Sudan University of Science and Technology

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HIV/AIDS and Some Sexual -Transmitted Diseases Among Pregnant Women and Voluntary Counseling and Testing Attendants in Malakal Town, Upper Nile State, South Sudan

الاصابة بفيروس فقدان المناعة وبعض الامراض المنقولة جنسيا بين الحوامل و مترددي مراكز الفحص الطوعي بمدينة ملكل- ولاية اعالي النيل –جنوب السودان

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DEDICATION

I would like to dedicate this humble piece of effort to those who have waited so long to see it a reality, after appreciable support and encouragement.

To my late father Nyicar (Atiek) and late mother Bukodho, brother Chol and sisters Tupac, Abuk and Nyalawo.

To my dear and lovely wives Regina Nyayay and Tabitha Ernest.

To my lovely children, Nyichar, Acwanyo, Lam, Mer and Wodo

With great love and gratitude.

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Abstract

This study was undertaken to evaluate the seroprevalence of HIV and STDs among pregnant women and voluntary counseling and testing attendants in Malakal Town, and to determine the possible risk factors that might have promoted the rapid spread of HIV and AIDS among the local population.

The primary objectives of the study were three: First, to estimate the seroprevalence of HIV and STDs; second, to determine the risk factors associated with disease transmission; and third, assess the sexual behavioral pattern of the target group with regard to condom use, abstinence and faithfulness. A total of 2000 participants (1200 pregnant women and 800 VCT Attendants) were screened. Specimens obtained were: venous blood, cervical swab and urine. Specimen analysis was conducted through various methods. These included the use of Determine HIV-1/2, Uni-Gol HIV 1/2, Enzyme-Linked Immunosorbent Assay (ELISA) and Western Blot for HIV diagnosis, culture on Modified New York City Medium (MNYC), gram's stain for gonorrhea, RPR for syphilis, and wet microscopic examination for candidiasis and trichomoniasis.

Data were then analysed by computer SPSS and presented in form of tables, pie-charts and statistical significance checked by Chi-square.

The results showed that out of the 2000 participants, ten (0.5%) were HIV positive, fourteen (0.7%) syphilis positive, six (0.3%) candidiasis, three (0.15%) trichomoniasis, and one (0.05%) gonorrheae. Among pregnant women the prevalence of different STDs was as follows: HIV (0.3%), syphilis (0.6%), candidiasis (0.3%), trichomoniasis (0.16%) and *Gonorrhea* (0.08%). While in VCT Attendants the prevalence of different STDs was HIV (0.75%), syphilis (0.75%), candidiasis (0.25%) and trichomoniasis (0.125%).

Co-infections of HIV with other STDs among pregnant women was 75%, with syphilis, 50%) with candidiasis and 50% with trichomoniasis. Co-infections of HIV with the other STDs among VCT Attendants were as follows syphilis 33%, candidiasis 100% and trichomoniasis 100%.

Regarding the use of condoms, only 100 (20%) of the 500 males subjects declared as regular condom users. CD4 counts were found less than 200 mm^3 in all HIV-reactive cases.

Based on the above findings, it is recommended that there is an urgent need for ordinate efforts against HIV, Syphilis and other STDs in Malakal Town, in addition to sustained public awareness campaigns that promote safe sex, abstinence, faithfulness and the use of condoms consistently and correctly.

ملخص الدراسة

اجريت هذه الدراسة لتحديد معدل الانتشار الصلى لفيروس فقدان المناعة الانساني وبعض الامراض المنقولة جنسيآ بين الحوامل و المترددين على مراكز الفحص الطوعي بمدينة ملكال. و كذلك لتحديد العوامل التى يمكن أن تساهم في انتشار الفيروس في المجتمعات المحلية.

تمثلت الاهداف الأساسية لهذه الدراسة في الأتي:

اولآ: حساب الانتشار الصلى لفيروس فقدان المناعة الانساني ومعدلات الاصابة ببعض الامراض المنقولة جنسيآ.

ثانيآ: لتحديد العوامل المساعدة علي انتشار هذه الامراض.

ثالثآ: قياس السلوك الجنسي للمجموعات المستهدفة فيما يختص بقبولهم استخدام العازل الذكري و العزل الجنسي و الاخلاص.

