



ISSN: 0975-833X

RESEARCH ARTICLE

PREVALENCE OF HUMAN IMMUNODEFICIENCY VIRUS AMONG PREGNANT WOMEN IN  
OMDURMAN MATERNITY MILITARY HOSPITAL

<sup>1</sup>Mohammed Aldai Hammad, <sup>2</sup>Mohammed Ahmed Abdalla and <sup>\*,3</sup>Esam Mohamed AbdulRaheem

<sup>1</sup>Department of Microbiology, College of Medical Laboratory Sciences, University of Karary, Khartoum, Sudan

<sup>2</sup>Department of Pathology, College of Medicine, University of Karary, Khartoum, Sudan

<sup>3</sup>Department of Medical Laboratories, College of Applied Medical Science, Shaqra,  
Shaqra University, Saudi Arabia

ARTICLE INFO

Article History:

Received 10<sup>th</sup> August, 2014

Received in revised form

23<sup>rd</sup> September, 2014

Accepted 17<sup>th</sup> October, 2014

Published online 30<sup>th</sup> November, 2014

Key words:

HIV, Pregnancy, Prevalence, Sudan.

ABSTRACT

**Study Design and Objective:** this was a descriptive cross-sectional study aimed to estimate the prevalence of HIV infection among Sudanese pregnant women at Omdurman Military Hospital.

**Methods:** the Immuno Chromatographic Test (ICT) and the Enzyme-Linked Immunosorbent Assay (ELISA) were used to detect the specific HIV Antigens and antibodies in the serum of 100 asymptomatic pregnant women attended the hospital.

**Results:** only one woman (1%) showed positive result of HIV on both ICT and ELISA.

**Conclusions:** ELISA is more specific than ICT for confirming the diagnosis of HIV.

Copyright © 2014 Mohammed Ahmed Abdallah et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

There are more than 40 million persons worldwide have the acquired immunodeficiency syndrome (AIDS) (UNAIDS, 2003), most of them are in sub-Saharan Africa (WHO/UNAIDS, 2006). Sudan is surrounded by several countries that having high rates of AIDS (FMOH SNAP, 2002). The first case of the disease reported in Sudan was in 1986 (Mahfouz, 2007), and by 2011 the number of cases reached 2218 patients (SNAP, 2010-2011). In 2002, a survey by Sudan National AIDS Program (SNAP) found the prevalence of HIV infection among general population was 1.6% (UNHCR, 2013). Reports of UNAIDS in 2011 showed that the prevalence of AIDS in Sudan after separation of Southern Sudan was around 0.4% (UNAIDS, 2011). However, recent research by UNDP's HIV/AIDS suggested that the mode of spread of the disease is continuous and the prevalence may reach 1.2% of the population by the year 2015 (UNDP in Sudan, 2012). HIV infection in pregnant women is a common worldwide problem (Minkoff, 2003). Reports of the United Nations AIDS (UNAIDS) and World Health Organization (WHO) showed that there were 17.5 million women with HIV infection at the end of 2005 all over the world (Newell, 2003). More than half a million of children are HIV infected each year by

transmission of the virus antigens from their mothers during pregnancy and most of these cases are in Africa (World Health Organization, 2002 and Peckham and Gibb 1995). The aim of this study was to establish the prevalence of HIV infection among Sudanese pregnant women attended the department of obstetrics and gynecology at Omdurman Military Hospital during the period between April and August 2014.

MATERIALS AND METHODS

This was a descriptive cross-sectional study conducted at Omdurman Military Hospital during the period between April and August 2014. Omdurman city is the northern part of Khartoum, the capital of Sudan. One hundred asymptomatic Sudanese pregnant women attended the antenatal care clinics were included in this study. The ages of all women tested ranged between 19 and 45 years. Venous blood samples were collected under suitable aseptic conditions, allowed to clot, then centrifuged at 3000 rpm for 5 minutes, and sera were obtained into sterile containers and stored at -80°C until tested. Personal and clinical data were collected by direct interviewing questionnaire. Ethical approval was obtained from the Faculty Management Board and verbal consents were taken from the participating pregnant women. Collected data and results were analyzed by using the statistical package for social sciences (SPSS) computer program version 16.

