 to 100 partners	29	34.94	18	21.69	36	43.37
More than 100 partners	9	28.13	5	15.63	18	56.25
Contamination by sexually transmitted disease in the past year						
Yes	43	29.05	55	37.16	50	33.78
No	55	44.35	35	28.23	34	27.42
Not informed	46	33.82	34	25.00	56	41.18

one third of the participants claimed to always use it in non-fixed intercourses. This result is different from that found in the study conducted in Igarassú, Pernambuco, from 2009 to 2011, with HIV positive users of the TCC. There, a significantly higher percentage of women (71.9%) claimed never to use the preservative[10].

The most frequent age group, composed of young adults aged between 20 and 35 years old, was also the most frequent one in epidemiological surveys conducted in other TCC units in Brazil [10,11,14,16]. With regard to the use of condoms, it was observed that the frequent use was more common among adolescents and elderly people, similarly to the results observed in a study that assessed the tendencies of condom use in the urban Brazilian population between 1998 and 2005, therefore noticing a significant increase in the use of condoms especially among adolescents, since this group was the most protected one when it came to occasional partners[2]. Opposite to findings in other studies, which pointed out to little adherence to the use of condoms among the elderly[17,18], in this study the use in this age group was more frequent than in the others. However, this may be due to the fact that the number of individuals at this age group was reduced.

Concerning the marital status of interviewees, about 70% of them were single, divorced or widowers, and this group used the condom more often, which was also observed by Berquó *et al.*[2]. Among married people, never using protection in non-fixed relationships was more common, which is different from other studies, which observed the more frequent use of condoms by people who referred having only occasional partners[2]. Considering that most participants in this study were male, it is possible to observe the vulnerability of the female gender, especially in stable relationships, as reported by the Ministry of Health[6]. Therefore, it is possible to say that marital status is considered to be a social condition, but not a reliable indicator to assess the sexual activity or the type and number of sexual partners[19].

With regard to schooling, we observed that the ones with 8 to 11 schooling years attended the TCC more often. As to the use of condoms, groups with higher schooling use it more often, which indicates the reduced use proportionally to decreasing schooling, thus confirming the findings of other studies[2,12].

As to sexual preferences, heterosexuals were prevalent in the search for care, and this tendency is confirmed in a study conducted in Santa Catarina[12]; however, in this group, the regular use of condoms was reported only by one third of the interviewees. Studies indicate the heterosexualization of the HIV epidemic, with increasing cases among heterosexuals and especially among women in stable relationships, who are exposed to being contaminated by partners with whom they cannot negotiate the use of condoms[12,20]. Among homosexuals and bisexuals, the frequency of use was higher than 50%.

Concerning the number of sexual partners in the past year, users who had more partners used protection inconsistently, since more than 70% of them never used a condom or used it only sometimes; so, as a paradox, they were the ones who used condoms the least. A similar behavior was observed in a study conducted in the TCC of São Paulo, where an approximate percentage of individuals did not use condoms frequently[11]; therefore, the risk of STD/AIDS dissemination increases. By considering that the intercourse with multiple partners is more common for the male gender, it leads to the situation of female vulnerability[11,12], because even the ones who usually have intercourse with a single partner have difficulties negotiating the use of protection during sexual intercourse, especially with their single partner[6].

With regard to reasons for the absence of condoms with a non-fixed partner, the alternative "does not like it" is the most frequent one, followed by the fact of trusting the partner. These results corroborate the ones pointed out in surveys conducted in Rio de Janeiro[11] and Minas Gerais[14]. On the other hand, the study by

Andrade *et al.*[10] observes the inversion in this order, since trusting the partner was more prevalent (33%), followed by "not liking it" (28%). Such a behavior may be a result of several factors, such as socioeconomic status and social configuration. However, sexual practices are surrounded by subjectivity and connected to the understanding of the individual about his or her own values and relations of power to which they are submitted[21].

In the past year, 36.27% of the participants claimed to have had some STD, which is higher than the percentage observed in a TCC of Rio de Janeiro, in 2011, where 27.9% of the participants reported having had some STD[22]. It is important to mention, however, that the number of ignored responses in this variable was expressive (33.3%), which makes it difficult to conduct a more concrete assessment of such a reality. With regard to the use of condoms, it was observed that those with some type of STD in the past year use condoms less than those who did not present with any STD in the same period, which would explain the infection, and also demonstrate the lack of sensitivity of these subjects for the adoption of protective behaviors, even after the occurrence of the infection.

The study enabled to know the sociodemographic and behavioral characteristics of users with non-fixed partners who searched for care in the TCC of Juazeiro, Bahia, in 2011, as well as the prevalence of condom use. Therefore, it was possible to observe unsafe sexual practices that expose them to higher risk of contamination by STD/AIDS. In this behavior, there are subtle differences in the several factors that are involved in the use of condom in this situation. It is important to mention the prevalent risk behavior in the several assessed aspects. The reduced use of condom in relationships with non-fixed partners, by individuals who also refer having stable partners, indicates the need of attention from health services towards this population, since they are not only exposed to being contaminated, but there is also the concomitant risk for the other partners, which shows the vulnerability of some groups, as is the case of women, who have difficulties negotiating the regular use of condoms in their sexual relationships. Another aspect that calls the attention is the low schooling of users, who are more resistant to the adoption of protective measures against STD/AIDS. The development of educational and health promotion actions addressed and adequate to this audience is necessary.

With regard to study limitations, it is important to consider that secondary data were used, whose quality may be compromised to the variety of professionals who cares for registration, lack of standardization to fill out the FE-SI-TCC, possible transcription errors, difficulties to understand the questions and the presented options of answer, both from the interviewer and the interviewee, besides the large number of uninformed or ignored data, which have an impact on the obtained results.

The continuous knowledge about the health situation is important, since it enables the development of strategies that favor the construction of knowledge, opportunities and options, besides the participation and co-responsibilization of the population when it comes to preventing and controlling sexually transmitted diseases. Some organizational measures in the TCC might contribute with the production of such knowledge, such as the implementation of the Information System, which would make it easier to establish actions of epidemiologic surveillance.

CONCLUSION

The use of condoms with non-fixed partners among these users is little frequent, and unsafe sexual practices that expose them and their partners to the higher risk of STD contamination are observed.

Conflict of interests

The author declare no conflict of interests.

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Vulvovaginitis in children and teens: relevance of clinical diagnosis

Vulvovaginite em crianças e adolescentes: relevância do diagnóstico clínico

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ABSTRACT

Introduction: Vaginal discharge is the most frequent complaint in Gynecology at any age. Pediatric and Adolescent Gynecology has specific features that differentiate it from gynecological care of women from other age groups. The search for a doctor, for children and adolescents, is generally accompanied by concern of parents and guardians. **Objective**: To evaluate the relevance of the clinical diagnosis face to the complaints suggestive of vulvovaginitis in children and adolescents. To identify symptoms, diagnoses, treatments, and outcomes in the study population. **Subjects and Methods**: Children and adolescents up to the of age of 15 years were selected for this retrospective study. They were looked after at the Pediatric and Adolescent Gynecology Ambulatory of the Hospital Universitário Antonio Pedro from 01/01/2002 to 31/12/2012. The following variables were studied: the city of origin of the patients, the way they were routed, age, status with or without menarche, complaints, while complaints, co morbidities, diagnosis, treatments performed, and outcome. Nonparametric test was used to verify the hypotheses established for the continuous variables. **Results**: From the pool of 203 patients included in the study, 46 had lack of hygiene care; 76, inappropriate clothing habits; 67, both; 11 patients were diagnosed with candidiasis; one was a carrier of the coalescence of the labia minora, and only two showed, vulvovaginitis. **Conclusions**: The relevance of the clinical diagnosis was proved, face to the complaints suggestive of vulvovaginitis, as 93.1 % of the study group did not show any kind of pathology.

Keywords: gynecology of childhood and adolescence, vulvovaginitis, clinical diagnosis, therapeutic management.

RESUMO

Introdução: Corrimento vaginal é a queixa mais frequente em Ginecologia, em toda e qualquer idade. A atenção em ginecologia infanto puberal apresenta características específicas que a diferenciam do atendimento ginecológico a mulheres de outras faixas etárias. A busca pelo médico, nas crianças e adolescentes, em geral é acompanhada de preocupação de pais e responsáveis. **Objetivo**: Avaliar a relevância do diagnóstico clínico frente a queixas sugestivas de vulvovaginite em crianças e adolescentes. Identificar sintomas, diagnósticos, terapêuticas e desfechos em crianças e adolescentes atendidas em um hospital universitário. **Métodos**: Estudo retrospectivo de análise de prontuários de crianças e adolescentes até 15 anos de idade, atendidas no Ambulatório de Ginecologia Infanto Puberal do HUAP de 01/01/2002 a 31/12/2012. Foram estudadas as seguintes variáveis: município de origem das pacientes, forma como foram encaminhadas, idade, status com ou sem menarca, queixas, tempo das queixas, presença de comorbidades, diagnóstico, tratamentos efetuados e desfecho. Foi utilizado teste não paramétrico para verificação das hipóteses estabelecidas para as variáveis contínuas. **Resultados**: Do universo de 203 pacientes incluídas no estudo, 46 apresentavam cuidados de higiene deficientes; 76, hábitos de vestuário inadequado; 67, ambos; 11 pacientes tiveram o diagnóstico de candidíase; 1 era portadora de coalescência de pequenos lábios e apenas 2 apresentavam, de fato, vulvovaginite. **Conclusão**: É alta a relevância do adequado diagnóstico, frente a queixas sugestivas de vulvovaginite, já que a quase totalidade do grupo em estudo não apresentou qualquer tipo de doença.

Palavras-chave: ginecologia infanto puberal, vulvovaginite, diagnóstico clínico, conduta terapêutica.

INTRODUCTION

Vulvovaginitis is the most common complaint in the Gynecology Outpatient Clinic[1], regardless of the age group of the patient. In childhood and adolescence, some authors estimate that it corresponds to about 60% of gynecological changes[2].