تم مسح 2000 مشارك (1200 امرأة حامل و 800 مترددي مراكز الفحص الطوعي) . اخذ من كل مشارك عينة دم وريدي، مسحة من عنق الرحم و عينة بول. اخضعت هذه العينات للفحص المعملي باستخدام عدة طرق منها فحص ديتارمين، فحص يوني جولد، فحص الاليزا و فحص الوسترن بلوت لتشخيص فيروس فقدان المناعة. والزراعة في مستنبت نيويورك ستي و صبغة غرام لتشخيص السيلان , فحص RPR للزهري و فحص لطاخة مبللة لتشخيص المبيضات البيضاء و المشعرات المهبلية.

تم تحليل المعلومات بواسطة الحاسوب برنامج SPSS وعرضت النتائج في شكل جداول و منحنى بلى و حساب الدلالة الاحصائية لها.

اظهرت بالنسبة للحوامل فقد كانت معدل الاصابة بالامراض المنقولة جنسيا علي النحو التالي: فيروس فقدان المناعة الانساني 0). 3%) ,الزهري (0.6%), المبيضات البيضاء (0.3%), المشعرات المهبلية (0.16%) و السيلان (0.08%).

اما مترددي مراكز الفحص الطوعي فقد كانت معدلات الاصابة كما يلي: فيروس فقدان المناعة الانساني (0.75%) ,الزهري (0.75%) ,المبيضات البيضاء (0.25%) و المشعرات المهبلية (0.125%).

بالنسبة للحوامل المصابات بفيروس فقدان المناعة الانساني فقد كان 75% منهن مصابات ايضا بالزهري و 50% منهن مصابات بكل من المشعرات المهبلية و المبيضات البيضاء كل علي حدا. اما المصابين بفيروس فقدان المناعة الانساني من مترددي مراكز الفحص الطوعي فقد كانوا كلهم مصابون ايضا بكل من المبيضات البيضاء و المشعرات المهبلية و 33% بالزهري.

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فيما يختص بالسلوك الجنسي للمشاركين فقد اقر 20% من الرجال والبالغ عددهم 500 باستخدامهم للعازل الذكري بصورة منتظمة.

اوضحت الدراسة ان عدد كريات الدم البيضاء المساعدة اقل من 200 في كل مل من الدم بالنسبة لكل المصابين بفيروس فقدان المناعة الانساني.

استنادا علي النتائج الموضحة اعلاه خرجت الدراسة بالتوصيات التالية:

توحيد الجهود من اجل مكافحة فيروس فقدان المناعة الانساني , الزهري و الامراض الاخري المنقولة جنسيا بمدينة ملكل وكذلك رفع الوعي الصحي للجمهور عن طريق دورات عمل لتشجيع استخدام العازل الذكري بطريقة صحيحة ضمانا للعلاقات الجنسية الامنة وكذلك العزل الجنسي و الاخلاص بين الزوجين

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LIST OF ABBREVIATIONS

HIV	Human Immunodeficiency Virus	DNA	Deoxyribonucleic Acid
AIDS	Acquired Immunodeficiency Syndrome	LTR	Long Terminal Repeats
STDs	Sexually Transmitted Diseases	SEAR	South East Asia Region
WHO	World Health Organization	CMV	Cytomegalo Virus
ELISA	Enzyme Linked Immunosorbent Assay	KS	Kaposi Sarcoma
ICT	Immuno-Chromatographic Test	HHV	Human Herpes Virus
MNYC	Modified New York City	RPR	Rapid Plasma Reagin
MOH	Ministry of Health	VDRL	Venereal Disease Research Laboratory
PLWHA	People Living with HIV/AIDS	IDU	Injectable Drug Use
ESA	East-South Africa	RNA	Ribonucleic Acid
UNAIDS	United Nations Acquired Immunodeficiency Syndrome	EES	Eastern Equatoria State
WES	Western Equatoria State	UNS	Upper Nile State
SSAC	South Sudan AIDS Commission	JS	Jonglei State

DRC	Democratic Republic of Congo
SHHS	Sudan Household Survey
ANC	AIDS National Commission
CDC	Center for Disease Control
SNAP	Sudan National AIDS Programme
NHIC	National Health Information Centre
UNICEF	United Nations Children Fund
ANCs	Antenatal Clinics
ASHA	American Social Health Association
PCP	Pneumocystis Carinii Pneumonia
HTLV	Human T cell Lymphotropic Virus
LAV	Lymphadenopathy Association Virus
SIV	Simian Immunodeficiency Virus

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1. Results

In this study a total of 2000 individuals (1200 pregnant women and 800 voluntary counseling and test attendants were recruited to participate in this study (Table 1).

