



Original Article

Relationship between Teenage Pregnancy out of Wedlock, CD4+ Count and Viral Sero-Immuno Chemical Pattern of HIV-1 P24 Antigen

Mathew Folaranmi Olaniyan*, Temitayo Afolabi

Department of Medical Science, Achievers University, Owo, Nigeria.

ARTICLE INFO

ABSTRACT

Received: 13 Mar 2017
Accepted: 26 Mar 2017

Study Background: Unplanned Teenage pregnancy out of wedlock could be as a result or cause psychosocial and economic challenges which may make the affected teenager susceptible to HIV and other sexually transmitted infections. **Aim and Objective:** This work was designed to determine the relationship between teenage pregnancy out of wedlock, CD4+ count and viral sero-immunochemical pattern of HIV-1 p24 antigen. **Materials and Methods:** This work was carried out among 25 pregnant teenagers aged 17 – 19 years post-delivery (n=9) and post-abortion (n=16) and 25 teenagers aged 15 – 19 years who have never been pregnant were recruited as control subjects. Standard interview was administered to each of the subjects to obtain socio-economic and demographic information. HIV-1 p24 antigen was determined in the subjects by ELISA while CD4+ count was enumerated in the subjects by cytofluorimetry. **Results:** The frequency of HIV-1 p24 gag antigen was higher in Pregnant teenagers studied post-abortion (31.3%) than the frequency of 11.1% and 4% obtained in Pregnant teenagers studied post-delivery and Non-pregnant female teenagers respectively. The frequency of HIV-1 p24 gag antigen in Pregnant teenagers studied post-delivery was higher than the results obtained in Non-pregnant female teenagers (11.1% Vs 4%). There was a significantly lower CD4+ count in the HIV-1 p24 gag antigen positive Pregnant teenagers aged 17 – 19 years post-delivery (n=1) than HIV-1 p24 gag antigen positive Pregnant teenagers aged 17 – 19 years post-abortion (n=5) and HIV-1 p24 gag antigen positive Non-pregnant female teenagers aged 15 – 19 years (n=1) with $p < 0.05$. There was also a significantly lower CD4+ count in HIV-1 p24 gag antigen positive Pregnant teenagers aged 17 – 19 years post-abortion (n=5) than the HIV-1 p24 gag antigen positive Non-pregnant female teenagers aged 15 – 19 years (n=1) with $p < 0.05$. **Conclusion:** This work has been used to reveal that unplanned pregnancy out of wedlock could increase the frequency of HIV-1 p24 gag antigen and deplete CD4+ count in the affected teenagers.

Keywords: Teenage Pregnancy, Wedlock, CD4+, HIV-1 P24 Antigen

1. INTRODUCTION

Increase in the incidence and prevalence of human immunodeficiency virus (HIV) infection has been linked with women of child-bearing age internationally. Vertical

Corresponding author *
Mathew Folaranmi Olaniyan
Department of Medical Science, Achievers University, Owo,
Nigeria
E-mail: olaniyanmat@yahoo.com

transmission of HIV could occur in utero, intrapartum and postpartum, but the majority of transmission occurs toward end of term, or during labour and at delivery¹.

Human Immunodeficiency Virus infection has not been well associated with embryopathy or teratogenic effect². HIV disease may cause higher rate of spontaneous abortion and delivery of low birth weight infants³. Pregnancy could accelerate immunosuppression in HIV disease and may cause low CD4 count in the HIV infected patients. Human immunodeficiency virus (HIV) infection is characterized by a decrease, and eventually, a depletion of CD4+ T-lymphocytes (helper T cells). By using immunophenotyping, patient specimens are tested for the proportion of lymphocytes that are T cells, B cells, natural killer (NK) cells, CD4+ T cells (helper T cells), and CD8+ T cells (suppressor/inducer T cells).⁴⁻⁶ Higher HIV viral load has been associated with pregnancy⁷. Michelle *et al.*,⁸ associated viral infection and pregnancy. In pregnancy there used to be immunological transformation to support the pregnancy and growing fetus. A breach in this protective process with respect to viral infection, the immune system will be weakened and infection with other microorganisms can then propagate and lead to outcomes, such as preterm labor.⁸