Several authors agree that when it comes to urinary urgency and dysuria, pre-menarche girls usually look for Pediatric urology. Some may even be submitted to cystoscopy and/or diagnostic vaginoscopy to determine the anatomical cause in the persistent infection. However, in most cases, no abnormality is found, so only hygienic measures are advised, as well as the suspension of possible allergens or irritants. A miccional dysfunction is an important cause when considering the etiology of persistent vulvovaginitis[3,4,5]. Other causes of gynecological care during childhood and adolescence are: coalescence of the labia minora; genitourinary malformations; premature thelarche, adrenarche and puberty; breast changes, several menstrual changes, of flow volume, period time and cycle, being the latter part of the axis maturation; tumors[6].

Vulvovaginitis is also one of the most frequent reasons that lead pediatric patients to the gynecologist[7]. It is important to emphasize that not always genital flow is a synonym of pathology, and not all pathology is infectious.

Some factors predispose a child to genital vulnerability: incomplete anatomical development, with absence of hair and labia majora; closeness between anus and vagina; atrophic genital mucosa, which denotes physiological hypoestrogenism at this age[8], and alkaline pH – from 6.5 to 7.5 (due to the same lack of estrogen and unbalanced vaginal flora); absence of cervical mucus; lack of antibodies; obesity; malformations; poor hygiene; use of antibiotics[9].

Vaginal infections may have important consequences on quality of life. Vaginal discharge, discomfort, pain, absenteeism at school, social and emotional negative reflexes, and also future sexual and reproductive problems are some of the issues related

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to vulvovaginitis. In a patient with an active sexual life, it can also facilitate the contamination by STDs[10].

Etiology is different for this clinical picture and ranges with age (lactobacillus is rarely observed in prepubertal girls, but they become more abundant among adolescent girls)[11,12], and at the presence of sexual activity. In prepubertal girls, it is usually non-specific and a consequence of poor perineal hygiene. In adolescents, it is the specific cause of physiological secretion (epithelial cell scaling, secondary to the estrogenic effect).

OBJECTIVE

To assess the relevance of the clinical diagnosis facing complaints that are suggestive of vulvovaginitis among children and adolescentes. To identify symptoms, diagnoses, therapies and outcomes in children and adolescents assisted in a university hospital.

METHODS

It is a retrospective study conducted in the Infant-Puberal Gynecology Outpatient clinic of HUAP, with medical records of patients aged up to 15 years old, from 01/01/2002 to 31/12/2012, with main complaint suggestive of vulvovaginitis. HUAP assists the cities in the Metropolitan Region II. Patients with active sexual life or those with suspicion of recent sexual abuse were excluded.

Medical records were analyzed based on clinical history, physical examination and the follow-up of patients. Four hundred and eighty three patients were being seen for the first time, from 01/01/2002 to 31/12/2012, and 203 of them were included in the study.

The SPSS Statistics 17.0 software for the statistical study of all of the variables was used.

Normality Kolmogorov-Smirnov and Shapiro-Wilk tests were conducted in all age groups to verify the parametric and non-parametric tendency of the studied material.

We conducted the analysis of multiple answers for clinical complaints. Since each patient presented more than one clinical complaint, the evaluation was performed altogether.

The project was approved by CEP of UFF, registration number 02955712.4.0000.5243.

RESULTS

Most assisted patients were from São Gonçalo and Niterói.

Concerning age, the population was comprised of children aged between 2 and 15 years old (oldest age of the study). Out of the 203 assisted patients, 7 were 15 years old; 26, 14 years old; 23, 13 years old; 36, 12 years old; 24, 11 years old at the first appointment; 16, 10 years old; 14, 9 years old; and 13, 8 years old; 9 patients aged 7 years old were assisted; 12 patients were 6 years old; 5 were 5 years old; 3 patients were 4 years old; 3 patients were 3 years old; and 1 patient was 2 years old. Mean age of 10.63; median of 11 years old. Kolmogorov-Smirnov and Shapiro-Wilk tests were statistically significant ($p < 0.05$). Histogram (**Graph 1**) reveals the frequency of the age group of patients included in the study.

Since it is not a convenience sample, the histogram was distant from the Gaussian curve (normal), as expected.

Out of the assisted patients, 88 had had menarche, which corresponds to 43.3%, and 115 still had not, representing 56.7%.

The diagnosis was based on the detailed anamnesis and on the accurate clinical examination (genital ectoscopy), due to the impossibility of performing a wet mount examination – absence of pathological vaginal fluid.

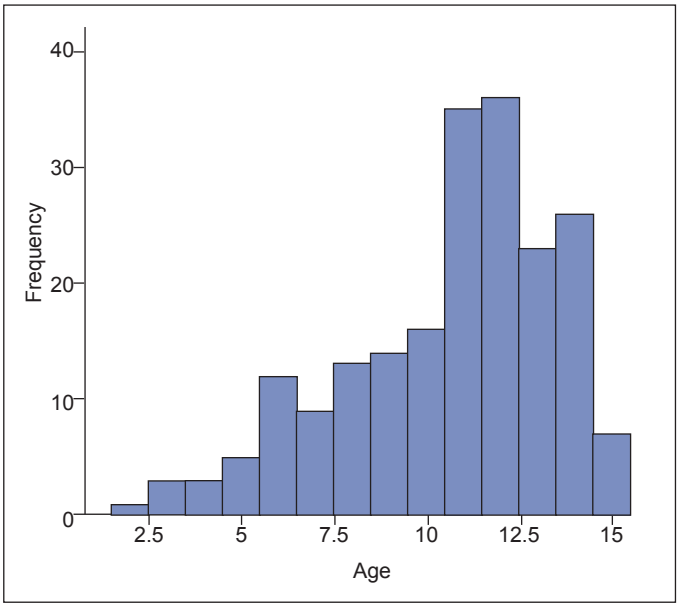
The most common complaint consisted of discharge (189 patients – 93.1%), followed by pruritus (56 patients – 27.6%). Odor was present among fewer patients (28 – 9.9%), and burning sensation, occasionally (5 – 1.8%). Referrals with reports of recurrent urinary infection (RUI), recurrent candidiasis or presence of yeast in the urine examination were rare (1 or 2 cases each).

We found a set of variables. We applied the multiple response statistical analysis for the complaints presented by the study population, and we found 238 complaints for 203 patients. This is justifiable because some of the patients had more than 1 symptom (2, 3 or even 4). **Table 1** presents these quantities.

Table 1 – Responses related to complaints of patients

Frequency of Complaints – Multiple Responses			
	n	Percentage	Percentage of cases
Complaints			
Discharge	189	67.0	93.1
Pruritus	56	19.9	27.6
Burning sensation	5	1.8	2.5
Odor	28	9.9	13.8
Recurrent RUI	2	0.7	1.0
Recurrent candidiasis	1	0.4	0.5
Presence of yeast	1	0.4	0.5
Total	**282**	**100.0**	**138.9**

RUI: Recurrent urinary infection.



Graph 1 – Frequency of age of patients assisted between 2002 and 2012.

The pathologies classified as comorbidities had several diagnoses, such as: dermatological conditions (genital lesions, such as vitiligo or lichen; lupus, herpes zoster, scleroderma, purpura); urinary tract infections (URI); neurological conditions (epilepsy or seizure, intellectual disability, transverse myelitis); diabetes mellitus; obesity; changes in genital route (septate hymen, urethral prolapse, labia minora, asymmetrical labia minora); vertical AIDS; Down syndrome, verminosis and others.

In most cases, diagnosis was not based on any micro-organism. The detection of poor hygiene associated or not with poor dressing habits, was in charge of 93.1% of appointments. With this chronic picture, some patients progressed to vulvitis, with nonspecific cause, that is, with no infectious agent. The coalescence of labia minora justified the complaint presented by 1 patient.

The occurrence of one specific etiological agent only happened in 6.4% of patients in this group: two cases of bacterial vaginosis and 11 cases of candidiasis.

With regard to candidiasis, a few comments are necessary. In the 11 cases, age ranged from 11 to 15 years old; 4 patients had already had their period, but seven still had not. In order to justify candida, even in little acid pH, atrophic genital mucosa and pre-pubertal hypoestrogenism, 6 patients were diabetic and one had vertical AIDS. Also, children who had recently taken antibiotics or immunosuppressive drugs were registered (**Table 2**).

A different treatment was adequate for each diagnosis. Recommendations were based on counseling for proper dressing and hygiene of the genital area. As proper clothes we indicate the use of cotton underwear, since it is a light and absorbing material for natural humidity, which does not increase body temperature and is hardly an allergen; skirts or dresses, as opposed to the modern habit of shorts or heavy or synthetic pants, which promote friction and injure the genital region. We do not recommend the use of daily tampons, deodorants and intimate soaps. We suggest the white color when it comes to underwear, soaps and toilet paper; the ones with no perfume, when it comes to toilet paper and tampons. In local treatment, sitting baths with salicylic acid or benzydamine were recommended. We also used topical creams with antimycotics, associated with corticoids or not; conjugated estrogens in one case and tinidazole associated with miconazole in another. Oral treatment consisted of fluconazole for one patient and secnidazole for another. We ruled out oral and local treatment for one patient with recurring candidiasis. We encouraged glucose regulation for diabetic patients.

Based on the established diagnoses, in 170 patients (83.7%), treatment was restricted to general orientations. Proper hygiene habits were encouraged, as well as adequate clothing for the climate we live in, as well as age group.

In patients who progressed to vulvitis, and those with mycotic vulvitis, it was necessary to add a topical prescription. Oral medication was established in case of bacterial vaginosis and in a case of genital candidiasis. Oral and local treatments were only established for one patient with severe recurring candidiasis and difficulties in glucose control (**Table 3**).

After the proposed treatment, 114 patiens (56.2%) were cured, and were left with orientations concerning hygiene and clothing.

Recurrence rates were low, affecting 16 patients, which corresponds to 7.9%, and symptom recurrence occurred even years later. Despite the report of temporary improvement, recurrence was due to the difficulties to change habits and due to the personal preference for one specific type of clothing. Reinforced treatment proposals comforted the patients once again.

DISCUSSION

Our results point out that vaginal discharge was the main complaint (93.1%) among children and adolescents, followed by pruritus, odor and burning sensation. Almeida *et al* also found a high percentage of children with discharge (85%)[13]; followed by burning sensation and, finally, pruritus.