\*Corresponding author: Esam Mohamed AbdulRaheem

Department of Medical Laboratories, College of Applied Medical Science, Shaqra, Shaqra University, Saudi Arabia.

For ICT testing, 50 micro liter of each sample serum was put into the sample window, then the device was placed on a flat surface and the results were read after 10 - 30 minutes. When result was positive, two distinct lines appeared, one line in control region and another line in test region. When result was negative, one red line appeared in control region.

For ELISA Testing, commercial ELISA Kits (HUMAN Diagnostic Co.Ltd. Germany) were used as described by the manufacturers. All reagents and samples were brought to room temperature before beginning the procedure. The serum samples were diluted as 1:100 and the washing solution was diluted as 1:20. Briefly, 100 µl of the negative control (NC), 100 µl of the positive control (PC), both were in duplicate form, and 100 µl of the diluted samples were incubated in micro titer strip wells coated with HIV antigen and antibodies at room temperature for 60 minutes. The wells were washed 3 times by washing solution using automatic washer to remove unbound components. Then 100 µl of anti-IgG conjugate were added to each well and incubated at room temperature for 30 minutes. After another washing step (3 times) to remove excess conjugate, an enzyme substrate reagent (TMB Substrate) was added (100 µl /well) and the plate was incubated for 20 minutes. The blue color changed to yellow after adding of the stop solution (100 µl). The optical density (OD) in a microplate reader was read within 30 minutes at 450 nm. Mean absorbance values of NC (MNC) and Mean absorbance values of PC (MPC) were calculated. The cut-off value (COV) was then calculated following this equation:

Cut-off=0.05, MNC=0.022, COV = MNC + 0.05

Sample Absorbance =3.00, COV = 0.022+0.05= 0.072

The test run was validated according to the manufacturer's criteria for validity as below:

Ab substrate blank < 0.150, and MNC<0.2003-MPC > 0.800

Samples with the absorbance > COV were considered as HIV Positive, while samples with absorbance < COV were considered as HIV negative.

## RESULTS

Pregnant women included in the study were Khartoum State residents and were almost of all Sudanese ethnic groups. About 82% were housewives. Only 14% had a history of previous receiving of blood transfusion and about 23% had history of one or more surgical operations. About 24% of women had no children. Only one woman (1%) showed reactive HIV on ICT and ELISA tests. (Table 1)

**Table 1. Main results of the study**

Occupation	History of blood transfusion	History of previous surgery	Children	HIV
82% housewives	+ve: 14%	+ve: 23%	Yes:76%	+ve: 1%
18% with work	-ve: 86%	-ve: 77%	No: 24%	-ve: 99%

The only one infected woman was a housewife aged 28 years, had children but not received blood transfusion or exposed to a surgical procedure.

## DISCUSSION

This study presented the most recent data on the sero prevalence of HIV in the pregnant ladies to identify susceptibility of the population in terms of age groups, occupation, and receiving blood transfusion. The result of the testing among the pregnant women in the study showed a prevalence of 1%, which will serve as a baseline data. This percentage is lower than that of the national prevalence among the general population in Nigeria of 4.4% (NARHS, 2007) and lower than the prevalence of 8.2% recorded in a study in Jos by researchers (Etukumana *et al.*, 2010). Records from other studies gave a prevalence of 1.0% among blood donors in Port Harcourt (Ejele *et al.*, 2005), and 8.2% among couples attending the fertility clinic in Sagamu (Sule-Odu *et al.*, 2005). A similar study among pregnant women in Okene revealed a prevalence of 2.83% (Ajoge *et al.*, 2008). The infected woman in this study was a housewife aged 28, had children but not received blood transfusion or exposed to surgical procedure. This age group is considered within the productive sexually active age group in women. This agrees with the study of HIV infection among pregnant women in Nigeria (NARHS, 2007) and with the study of (Ajoge *et al.*, 2008) in which the reactive cases were within the age group of 20-29 years. Other studies on HIV seroprevalence among other study populations had their highest frequency among the age bracket of 20-29 years (Sagay *et al.*, 2005). The probable reason for this is that people in this age group are more sexually active than those in other age groups, and are more likely to have multiple sexual partners, thereby increasing their risk of HIV infection.