Human Immunodeficiency Virus type 1 p24 antigen is a viral protein that makes up most of the viral core. Serum concentrations of p24 antigen are high in the first few weeks after infection; tests sensitive to p24 antigen are therefore useful for diagnosing very early infection when antibody levels are still low. HIV-1 p24 Antigen ELISA is an enzyme linked immunoassay used to detect Human Immunodeficiency Virus Type 1 (HIV-1) p24 antigen in cell culture media, as well as human sera and plasma. It can also be used to monitor the purification and biochemical behavior of HIV-1. The assay may augment or supplant reverse transcriptase measurements traditionally employed to detect the presence of HIV-1.⁹⁻¹¹

This work was therefore designed to determine the relationship between teenage pregnancy, CD4+ and viral sero-immunochemical pattern of HIV-1 p24 antigen.

2. MATERIALS AND METHODS

Study area

This work was carried out in Owo, Ondo state – Nigeria. Owo is situated in south-western Nigeria, at the southern edge of the Yoruba Hills, and at the intersection of roads from Akure, Kabba, Benin City, and Siluko. Owo is situated halfway between the towns of Ile Ife and Benin City. Owo is a city in Ondo State of Nigeria. Between 1400 and 1600 AD, it was the capital of a Yoruba city-state. The local government has a population of 222,262, based on 2006 population census.

Study population

This work was carried out among 25 pregnant teenagers aged 17–19 years post-delivery (n=9) and post abortion

(n=16) and 25 teenagers aged 15 – 19 years who have never been pregnant were recruited as control subjects. Standard interview was administered to each of the subjects to obtain socio-economic and demographic information.

Biological specimen

Five millilitre of venous blood was obtained into EDTA anticoagulated specimen bottles for the evaluation of p24 gag gene in the subjects.

Ethical Consideration

The proposal was reviewed and approved by the Research and Ethical Committee of the Department of Medical Laboratory Science, Achievers University, Owo-Nigeria. All subjects volunteered themselves and consented before they were studied. Each subject was pre and post-test counseled.

HIV-1 p24 Antigen ELISA using Zeptrometrix retrotek kit

Principle: Microwells are coated with a monoclonal antibody specific for the p24 gag gene product of HIV-1. Viral antigen in the specimen is specifically captured onto the immobilized antibody during specimen incubation. The captured antigen is then reacted with a hightitered human anti-HIV-1 antibody conjugated with biotin. Following a subsequent incubation with Streptavidin-Peroxidase, color develops as the bound enzyme reacts with the substrate. Resultant optical density is proportional to the amount of HIV-1 p24 antigen present in the specimen.

CD4 + COUNT

CD4 + count were carried out using PartecCyFlow Counter and reagent.

Summary of Test Principle: This is done by incubating anti-coagulated whole blood with monoclonal antibodies to the various cellular antigens that identify specific cell populations (phenotypes), and then lysing the blood to remove red blood cells. The antibodies are conjugated to fluorescent tags that emit light of a certain frequency when excited by a laser beam. The specimens are analyzed on a flow cytometer to determine the proportion of cells of a particular phenotype (that emit light at the right wavelength).

Method of Data analysis

The results obtained was subjected to statistical analysis using SPSS 18.0 and to determine probability and students' 't' values including level of significance at 0.05.

3. RESULTS

The frequency of HIV-1p24 gag antigen was higher in Pregnant teenagers aged 17 – 19 years studied post-abortion(31.3%) than the frequency of 11.1% and 4% obtained in Pregnant teenagers aged 17 – 19 years studied post-delivery and Non-pregnant female teenagers aged 15 – 19 years respectively. The frequency of HIV-1p24 gag antigen in Pregnant teenagers aged 17 – 19 years post-delivery was higher than the results obtained in Non-pregnant female teenagers aged 15 – 19 years(11.1% Vs 4%).(Table 1,2 ; Figure 1,2).