Out of the 203 assisted patients, 189 (91.3%) presented the etiological diagnosis of poor hygiene, inadequate clothes or both. This information corroborates that of other authors, who did not identify any specific infectious agent and agree that the reeducation concerning hygiene is a form of treatment[14-16].

In many children and adolescents, we detect remains in the interlabial sulci[13], which confirms the importance of a detailed gynecological examination to guide the proper diagnosis and conduct[13,14]. Vulvar ectoscopy, with lenses and good light, is indispensable in these patients, and reinforces the importance of this type of examination. It equally indicates the need of not skipping steps in the gynecological investigation of the adult woman.

The second most found diagnosis was candidiasis – 11 patients (5.4%). By crossing this information with the date of the appointment, we did not find a connection showing higher incidence in hotter months, since in the summer the frequency of candidiasis increases due to heat and sweating; therefore, clothing adaptation is emphasized, even among adult women[17]. In patients with candidiasis, there are several comorbidities. This picture reveals the importance of simultaneous care with other pediatric specialties[18]. The use of treatment with antibiotics or immunosuppressive drugs,

Table 2 – Frequency of found diagnoses

	Frequency	Percentage	Accumulated percentage
Poor hygiene	46	22.7	22.7
Inadequate clothing	76	37.4	60.1
Hygiene + Clothing	67	33.0	93.1
Candidiasis	11	5.4	98.5
Vaginosis	2	1.0	99.5
Coalescence	1	0.5	100.0
Total	**203**	**100.0**	

Table 3 – Percentage of treatments

	Frequency	Percentage	Accumulated percentage
Orientations	170	83.7	83.7
Local medication	30	14.8	98.5
Oral medication	2	1.0	99.5
Oral and local	1	0.5	100.0
Total	**203**	**100.0**	

such as corticoids and Methotrexate® (rheumatic diseases) explain the presence of candida in pre-puberal patients[11].

Finally, 2 patients were diagnosed with bacterial vaginosis, and 1, with coalescence of labia minora. Labial adherence an become an extra factor so that normal genital humidity accumulates, thus giving the false impression of vaginal discharge[19].

Out of the 189 patients who did not present an etiological agent for their complaints, only 19 progressed to vulvitis, thus requiring local treatment. The other 170 patient were only treated with general recommendations[20,21].

We obtained a percentage of 35% of patients who did not return. In accordance with this data, Sharon McGreal and Paul Wood, in a study conducted in England in 2013, concluded that 35% of Infant-Puberal Gynecology patients were discharged after the initial appointment[22], with no return. In the English work, which comprehended 15 years, the most common cause of discharge was vulvovaginitis (82%), which responded to simple hygiene actions.

CONCLUSION

The relevance of clinical diagnosis was confirmed, facing the complaints that were suggestive of vulvovaginitis in 2013 assisted patients, out of which 189 (93.1%) did not present any type of disease. The main symptom was vaginal discharge. The main etiology was poor hygiene habits and clothing. The most used treatment consisted of recommendations. Most patients presented cure as an outcome.

Conflict of interests

The authors declare no conflict of interests.

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A SURVEY ON ADOLESCENT SEXUAL BEHAVIOR IN A PUBLIC BRAZILIAN HIGH SCHOOL: SOME DATA TO HPV VACCINATION INTRODUCTION

UMA PESQUISA SOBRE O COMPORTAMENTO SEXUAL DO ADOLESCENTE EM UMA ESCOLA PÚBLICA DE ENSINO MÉDIO: ALGUNS DADOS PARA A INTRODUÇÃO DA VACINAÇÃO CONTRA O HPV

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ABSTRACT

Introduction: Many evidences have demonstrated the association between human papillomavirus (HPV) infection and cervical cancer, and prophylactic vaccines have been effective to prevent this infection. In relation to the vaccination program of the population, it is important to study the sexual behavior of adolescent students, especially the onset age of sexual activity. **Objective:** To evaluate the sexual behavior of adolescent students from public schools in relation to some associated variables and to link the onset age of sexual activity with HPV vaccination of the population. **Methods:** The study was based on the application of a questionnaire to 500 students of public high schools of the city of Curitiba, aged between 13 and 19 years, to assess their sexual behavior and related questions. Of the 500 questionnaires, 488 were answered and analyzed by statistical methodology. The study was approved by local regulatory bodies. **Results:** Regarding sexual activity, it was observed that it was most frequent along male than female students. It is noticed that 47.8% of boys and 24.6% of girls answered positively to this question. Similarly, 38.7% of boys reported having initiated sexual activity before age 14 compared to only 8.5% of the girls. Other data about the perceived risk of contracting a sexually transmitted infection and contraception condom were assessed. The relation between drug use (tobacco, alcohol and marijuana) and sexual activity was demonstrated. About 45% of sexually active students stated regular use of drugs, compared with less than 20% of those who reported not having initiated sexual activity ($p < 0.001$), whereas this proportion was even more evident when analyzed only the use of marijuana. The "protector" effect of family environment shows an interesting finding: the adolescents who lived with their parents were less sexually active than those who did not report such situation with a percentage of 31.3% versus 59.4% ($p = 0.003$). **Conclusion:** We concluded that sexual activity was more evident among male participants as sexual initiation was earlier among boys. Use of drugs and independence of family environment were related to higher rate of earlier and current sexual activity. According to researches, 90% of the students who already are 17 years old had initiated sexual activity; therefore, we can conclude that the age of vaccination proposed by most governmental authorities and the Brazilian Federation of Gynecology and Obstetrics (Febrasgo) is adequately when it comes to prevent HPV infection.

Keywords: adolescence, sexual behavior, HPV vaccine.

RESUMO

Introdução: Muitas evidências têm demonstrado a associação entre a infecção pelo vírus do papiloma humano (HPV) e o câncer cervical, e as vacinas profiláticas têm sido eficazes na prevenção desta infecção. Quanto ao programa de vacinação da população, é importante estudar o comportamento sexual de adolescentes, especialmente na idade de início da atividade sexual. **Objetivo:** Avaliar o comportamento sexual de adolescentes alunos de escolas públicas em relação a algumas variáveis associadas e relacionar a idade de início da atividade sexual com a vacinação da população contra o HPV. **Métodos:** O estudo se baseou na aplicação de um questionário a 500 alunos de escolas secundárias públicas da cidade de Curitiba, com idade entre 13 e 19 anos, para avaliar seu comportamento sexual e questões relacionadas. Dos 500 questionários, 488 foram respondidos e analisados por metodologia estatística. O estudo foi aprovado pelos órgãos reguladores locais. **Resultados:** Em relação à atividade sexual, observou-se que era mais frequente no sexo masculino do que no feminino. Percebe-se que 47,8% dos meninos e 24,6% das meninas responderam positivamente a esta pergunta. Da mesma forma, 38,7% dos meninos relataram ter iniciado atividade sexual antes dos 14 anos, comparado a apenas 8,5% das meninas. Outros dados relacionados ao risco percebido de contrair uma infecção sexualmente transmissível e uso de preservativos e contraceptivos foram avaliados. Foi demonstrada a relação entre o uso de drogas (tabaco, álcool e maconha) e atividade sexual. Cerca de 45% dos estudantes sexualmente ativos relataram uso regular de drogas, em comparação com menos de 20% daqueles que relataram não ter iniciado atividade sexual ($p < 0,001$), enquanto essa proporção era ainda mais evidente quando analisado apenas o uso de maconha. O efeito "protetor" do ambiente familiar revela uma descoberta interessante: os adolescentes que viviam com os seus pais eram menos ativos sexualmente do que aqueles que não relataram tal situação, com uma percentagem de 31,3 % versus 59,4% ($p = 0,003$). **Conclusão:** Concluiu-se que a atividade sexual foi mais evidente entre os participantes do sexo masculino, já que a iniciação sexual ocorreu mais cedo entre os meninos. Uso de drogas e independência do ambiente familiar foram relacionados a maior ocorrência de atividade sexual anterior e atual. De acordo com estudos, 90% dos alunos que já têm 17 anos de idade tinham iniciado atividade sexual; portanto, podemos concluir que a idade de vacinação proposta pela maioria das autoridades governamentais e pela Federação Brasileira de Ginecologia e Obstetrícia (Febrasgo) é adequada quando se trata de prevenir a infecção pelo HPV.

Palavras-chave: Adolescência, Comportamento sexual, Vacina contra o HPV.

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INTRODUCTION

Sexual activity has become increasingly earlier, and a greater number of partners are reported mainly when analyzing the adolescents [1].

This study was initiated in response to an ongoing surge in sexually transmitted diseases (STDs) and undesired pregnancies among the youth of one of the districts of Curitiba, a city with 1,700,000 inhabitants in South Brazil.

Many evidences have demonstrated the association between human papillomavirus (HPV) infection and cervical cancer, and prophylactic vaccines have warned efficacy in this infection[2-4]. In relation to the vaccination program of the population, it is important to study the sexual behavior of adolescent students, especially in the onset age of sexual activity.

It was also designed to assess the sexual profile of a medium- to low-income population sample in the perspective of introducing the prophylactic vaccine against HPV infection, after the promising results announced in several clinical trials and published up to then. The survey was conducted in a public high school chosen as an average Brazilian school parameter during the year of 2008.

OBJECTIVE

The objective of this study was to evaluate factors related to sexual behavior among adolescent students of public schools in medium- or low-income population, trying to correlate with the guidelines of HPV vaccination, especially regarding the onset age of sexual activity in this population.

Therefore, the following four parameters were analyzed:

1. Sexual activity level and debut of sexual activity by gender
2. Educational attainment, knowledge of sexual risks and use of contraceptive methods
3. Use of drugs and sexual activity
4. Family structure and sexual activity

METHODS

Population

Of 500 students of public high schools, aged from 13 to 19 years, 448 answered individual questionnaires composed of multiple-choice questions on gender, age, family structure, level of knowledge, use of drugs and use of contraceptive method. These questionnaires were applied by a group of four students from the infectious transmitted diseases subject in the 4th year of Medical Course at Universidade Federal do Paraná (UFPR). This group received training in Good Clinical Practice and orientations how to teach the students to fill the questionnaires.