## Conclusion

The ICT is a practical and sensitive procedure for HIV screening. The ELISA test is more specific than ICT and it is the test of choice for confirming the diagnosis of HIV.

## Acknowledgements

Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

## REFERENCES

- Ajoge HO, Ahmad AA, and Olonitola OS. 2008. Trend of human immunodeficiency virus in Okene. *J. Pure Appl. Microbiol.*, 2:119-24.
- Ejele OA, Nwauche CA, and Erhabor O. 2005. Seroprevalence of HIV infection among blood donors in Port Harcourt, Nigeria. *Niger J Med.*, 14:287-9.
- Etukumana *et al.* 2010. HIV Risk Factors among Pregnant Women in a Rural Nigerian Hospital. *West Indian Med J.*, 59(4): 424.
- Minkoff H. 2003. Human immunodeficiency virus in pregnancy. *Obstet Gynecol*, 101:797-810.
- Mahfouz, M. S. 2007. Modeling the impact of HIV/AIDS epidemic on mortality in sub-Saharan Africa with

- reference to Zimbabwe, Tanzania and Sudan (1985–2003). Ph.D. thesis, Sudan University of Sciences and Technology.
- National Reproductive Health Survey (NARHS), Federal Ministry of Health, Abuja, 2007.
- Newell ML. 2003. Antenatal and perinatal strategies to prevent mother-to-child transmission of HIV infection. *Trans R Soc Trop Med Hyg*, 97:22-4.
- Peckham C and Gibb D. 1995. Mother-to-child transmission of the human immune deficiency virus. *N Eng J Med*, 333:298–02.
- Sagay AS, Kapiga SH, Imade GE, Sankale JL, Idoko J, and Kanki P. 2005. HIV infection among pregnant women in Nigeria. *Int J Gynaecol Obstet*, 90:61-7.
- Sudan National AIDS program (SNAP). 2002. Situation Analysis, Behavioural and Epidemiological Surveys and Response Analysis. *Sudan*, FMOH SNAP 2002.
- Sudan National AIDS program (SNAP), “Sudan federal ministry of health, Global AIDS Response Progress Reporting 2010– 2011,” <http://www.unaids.org/en/dataanalysis/knowyourresponse/countryprogressreports/2012countries/ce>
- Sule-Odu AO, Oladapo OT, Jagun OE, and Awosile J. 2005. Microbial isolates and HIV infection in couples attending fertility clinics in Sagamu, Nigeria. *J ObstetGynaecol*, 25:685-8.
- UNAIDS2002. Report on the global HIV/AIDS epidemic – July 2002.
- UNAIDS2011. Report on the global AIDS epidemic, <http://www.unaids.org/en/dataanalysis/datatools/aidsinfo/>
- UNDP in Sudan. Fighting HIV/AIDS in Sudan, [http://www.sd.undp.org/content/Sudan/en/home/operations/projects/hiv\\_aids/fighting\\_hiv/](http://www.sd.undp.org/content/Sudan/en/home/operations/projects/hiv_aids/fighting_hiv/)
- UNHCR Sudan country Report 2013. <http://www.unhcr.org/pages/49e483b76.html>
- WHO/UNAIDS, Global AIDS Epidemic Update, Middle East and North Africa-Sub Sahara, 2006.
- World Health Organization. Prevention of mother-to-child transmission of HIV: Selection and use of Nevirapine. WHO/HIV\_AIDS/2001.3.WHO/RHR/01.21. Geneva: World Health Organization; 2002.

\*\*\*\*\*