There was a significantly lower CD4+ count in the HIV-1p24 gag antigen positive Pregnant teenagers aged 17 – 19 years post-delivery(n=1) than HIV-1p24 gag antigen positive Pregnant teenagers aged 17 – 19 years post-abortion (n=5) and HIV-1p24 gag antigen positive Non-pregnant female teenagers aged 15 – 19 years(n=1) with p<0.05(Table1,2 ; Figure 1,2).

There was also a significantly lower CD4+ count in HIV-1p24 gag antigen positive Pregnant teenagers aged 17 – 19 years post-abortion (n=5) than the HIV-1p24 gag antigen positive Non-pregnant female teenagers aged 15 – 19 years(n=1) with p<0.05(Table1,2 ; Figure 1,2)..

Table 1: Frequency of HIV1 HIV-1p24 CD4+ Count obtained in the subjects

	Pregnant teenagers aged 17 – 19 years post-delivery(n=9)	Pregnant teenagers aged 17 – 19 years post-abortion (n=16)	Non-pregnant female teenagers aged 15 years(n=25)
Frequency of HIV-1p24 gag antigen	1(11.1%)	5(31.3%)	1(4%)
CD4+ count(cells/mm3) in HIV-1p24 gag antigen positive teenagers	200±15.0	305±10.0	402±21.0

Table 2: Comparative evaluation of the CD4+ Values among the subjects

	HIV-1p24 gag antigen positive Pregnant teenagers aged 17 – 19 years post-delivery(n=1) VS HIV-1p24 gag antigen positive Pregnant teenagers aged 17 – 19 years post-abortion (n=5)	HIV-1p24 gag antigen positive Pregnant teenagers aged 17 – 19 years post-delivery(n=1) VS HIV-1p24 gag antigen positive Non-pregnant teenagers aged 15 – 19 years(n=1)	HIV-1p24 gag antigen positive Pregnant teenagers aged 17 – 19 years post-abortion (n=5) VS HIV-1p24 gag antigen positive Non-pregnant female teenagers aged 15 – 19 years(n=1)
CD4+ count(cells/mm3)	-5.824	-7.827	-4.170
't' value			
'p' value	0.014*	0.008**	0.0265*

*Significant at 0.05 level of significance

Table 3: Results obtained after a standard interview

	Pregnant teenagers aged 17 – 19 years post-delivery(n=9)	Pregnant teenagers aged 17 – 19 years post-abortion (n=16)	Non-pregnant female teenagers aged 15 – 19 years(n=25)
Educational Status			
Number of subjects who completed Primary Education	9(100%)	16(100%)	25(100%)
Number of subjects who completed Secondary Education	3(33.3%)	4(25%)	25(100%)

	Number of subjects who completed or on Tertiary Education	0	0	4(16%)
	Number of subjects who dropped out of Secondary or Tertiary Education	4(44.4%)	12(75%)	0
Pregnancy preparedness	Planned	0		Not applicable
	Unplanned	9(100%)	16(100%)	Not applicable
Number of pregnancy	One	9(100%)	0	Not applicable
	Above One	0	16(100%)	Not applicable
Economic status	Financial dependent	9(100%)	16(100%)	25(100%)
	Financial non-dependent	0	0	0
Abandonment by family following the pregnancy	Abandoned by the family	3(33.3%)	9(56.3%)	0
	Supported by the family	6(66.7%)	7(43.6%)	25(100%)