Procedure

The data were collected before the activities of the classes with permission of director of schools and after explaining the detail of the survey to the teachers. Confidentiality was kept by non-identification. The data collected were analyzed by Chi-square method. The study was approved by the ethics committee of Clinics Hospital from UFPR according to the Brazilian Research Regulations and Good Clinical Practice.

RESULTS

After analyzing large amounts of raw data, the following trends in sexual behavior among the population studied were found.

Sexual activity level and debut of sexual activity by gender

Talking about the presence or absence of active sexual relationship at the time of visit, we can observe a significant increase in this situation in male students (**Figure 1**). **Figure 2** shows the rate of the sexual onset of male and female students. It also shows that the boys start sexual activities earlier.

The data showed tha among the surveyed students 47.8% of the male reported being sexually active, contrasting to 24.6% of the female (**Figure 1**). Boys were also stated being more precocious than girls (**Figure 2**). At the age of 14 years 38.7% of boys against 8.5% of girls were declared being sexually active. It was also observed that of the 20% girls that had their sexual initiation, 11% have their debut up to the age of 16 years. According to the data collected, initiation rates for both genders will be equal at the age of 17 years, when 90% of the students are sexually active.

Educational attainment, knowledge of sexual risks and use of contraceptive methods

According to the answers assembled in **Figure 3**, only less than 8% of the students do not use any contraceptive or preventive method, and almost 85% reported using a barrier method, almost exclusively condoms. However, as research on condom use among adolescents has inherent difficulties[5], the questionnaire could not convey whether the students were properly using it.

Use of drugs and sexual activity

The association of drugs and sexual activity are well established in **Figures 4 and 5**. While less than 20% of the non-sexually

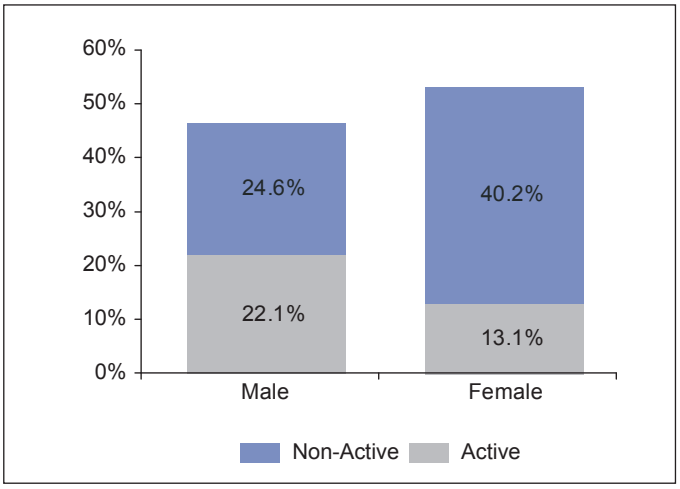

Figure 1 – Students' overall sexual activity by gender (ages 13 to 19).

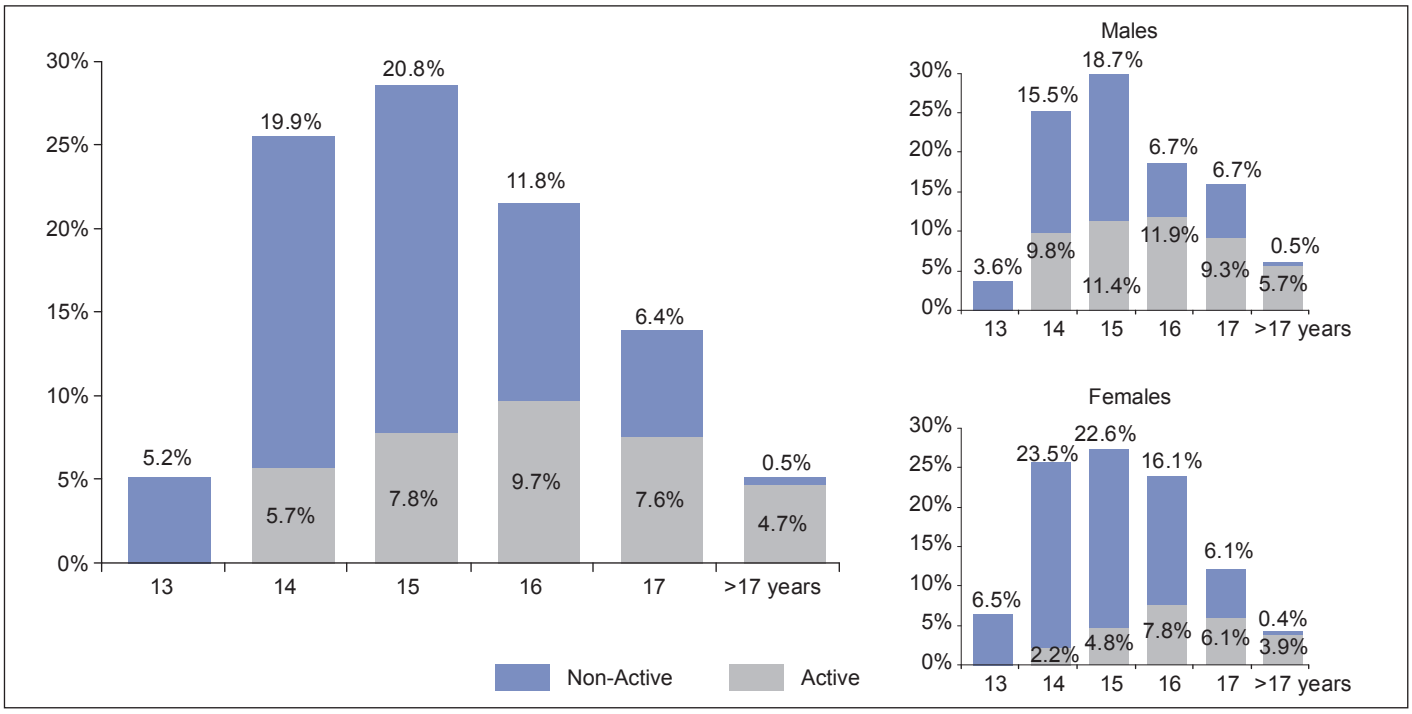

Figure 2 – Age at sexual debut.

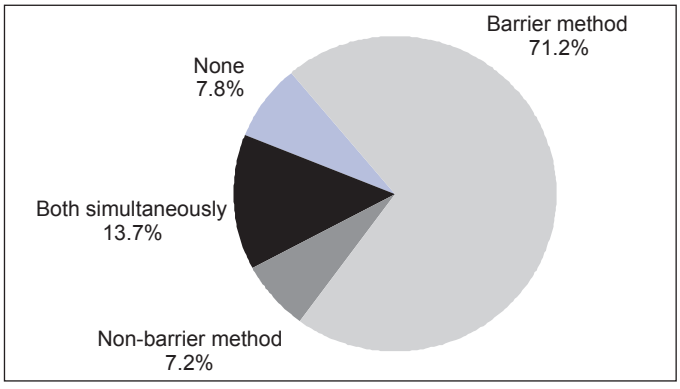

Figure 3 – Use of contraceptive or preventive barrier methods.

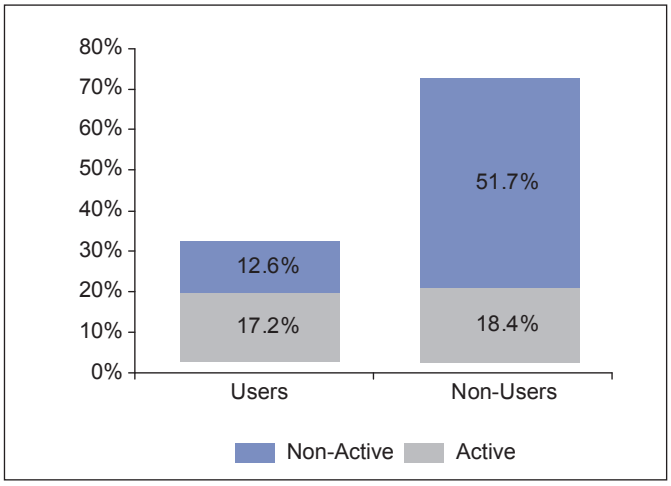

Figure 4 – Use of drugs (tobacco, alcohol, marijuana) and sexual activity.

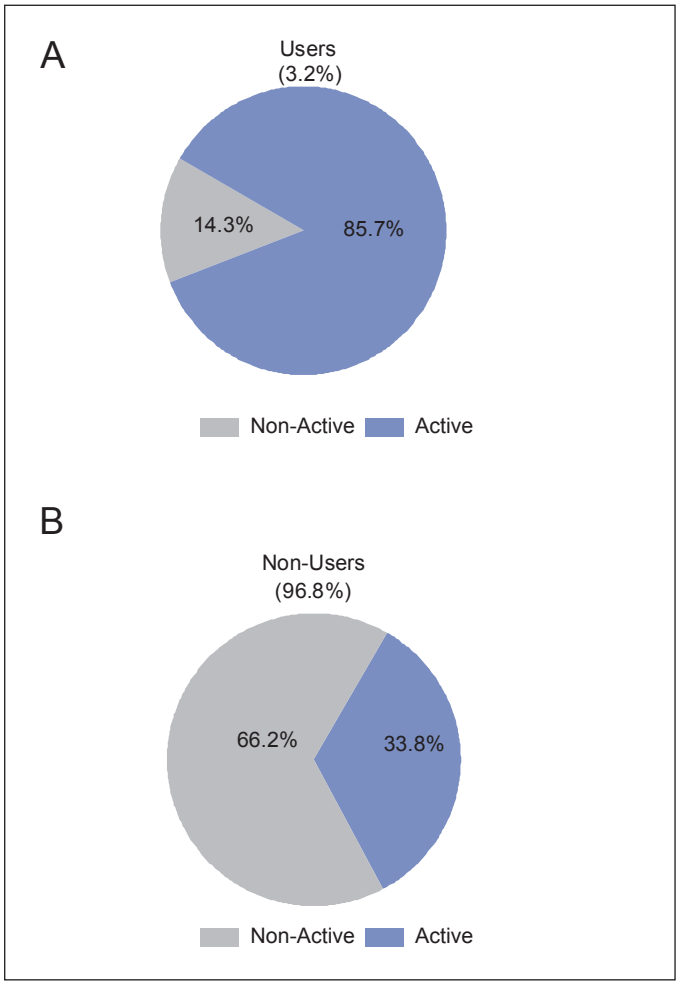

Figure 5 – Use of marijuana and sexual activity.

active group reported using some kind of drug regularly (tobacco, alcohol, marijuana), more than 45% in the sexually active group were regular consumers ($p < 0.001$). What is most striking is the linkage between marijuana use and sexual activity: 85.7% of marijuana users are sexually active, against a 33.8% of sexual activity among non-users of marijuana (**Figure 5**) ($p = 0.0002$) and 44.5% of sexual activity among users of different drugs.

Family structure and sexual activity

The growing number of single-parent families and youngsters living in non-traditional family set ups have great influence on sexual activity level as demonstrated in **Figure 6**. Teenagers living with both parents are less prone to be sexually active (31.3%) than those who do not (59.4%), ($p = 0.003$).

DISCUSSION

The evaluation of some factors selected here was considered with great importance to study the prevention of STDs and the correlating factors such as drugs use. Add to this situation that some sexually transmitted infections (STIs) are strongly linked with genital carcinomas mainly cervical cancer. It is a fact that infection with HPV is necessary for the development of cervical cancer and its precursors. In the last decade, two vaccine trials had demonstrated capacity for prevention of this infection and precursor lesions for cervical cancer[4,6].

Analyzing the four main groups in the study about sexual activity and its prevalence and precocious puberty in boys, one might well argue that this inequality was overestimated because boys were bound to convey a false image of their sexual behavior. Notwithstanding, the following concerns obviously emerge from this disparity because they substantially increase the risk of spreading STDs.

Such an early and well-spread sexual activity among boys should be considered as a major risk factor for their future marital partners because boys may be "accumulating" a large spectrum of STDs such as HPV, syphilis and chlamydial infection. In a review of prevalence studies of adolescent and college-aged women repeatedly tested over time for HPV, as many as 90% tested positive for HPV at least 1 time[7]. Older women are also at risk: 34% of a sample of older, postmenopausal women (median age 56), most of whom had had only 1 sexual partner in their lifetime, were HPV positive at some point during a 7-year follow-up, suggesting that the sexual history of the partner(s) may be a co-determinant of risk[5].

The present survey was unfruitful in highlighting different trends of behavior among the studied group when comparing level of knowledge and sexual activity. Significant patterns, such as whether better informed students behave more safely, could not be drawn out of the raw data collected. The authors found that sample homogeneity with group similar levels of exposure to information concerning sexuality could well be the reason. It has to be noted here that a previous study conducted in Northeast Brazil[7] had already shown that educational attainment is among the variables that are consistently associated with differential risk of engaging in first intercourse during adolescence, including premarital intercourse, and of contraceptive use during sexual initiation[8]. In this study, the use of contraceptive methods or protective barrier methods against STDs appeared to be suitably spread among the population surveyed, suggesting positive effects of prevention and targeted intervention efforts.

From the point of view about use of drugs, scientific research has demonstrated that the use of alcohol and drugs is related to the occurrence of unsafe sexual behavior that places adolescents at risk for pregnancy or for contracting STDs. The characteristic intransigence of the teenager, the search for recognition and respect from peers and the careless attitude toward the long-term consequences are all well served by the use of drugs and also by sexual activity. The regular use of substances of abuse, young age and sexual activity represent a grave combination: an altered mental status prevents judicious measures of safe sex, not to mention the exposure to unsafe environments.

The supervision from parents showed an important point to control the sexual activity and its correlated situations as drugs use. Lack of supervision from parents and public structures involved

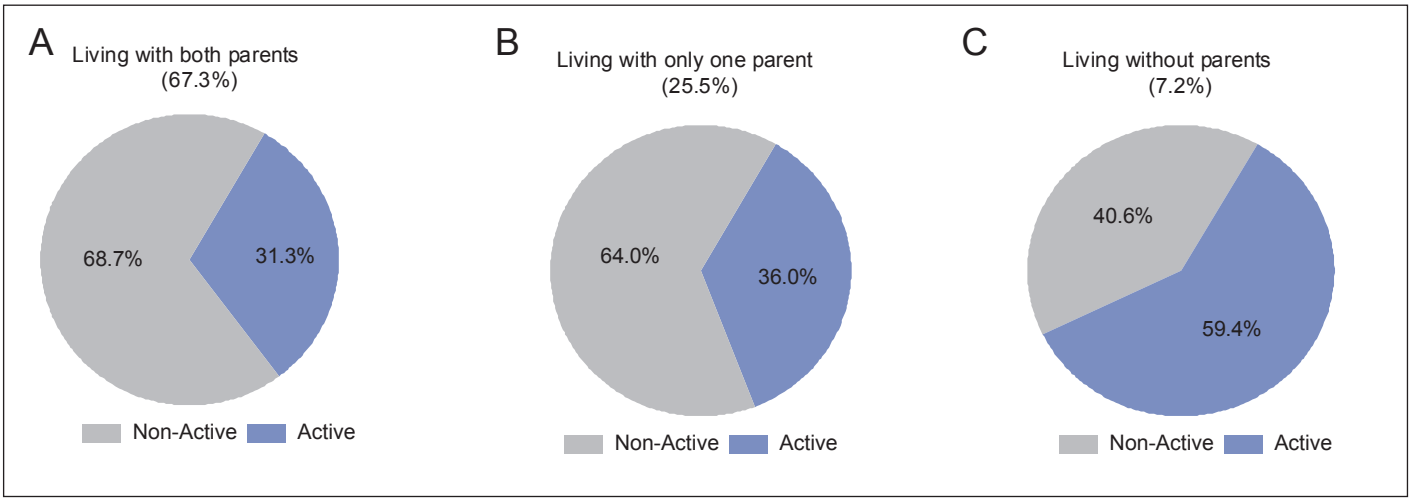

Figure 6 – Students' sexual activity compared to their family status.

in child upbringing appears to be the most determinant factor for high-risk conduct of adolescents, in mid- to low-income settings, and brings much concern about which role could the public sanitary structures be playing to prevent young people's idleness, ignorance and at the same time which preventive measures in public health, in governmental planning and in clinical practice should be introduced to reduce morbidity rates among low-income population in Brazil.

HPV, one of the most common STDs worldwide, causes nearly 100% of cervical cancers in women and a substantial number of other anogenital cancers and warts. While transmission rates are dramatically expressive among young, sexually active populations, it is estimated that 75% of sexually active individuals will become infected with at least one type of HPV at some point during their lives. The overwhelming majority of women affected by cervical cancer live in developing countries, where screening programs and infrastructures for prevention, diagnoses and treatment are weak[9].

In the past years, developed vaccines against HPV, which have been licensed in several countries following the determination that they have an acceptable benefit–risk profile[10], provide substantial hope for preventing deaths, psychological stress and expensive treatment costs induced by cervical cancer.

If on the one hand, vaccination against HPV does not eliminate the need for cervical screening to minimize cancer incidence, on the other hand, women who have no evidence of past or current infection with the HPV genotypes present in the vaccines, are likely to have a protection superior to 80% against persistent HPV infection[2,3].

To prevent peak incidence of HPV, the North American Advisory Committee on Immunization Practices (ACIP) recommends vaccination of girls between ages 11 and 12 years, right before the onset of sexual activity.

The Brazilian Federation of Gynecology and Obstetrics (Febrasgo) recommends this vaccination around 12 years of age, according to regional behavior differences[11].

In countries with significant cultural, racial, economic and educational regional dissimilarities such as Brazil, one might suggest that the target age for vaccinating girls should first consider these regional differences. Further studies in this course are of great importance to provide an optimal cost-effectiveness to vaccination programs.

Extending the vaccination more than the target population should be considered in boys and in the women after teenage. We can see a good example for this approach in the Australian HPV Vaccination Program that had shown these benefits[12].

Moreover, because promoting responsible sexual and health-seeking behaviors among secondary school students of public schools remains a major public health concern, Brazilian government health structures should take every opportunity during future preventive campaigns to provide thorough orientation on STIs to adolescents. Clear information on the need to maintain Papanicolaou testing after HPV vaccination is vital. The possibility of conjugating other age-appropriate vaccines such as Hepatitis B vaccine as suggested by the Centers of Disease Control and Prevention (CDC) should be contemplated as well.

It is of highest importance that low-income target populations, among whom cervical cancer rates are seriously elevated and resistant to prevention programs, have access to this vaccine. Otherwise, at the utmost point, vaccine existence could actually run the risk of being questioned. Tiered pricing, innovative financing mechanisms and multidisciplinary partnerships will be essential[7] to favor preventive actions where they are remarkably demanded.

If early sexual activity cannot be prevented, at least some of its undesired consequences should, and could, be avoided and the vaccination against HPV is one of the manners to do it.

As a widely referred cultural value that is relevant to gender-related socialization, which supports and stimulates a more liberal behavior for boys than for girls where, 47.8% of the surveyed male students reported being sexually active, contrasting to 24.6% of the female students. Boys were also stated being more precocious. The results showed that among surveyed students, 38.7% of boys against only 8.5% of girls were declared being sexually active at the age of 14 years.

CONCLUSION

That sexual activity was more evident among male participants, like the sexual initiation was also earlier among boys. Use of drugs and independence from the family environment were related to higher early references and have had current sexual relationship. According to researches, almost all of the students who already are 17 years old had initiated sexual activity. Therefore, we can conclude that the age of vaccination proposed by most authorities such as the Febrasgo is adequately when it comes to prevent HPV infection.

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Conflict of interests

Newton Sérgio de Carvalho was a researcher of the GSK vaccine against oncogenic HPV, and he acts lecturing for holders of both vaccines patents (GSK and MSD) companies. The other authors declare no conflict of interests.