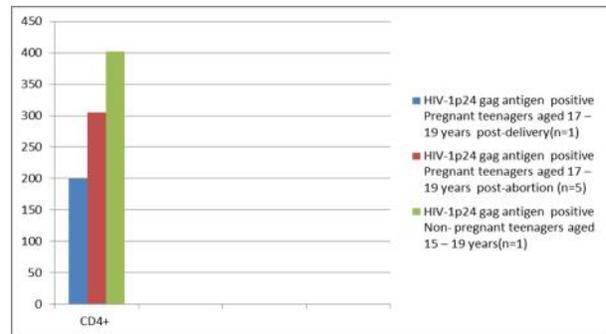


Fig 1: comparative description of the value of CD4+ in HIV-1p24 antigen positive subjects

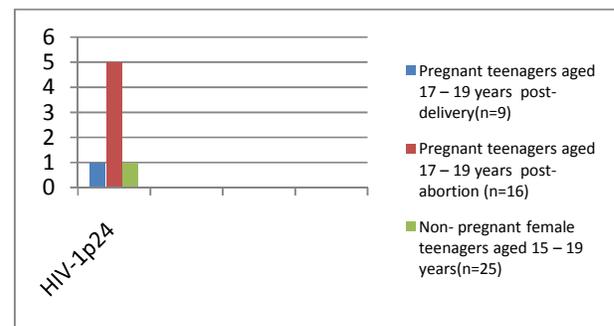


Fig 2: comparative description of the frequency of HIV-1p24 antigen among the subjects

4. DISCUSSION

This work has been used to determine the relationship of teenage pregnancy out of wedlock with CD4+ count and viral sero-immunochemical pattern of HIV-1 p24 antigen. The following are the significant findings.

The frequency of HIV-1p24 gag antigen was higher in Pregnant teenagers studied post-abortion (31.3%) than the frequency of 11.1% and 4% obtained in Pregnant teenagers studied post-delivery and Non- pregnant female teenagers respectively. The frequency of HIV-1p24 gag antigen in Pregnant teenagers studied post-delivery was higher than the results obtained in Non- pregnant female teenagers (11.1% Vs 4%).

Presence of HIV-1p24 antigen is an indication of HIV1 infection. It is a viral protein that makes up most of the viral core and is found in the plasma following viral replication. Plasma concentration of p24 antigen are high in the first few weeks after infection; tests sensitive to p24 antigen are therefore useful for diagnosing very early infection when antibody levels are still low. Higher frequency of HIV-1p24 could be as a result of the low socioeconomic-educational profiles of the teenage pregnant women studied post-delivery or post abortion despite high access to antenatal care, as many test subjects were abandoned because of unplanned pregnancy out of wedlock as this may make them prone to the infection in their efforts to cope with the socio-economic challenges. Another fact is that pregnancy is a sex related condition which shares this same feature with HIV which is a sexually transmitted infection¹².

There was a significantly lower CD4+ count in the HIV-1p24 gag antigen positive Pregnant teenagers studied post-delivery (n=1) than HIV-1p24 gag antigen positive Pregnant teenagers studied post-abortion and HIV-1p24 gag antigen positive Non-pregnant female teenagers studied as control subjects. There was also a significantly lower CD4+ count in HIV-1p24 gag antigen positive Pregnant teenagers studied post-abortion than the HIV-1p24 gag antigen positive Non-pregnant female teenagers. These findings could be associated with the fact that Human Immunodeficiency Virus infection has not been well associated with embryopathy or teratogenic effect². HIV disease may cause higher rate of spontaneous abortion and delivery of low birth weight infants^{3,13}. Pregnancy could accelerate immunosuppression in HIV disease and may cause low CD4 count in the HIV infected patients. Human immunodeficiency virus (HIV) infection is characterized by a decrease, and eventually, a depletion of CD4+ T-lymphocytes (helper T cells)^{1,14}.

5. CONCLUSION

This work has been used to reveal that unplanned pregnancy out of wedlock could increase the frequency of HIV-1p24 gag antigen and deplete CD4+ count in the affected teenagers.

6. RECOMMENDATION

Routine evaluation of HIV-1p24 gag antigen and CD4+ count in unplanned teenage pregnancy will improve the management of the teenager who may be affected.

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Conflict of Interest: None

Source of Funding: Nil