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Prevalence of infection with high-risk HPV in women using hybrid capture conducting prevention of cervical cancer in Southern Brazil

Prevalência de infecção por HPV de alto risco em mulheres utilizando captura híbrida na prevenção do câncer do colo do útero no Sul do Brasil

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ABSTRACT

Introduction: High-risk Human Papillomavirus (HR HPV) infection is known to be linked to cervical cancer, with molecular biology tests being an important tool in diagnosis. **Objective:** This study is aimed to quantify the prevalence of HPV infection in women from the Southern part of the State of Rio Grande do Sul, Brazil, correlating factors associated with the development of precursor lesions and of cervical cancer. **Methods:** 643 women were enrolled in the study, by filling out a standardized questionnaire and undergoing cytology, colposcopy, and HR HPV Hybrid Capture 2 (HC2) tests. **Results:** Most patients were aged between 20 to 39 years (70.6%), this decreased the percentage of smokers from 23% to 11%. The average age of sexual debut through the period studied was of 18 years old. HR HPV prevalence was correlated with younger ages, with fewer patients infected by HR HPV when they were older at first sexual activity. Almost 70% prevalence of infection was observed in women who had 4 or more sexual partners. Altered cytology and colposcopy results had significantly higher rates of HR HPV infection. 334 women were referred for biopsy. Of those, 321 had altered colposcopy results and cytopathology of ASC-US/AGC-US, LSILs and HSILs, with 231 biopsies performed by the study. None of the results indicated cervical cancer. HC2 showed higher specificity than cytology, with high positive and negative prediction values (49.8% and 78.6%, respectively).**Conclusion:** The inclusion of HR HPV testing in screening programs in Brazil, according to international policies, will lead to fewer biopsies in women without infection and increased interval between screenings.

Keywords:high risk HPV, cervical cancer, hybrid capture, Brazil.

RESUMO

Introdução: Sabe-se que infecções por HPV de alto risco (HPV AR) estão ligadas ao desenvolvimento de câncer cervical. **Objetivo:** Esse estudo teve como objetivo quantificar a prevalência de infecções por HPV em mulheres da metade sul do Estado do Rio Grande do Sul, Brasil, correlacionando fatores associados ao desenvolvimento de lesões precursoras e câncer cervical. **Métodos:** Para tanto, 643 mulheres foram incluídas no estudo, preenchendo um questionário padronizado e submetidas aos exames de citologia, colposcopia e HPV AR (Captura Híbrida 2). **Resultados:** A maioria das pacientes tinha idade entre 20 e 39 anos (70,6%), houve decréscimo na porcentagem de fumantes de 23% para 11% e a média de idade ao início da vida sexual era de 18 anos. A prevalência de HPV AR é correlacionada com idades mais jovens, com menos pacientes infectadas por HPV AR quando estas eram mais velhas no momento do início da atividade sexual. Prevalência próxima a 70% foi observada em mulheres que tiveram 4 ou mais parceiros sexuais. Resultados citológicos e colposcológicos alterados tiveram taxas significativamente mais altas de infecção por HPV AR. 334 mulheres foram encaminhadas à biópsia. Destas, 321 tiveram resultados de colposcopia alterados e citopatologia ASC-US/AGC-US, LSILs e HSILs, com 231 biópsias realizadas neste estudo. Nenhum dos resultados indicou câncer. O teste de CH2 mostrou mais especificade do que a citologia, com altos valores preditivos positivos e negativos (49,8% e 78,6%, respectivamente). **Conclusão:** A inclusão de testes para HPV AR nos programas de triagem no Brasil, de acordo com as políticas internacionais, levará à redução de biópsias em mulheres não infectadas e aumentará o intervalo entre exames.

Palavras-chave: HPV de alto risco, câncer cervical, captura híbrida, Brasil.

INTRODUCTION

Cervical cancer is the third most common malignancy in women, and the seventh in general, with approximately 270,000 deaths annually[1]. Epidemiologic studies have shown that the main aetiological factor of cervical cancer is the infection with high-risk (HR) types of Human Papillomaviruses (HPVs)[2]; in fact, nearly all of cervical cancer cases test positive for HPV[3].Persistent HPV infection have been unequivocally linked to the development of cervical cancer, and at least 15 HPV sub-types are classified as high risk, including 16, 18, 31, 33 and 51[4]. HPV types 16 and 18 are the most carcinogenic, responsible for approximately 70% of all cervical cancers[5] .

The knowledge of the association between HPV and cervical cancer has led to the development of new screening techniques based on molecular biology testing. Some of these strategies include PCR-based diagnosis or Hybrid Capture 2 (HC2) assays, and between them, HC2 testing has better sensitivity for the detection of High-grade Squamous Intraepithelial Lesions (HSIL)[6–9].

Among the pre-malignancy possible results of Pap smear, HSIL shows more severe cell abnormalities and are more likely to progress into cancer if left untreated[10]. Hence the importance of identifying HR HPV in patients with a HSIL diagnosis.

Reviews on HPV infection, screening processes and treatment options indicate a lack of studies in developing countries[7]. The current study aims at quantifying HPV infection in women

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from the Southern part of the State of Rio Grande do Sul, and describes factors associated with the development of precursor lesions and cervical cancer.

METHODS

A cross-sectional study was performed at the Gynecological Cytology Specialized Clinic (SECIG, Pelotas, RS-Brazil). All women included in the study were the patients who were referred for test of HPV, by using uterine cervix samples and Hybrid Capture 2 (HC2) method, between January of 1998 and July 2012. This population comprises patients of gynecological practices from the entire Southern region of the State of Rio Grande do Sul (Brazil), private and insured. SECIG is the only service in the region, performing all the three screening tests such as cytopathology, videocolposcopy and HC2, being a reference also for the treatment of uterine cervix pathologies.

The study population comprised of 643 women aged between 15 to 81 years. The hybrid capture test was requested by the patient's physician mostly based on previous history of HPV infection or the presence of clinical findings. Pregnant women, patients with diagnosis or suspicion of immunosuppression and those who underwent total hysterectomy were excluded. Patients answered a standardized questionnaire which included the following information: age, number of pregnancies, age of first sexual intercourse, number of sexual partners, smoking, previous history of HPV, and birth control method of choice. Gynecological exam was then performed and screening test samples were obtained according to the following protocol:

For cervical cytology, an Ayre's spatula was used to collect cells from the transformation zone and a cytobrush for endocervical cells. Slides were fixed in 95% ethanol and Papanicolaou stained was used. A single pathologist analyzed all cytological tests and results were described using Bethesda International Classification[11].

Colposcopy was performed using a *DFVasconcellos*® videocolposcope model CP-M1250, according to the literature[12]. Colposcopy findings were classified according to the International Federation of Cervical Pathology and Colposcopy (IFCCP) classification[13] and the images were digitalized. Results were catalogued as normal and abnormal according to the presence of: aceto-whitening at different levels, changed patterns of the blood vessels, and the stain pattern with iodine.Testing was unsatisfactory when the totality of the squamocolumnar junction was not visualized or intense atrophy and inflammatory process that prevented evaluation was observed.

Patients with altered colposcopies were submitted to biopsy, using *MedGyn*® BabyTischlerCervicalBiopsy forceps, and subsequent histologic analysis with Hematoxylin/Eosin coloration. At colposcopy, two or more biopsy specimens should be taken. The used nomenclature was: low-grade Cervical Intraepithelial Neoplasia (CIN1), high-grade Cervical Intraepithelial Neoplasia (CIN2, CIN3) and invasive cervical carcinoma[14].

For the detection of HPV DNA by HC2, material was collected from the cervix using the swab and collection kit provided by *Digene*® HC2 HPV DNA Test (Qiagen N.V., Netherlands). The material was processed according to manufacturer's instructions. Samples were analyzed for HR HPV types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59 and 68. The usual limit of 1 pg/mL of HPV DNA 16 was used as positive control, determining both quantitative and qualitative results (1 pg/mL equals 0.1 viral copy by cell). Positive results were then categorized in low (1 pg/mL to 10 pg/mL), moderate (10 pg/ml to 100 pg/mL) and high viral load (>100 pg/mL).Bivariate analyses were performed using chi-square and chi-square for linear trend. Statistical tests were considered to be statistically significant at a $p < 0.05$.

The study protocol was approved by the Ethics Committee of the Universidade Federal de Pelotas (Approval report number 425.607).

RESULTS

The majority of the patients were aged between 20 to 39 years (70.6%) (**Table 1**), and the age distribution did not changed in different periods throughout the of the study. The prevalence of smoking was 23% at the first period of years and showed a significant reduction through the years, reaching 11% at the last period. Regarding the age of sexual initiation, there was an increase in the number of women having their sexual debut before the age of 15 years, and a decrease in those who started at the age of 20 or more.

The number of sexual partners was evenly distributed between 1, 2 or 3, and 4 or more for the first third of the study. From 2003 onwards we can see a trend of increase in the number of sexual partners in this population. The number of pregnancies did not vary throughout the studied period. There was a significant trend of decrease in the number of women infected by HR types of HPV on recent years (**Table 1**).

Table 2 shows the positivity for HR HPV according to the sample characteristics. Regarding HR HPV prevalence, there was a linear correlation between a positive result for HPV and age, with a clear decrease in HPV infection with the increase in age ($p < 0.001$). This study did not find a significant correlation between HPV infection and smoking ($p = 0.4$). There was, however, a linear trend for reduction in HR HPV infection with the increase in the age of sexual initiation ($p < 0.001$).

We found that an increase in the number of sexual partners was associated with an increase in HR HPV infection ($p < 0.001$), reaching almost 70% of prevalence in those who had 4 or more partners. Moreover, no correlation was found between the number of pregnancies and infection by HR HPV (**Table 2**). Although infection decreased in a linear pattern between those with no children and those with 1 or 2 pregnancies, the trend was not maintained. Those women with 3 or more pregnancies showed similar values of HR HPV infection than women with only one pregnancy (**Table 2**).

Table 3 shows the relationship between positive results for HR HPV tests, colposcopy and cytopathology exams. Patients with altered colposcopy had significantly higher rates of HR HPV infection when compared with those patients whose colposcopy showed no alteration ($p < 0.001$). There was also a significant difference according to the results of the cervical cytopathology tests. More severe results showed higher prevalence of HR HPV infection. Results varied from a prevalence of 37.2% of HR HPV infection among patients with normal cytopathology to a 98.4% prevalence among patients with HSILs.

Table 1 – Characterization of the cohort, on the three periods of the study, according to the variables from the standardized questionnaire

Variables	1998 – 2002	2003 – 2008	2009 – 2012	Total	p-value
	n = 199	n = 227	n = 217	n = 643	
Age					**0.34***
Up to 19 years old	12.6	8.8	6.9	9.3	
20 to 29 years old	45.2	56.4	45.6	49.3	
30 to 39 years old	18.1	21.2	24.4	21.3	
40 to 49 years old	14.6	11.5	14.8	13.5	
50 years old or more	9.6	2.2	8.3	6.5	
Smoking					**0.001***
No	76.9	85.5	88.9	83.9	
Yes	23.1	14.5	11.1	16.0	
First intercourse					**0.005***
Before 15 years old	19.1	19.8	24.0	21.0	
16 to 19 years old	54.3	56.8	62.2	57.9	
20 years old or more	26.6	23.4	13.8	21.2	
Number of partners					**< 0.001***
1	36.2	25.6	17.1	26.0	
2 to 3	31.7	34.4	33.2	33.1	
4 or more	32.2	40.1	49.8	40.9	
Pregnancies					**0.40***
0	64.8	72.3	64.5	67.4	
1	10.6	13.7	17.1	13.8	
2	17.1	7.9	13.4	12.6	
3 or more	7.5	6.2	5.1	6.2	
HR HPV					**0.05***
Negative	38.2	28.2	47.0	37.6	
Positive	61.8	71.8	53.0	62.4	

*Chi-square for linear trend.

Table 4 presents results for colposcopy and cytopathology exams, since the criteria for referral to histological analysis by biopsy was the correlation between altered colposcopy and cytology results. The results on this table indicate that the patients that should be referred to biopsy are those with altered colposcopy results (atypical transformation zone) and cytopathologic results of ASC-US/AGC-US, LSILsand HSILs. This group corresponds to 321 women. Nevertheless, a further 6% of patients (13 women) were referred to biopsy despite having normal cytopathologic results. Their colposcopy findings included intense reaction to acetic acid, mosaic and punctation.

Therefore, 334 women were referred for biopsy, but only 231 biopsy exams were performed, since some patients returned to their physicians of choice to undergo the procedure. In the group of 231 women that had biopsy exams done by our team, results were as follows: 10% presented chronic cervicitis, 43% CIN I, 46% CIN II or III. None of the performed biopsies suggested cervical cancer.

From the total of patients with CIN II or III (107 women), 75% were referred to Loop Electro-surgical Excision Procedure (LEEP), 10% to cold knife conization, and 3% to electrocauterization of the cervix. The remaining patients were treated by their physician of choice. Histological surgical results, for both LEEP and cone, were 3% negative, 16% CIN I, 77% CIN II or III, and 4% invasive carcinoma. Regarding the margins of LEEP/cone samples, 85% had noninvolved (negative) margins.

Figure 1 presents sensibility and specificity values of the methods when compared to the histological findings, while **table 5** presents positive and negative prediction values according to the tests.

Table 2 – High Risk HPV prevalence, according to characteristics of the cohort

Variables	High Risk HPV		p-value
	Negative	Positive	
	n = 242	n = 401	
Age			**< 0.001***
Up to 19 years old	25.0	75.0	
20 to 29 years old	30.3	69.7	
30 to 39 years old	36.5	63.5	
40 to 49 years old	57.5	42.5	
50 years old or more	73.8	26.2	
Smoking			**0.40**
No	38.3	61.7	
Yes	34.0	66.0	
First intercourse			**< 0.001***
Before 15 years old	26.7	73.3	
16 to 19 years old	37.1	62.9	
20 years old or more	50.0	50.0	
Number of partners			**< 0.001***
1	50.9	49.1	
2 to 3	33.8	66.2	
4 or more	32.3	67.7	
Pregnancies			**< 0.001***
0	31.4	68.6	
1	46.1	53.9	
2	55.6	44.4	
3 or more	50.0	50.0	

*Chi-square for linear trend.

Table 3 – High risk HPV prevalence, according to colposcopy and cytology results

Variables	HR HPV viral load			p-value
	Negative	Positive	Total	
	n = 242	n = 401	n = 643	
Colposcopy				< 0.001
Normal	64.1	35.9	44.2	
Altered	16.7	83.3	55.8	
Cytopathologic				< 0.001
Normal	62.8	37.2	41.8	
ASC-US/AGC-US	38.5	61.5	14.2	
CIN I	16.8	83.2	34.2	
CIN II e III	1.6	98.4	9.8	

Sensibility for altered cytopathology test was 98.1% and positive prediction of 48.4%. Specificity was 9.7% and negative prediction of 53.7%. Regarding HR HPV, sensitivity was 94.4%and positive prediction of 49.8%, while specificity was 17.7% and negative prediction was of 78.6%.

DISCUSSION

There was an increase in the number of women with age above 30 who were seeking medical care with physicians for HPV-related exams throughout the studied period. From 2009 onwards it was observed a decrease in the proportion of patients aged less than 29 years and an increase in those aged over 30, relative to the two previous study periods. This agrees with current policy guidelines that advise the cotesting for HPV and cytopathology for women aged 30 or older[10]. It was also observed a decline in smoking habits throughout the study, reaching less than half of the

Table 4 – Relative results between colposcopy and cytology tests

Cytopathologic	Colposcopy				p-value
	Normal		Altered		
	n	%	n	%	< 0.001
Normal	231	85.9	38	14.1	
ASC-US/AGC-US	33	36.3	58	63.7	
CIN I	20	9.1	200	90.9	
CIN II e III	0	0	63	100.0	

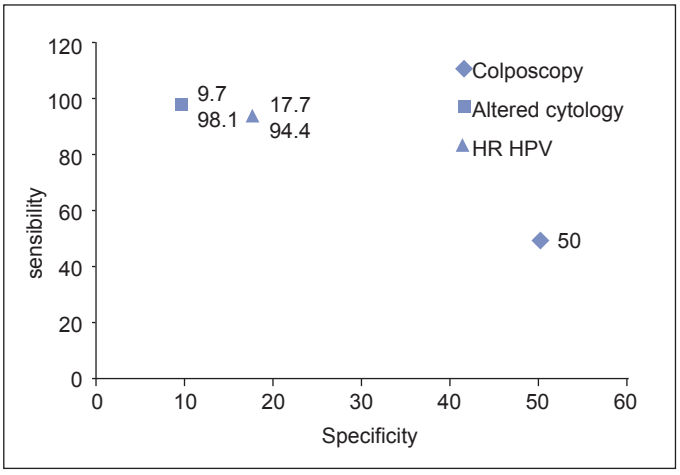

Figure 1 – Sensibility and specificity results for colposcopy, cytopathology and HR HPV tests.

Table 5 – Positive and negative predictive values (PPV and NPV, respectively) for precursor lesion prediction on colposcopy, cytopathology and HR HPV tests

	PPV	NPV
Colposcopy	46.3	-
Altered cytology	48.4	53.7
HR HPV	49.8	78.6

initial proportion of smokers. This trend has also been observed in other countries[15,16]. In the United Kingdom there was a significant reduction in the percentage of female smokers, from 40% in the 1970's to 20% in 2007, an estimate that remains constant[15]. The proportion of 16% for smoking found in our study is the same described in the United States[16].

A change in the age of sexual initiation is evident in this population, with a trend for earlier initiation. Other studies have shown an average decrease of four years in the sexual debut [17]. Bajos *et al.*[17] also observed an increase in the number of sexual partners between the years of 1970 (1.8) to 2006 (4.4). The same was observed in the present study. As most middle-income countries, Brazil has made the transition to a low-fertility country, with women having less children, having near zero population growth rate[18]. The data seen is this population reflects this tendency for smaller families. Nonetheless, we could not define a trend in HR HPV infections, with the prevalence fluctuating between different time periods.

Our study has shown that younger women were at greater risk of contracting HR HPV. This finding agrees with previous findings[19]. Also, the early beginning of sexual activity may lead to an increased number of partners in life, and both variables increase the likelihood of HR HPV infection. In this study 21% of women had started sexual life before the age of 15, and over 73% of them tested positive for HR HPV infection. Although there is limited information of sexual behavior data for Brazil[1], this report agrees with previous findings of another Brazilian group, where 20% of women reported having had their sexual debut at the age of 15 or younger[20].

With the average age of sexual initiation being 18 years, women who started sexual activity after the average age had lower risk of HR HPV infection than those whose onset was below average age. Regarding the number of partners, there was a significant increase (38%) in HR HPV infection with higher number of sexual partners.

Although there is an indication that smoking could be an independent factor associated with squamous cell carcinoma and adenocarcinomas[20,21], this study did not find correlation between smoking and infection by HR HPV. However, the actual role of independent factors still bears a level of uncertainty.

According to the literature, there is a relative increase of risk to develop cervical cancer with, not only an increasing number of sexual partners, but also with younger age at first intercourse, younger age at first full-term pregnancy, increasing duration of oral contraceptive use, and also with increasing parity[22]. The findings of this study don't follow such trend. However, this may be explained by the distribution of the cohort. The number of women who had 3 or more pregnancies and 4 or more partners is only 5% of the number of women without children with 4 or more partners (data not shown). The absence of linearity for this variable may be due to the fact that, for this study, an increase in the number of pregnancies was proportional to a decrease in the number of sexual partners (data not shown).

The high sensitivity of HR HPV test is very important when colposcopy and cytology tests give false positive results or to reassure patients that had inconclusive results from the aforementioned tests. Over 38% of patients diagnosed with ASC-US/AGC-US through cytopathology were HR HPV negative. Since the patient won't need to treat an abnormality that will probably disappear without treatment, the psychological tension associated with a diagnosis that could lead to cancer is considerably lowered[10]. Also, increasing the interval on follow-up visits benefits the patient emotionally, since the negative result on the HR HPV test would restrict the physician from referring the patient to colposcopy. In the Brazilian case, this wouldn't account for a significant financial difference, as colposcopy tests cost R$ 3.38 on the Public Health System (SUS)[23]. However, in countries where the test is only available through private medical care, the increase in costs might make a significant difference on both access to the test and its combination with other tests.

Although most research groups find that HPV testing is more sensitive, but less specific than cytology[7,19,24], we report different findings. As seen in **Table 5**, HR HPV testing showed opposite results, with lower sensitivity (although high percentage value) and higher specificity than cytological test. Since, results showed higher positive and negative predictive values (PPV and NPV, respectively), the tendency is for higher costs of screening. As cytology is cheaper than HR HPV tests, when it has higher PPV values, this can reduce the referral of patients to colposcopy. A thorough screening strategy, as the one presented here, prevents the development of cervical cancer in apparently adequately screened women. Also, with such high NPV, the use of HR HPV test can lead to an extension on screening interval.

CONCLUSION

Therefore, from 14 years of analysis included in this study, we see that women in the Southern part of Rio Grande do Sul are now smoking less, have first intercourse at younger age, and increasing the number of partners throughout their life and hence exposing themselves to higher risks of HR HPV infection. However, there has been a decrease in the number of children they have. Women and physicians are complying with international policies for HR HPV testing, since the percentage of women aged 30+ referred to testing increased. And with HR HPV tests showing high levels of specificity, screening intervals may be increased without compromise to the patient's health.

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Conflict of interests

The author declare no conflict of interests.

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Prevalence, Genotypes of Human Papillomavirus Infection and Risk Factors for Persistence in a Cohort of HIV-Infected Pregnant Women

Prevalência e genotipagem do DNA-HPV e fatores de risco relacionados com a persistência viral em uma coorte de gestantes HIV-positivas

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Evaluators: Gutemberg Leão de Almeida Filho, Isabel Cristina Chulvis do Val Guimarães, Vera Lúcia Nunes Pannain, Miguel Angelo Martins Moreira e Mauro Romero Leal Passos
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Banca: Gutemberg Leão de Almeida Filho, Isabel Cristina Chulvis do Val Guimarães, Vera Lúcia Nunes Pannain, Miguel Angelo Martins Moreira e Mauro Romero Leal Passos.
Data da apresentação e aprovação: 19 de Dezembro de 2013

ABSTRACT
HIV-positive pregnant women are more vulnerable to infection and persistence of human papillomavirus (HPV). The aim of this study was to determine the prevalence and genotypes of HPV in a cohort of HIV-positive pregnant women during pregnancy and one year after delivery, analyzing risk factors for persistence. A prospective study was performed with pregnant women followed-up in the Integral Assistance Program for HIV-positive Pregnant Women of the Federal University of Rio de Janeiro, between 2009 and 2011. Demographic, clinical and laboratorial data were evaluated. Cervical samples were collected during pregnancy and one year after delivery. HPV DNA and p53 gene were amplified by polymerase chain reaction (PCR) technique and cloning. HPV direct PCR sequences were typed by submission to Blast Search tool at the National Center for Biotechnology Information (NCBI) website. The prevalence of HPV during pregnancy was 84.3% (118/140), and 106 samples were genotyped. Thirty different HPV types were founded, of which 81.1% were high-risk type. The most prevalent types were: 16, 58, 35, and 53. Infection by multiple types occurred in 18.9%. Persistent infection was noted in 50%, being 30% type-specific and 20% reinfection cases. Persistence was correlated with a $TCD4^+$ count ≤ 350 cells/mm^3 ($p = 0.05$). No correlation was observed between p53 polymorphism and infection by HPV or persistence of HPV infection. In conclusion, there was a high rate of HPV prevalence in this cohort of HIV-positive pregnant women, with a predominance of oncogenic types and persistence of infection in half of the cases, which was correlated with immune suppression.
Keywords: HPV, HIV, pregnancy, risk factors, p53 gene.

RESUMO
Gestantes portadoras do vírus da imunodeficiência humana (HIV) são mais vulneráveis à infecção e persistência do papilomavírus humano (HPV). O objetivo deste estudo foi determinar a prevalência do HPV e seus genótipos numa coorte de gestantes HIV-positivas no pré-parto e um ano após o parto, analisando fatores de risco relacionados à persistência. Foi feito um estudo prospectivo de gestantes atendidas no Programa de Assistência Integral à Gestante HIV-positiva da Universidade Federal do Rio de Janeiro, entre 2009 e 2011. Dados demográficos, clínicos e laboratoriais foram avaliados. Amostras cervicais foram coletadas durante a gestação e um ano após o parto. O DNA do HPV e o gene da p53 foram amplificados pelo método de reação em cadeia da polimerase (PCR) e clonagem. A tipagem foi realizada com padrões depositados no banco de genes (Genbank) através do programa do *National Center for Biotechnology Information* (NCBI/BLAST). A prevalência do HPV na gestação foi de 84,3% (118/140) e 106 amostras foram genotipadas. Foram encontrados 30 tipos diferentes de HPV, dos quais 81,1% eram HPVs de alto risco, sendo mais prevalentes os tipos 16, 58, 35 e 53. A infecção por múltiplos tipos ocorreu em 18,9%. A taxa de persistência da infecção foi de 50%, sendo 30% tipo-específicas e 20% reinfecções. Essa persistência se correlacionou significativamente com a contagem de células $TCD4^+$ ≤ 350 células/mm^3 ($p = 0,05$). Não houve correlação entre infecção e persistência da infecção pelo HPV e polimorfismo da p53. Concluiu-se que houve alta taxa de prevalência de HPV nessa coorte de gestantes HIV-positivas, com predominância de tipos virais oncogênicos e persistência da infecção em metade dos casos, sendo esta correlacionada com o grau de imunossupressão.
Palavras-chave: HPV, HIV, gravidez, fatores de risco, gene p53.

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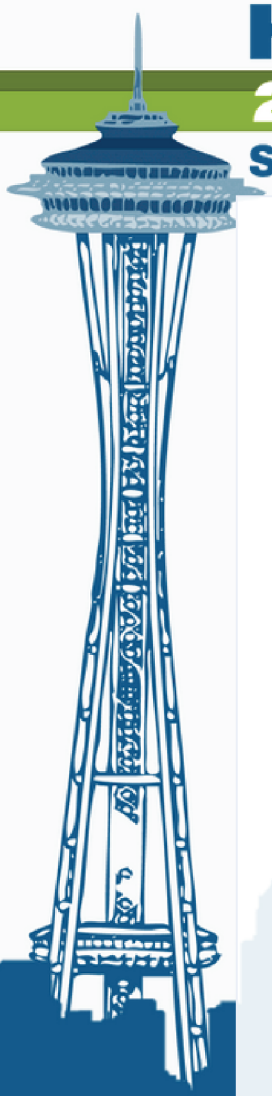

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General Information

Dates
August 20-21, 2014 – Pre-Conference Clinical & Public Health Workshop
August 21-25, 2014 – Main Conference Clinical, Laboratory & Public Health Scientific Sessions

Venue
Washington State Convention Center
800 Convention Place
Seattle, Washington 98101
United States

Phone: 1.206.694.5000
Fax: 1.206.694.5398
www.wsctc.com

Hotel
Sheraton Seattle Hotel & Towers
1400 6th Avenue
Seattle, Washington 98101
United States

Phone: 1.206.621.9000
Fax: 1.206.621.8441
www.sheraton.com/seattle

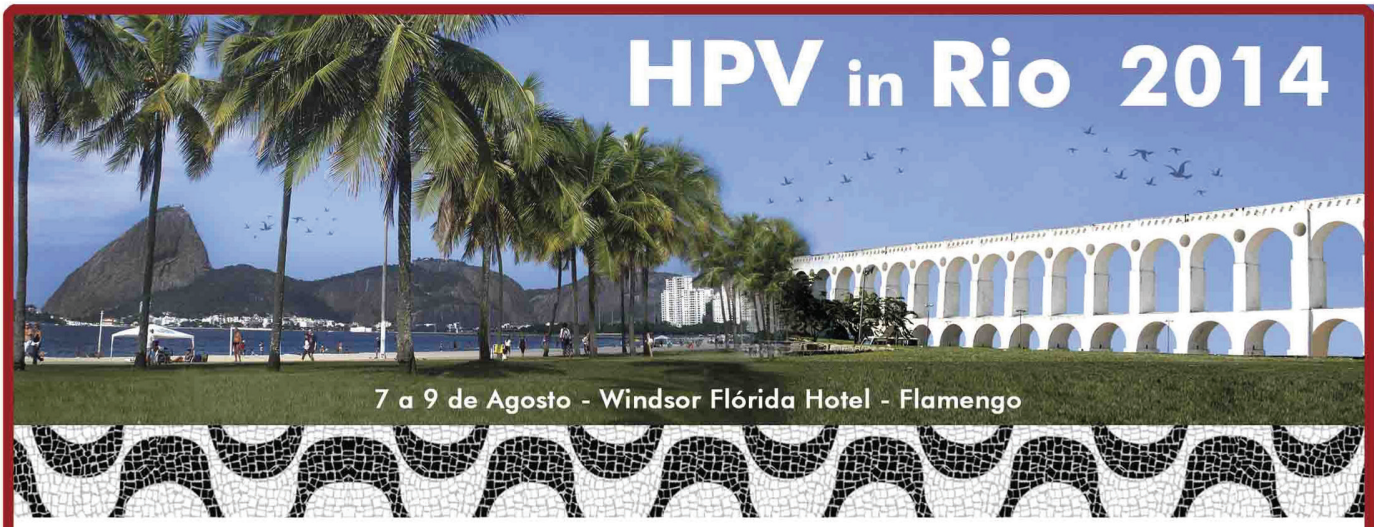
Language
English is the official language of the 29th International Papillomavirus Conference & Clinical Workshop.

Letters of Invitation
After completion of the online registration form, you will receive a link in your registration confirmation email to create a letter of invitation for use in visa applications. You will need to submit your Name, Date of Birth, Passport Number, and Nationality in order to generate the letter.

The Letter can then be printed and may be presented to your Embassy/High Commission to assist with the application of your visa. However, this, in no way constitutes an official invitation or offer to cover the cost of registration, travel or any other expenses.

Liability
Neither the Organizing Committees and/or Conference Secretariat shall be held liable for personal accidents or losses or damage to private property of registered delegates of the Symposium. Delegates should make their own arrangements regarding personal insurance.

www.hpv2014.org/



Inscrições abertas para apresentação de trabalhos científicos

www.hpvinrio.com.br