The most prevalent STD among pregnant women was syphilis (0.6%) followed by HIV infection and candidiasis (0.3%) each (Table 2).

Among the HIV infected pregnant women (4) co-infection with syphilis was found in 3 (75%), with candidiasis in 2 (50%) and with trichomoniasis in 2 (50%). Table 3.

One third of HIV infected VCT Attendants were co-infected with syphilis (Table.4).

The most frequent STD in age group 18 – 20 years, was syphilis (2.0%) followed by candidiasis (1.0) while was the most frequent STD in the age group 21 – 24 years was HIV (0.37%). Table 5.

In females the most frequent STD was syphilis (0.6%) followed by HIV (0.5%), while was the most frequent STD in males was syphilis (1.0%) followed by HIV (0.5%). Table 6.

The rate of infection by syphilis, HIV and candidiasis was higher in Malakia (1.0%, 0.8% and 0.8%) respectively, followed by Jalaba and Mudiria (0.4%) each (Table 7).

All the investigated STDs were higher among the illiterates (Table 8).

The rate of syphilis and HIV was higher among the married participants compared to the unmarried (single) (Table 9).

The pattern of $CD4^+$ count among the participants positive for the investigated STD is shown in Table (10) which shows that all HIV patients (10) have $CD4^+$ count below 200/mm^3 and patients with trichomoniasis (3) have $CD4^+$ count also between 50 - 100/mm^3 below Table (10).

Table (1).Shows the percentage of the STDs investigated in the studied population (n = 2000).

Type of STD:	Positive for Disease Frequency:	Percentage %
HIV	10	0.5
Syphilis	14	0.7
Candida	6	0.3
T. vaginalis	3	0.15
Gonorrhoea	1	0.05

Table (2).Distribution of the Different STDs Among Pregnant Women and VCT Attendants:

Type of STD:	Pregnant Women:			VCT Attendants:		
NO:	Total	Positive +ve	%	Total	Positive +ve	%
HIV	1200	4	0.3	800	6	0.75
Syphilis	1200	8	0.6	800	6	0.75
Candida	1200	4	0.3	800	2	0.25
T.Vaginalis	1200	2	0.16	800	1	0.125

Gonorrhoea	1200	1	0.08	800	0	0.0

Table (3).Among Pregnant Women Co-infection of HIV Positive with other STDs:

Type of STD:	Number:	%
Syphilis	3	75
Candida	2	50
T.vaginalis	2	50

Table (4).VCT Attendants Co-infection of HIV Positive with other STDs:

Type of STD:	Number:	%
Syphilis	2	33.3
Candida	2	33.3
T.vaginalis	1	100

Table (5).Distribution of the Different STDs According to Age:

Type of STD:	Age: 18 – 20.			Age: 21 – 24.		
NO:	Total	Positive +ve	%	Total	Positive +ve	%
HIV	400	2	0.5	1600	8	0.5
Syphilis	400	8	2.0	1600	6	0.37
Candida	400	4	1.0	1600	2	0.12
T.vaginalis	400	2	0.5%	1600	1	0.06
Gonorrhoea	400	1	0.25%	800	0	0.0

Table (6).Distribution of the Different STDs According to Sex:

Type of STD:	Female:			Male:		
NO:	Total	Positive +ve	%	Total	Positive +ve	%
HIV	1600	8	0.5	400	2	0.5
Syphilis	1600	10	0.6	400	4	1.0
Candida	1600	6	0.37	400	0	0.0
T.vaginalis	1600	3	0.18	400	0	0.0
Gonorrhoea	1600	1	0.06	400	0	0.0

Table (7).Distribution of the Different STDs According to Residence:

Type of STD:	Malakia:			Jalaba:			Mudiria & Assoa:			Lwakat:		
NO:	Total	+ve	%	Total	+ve	%	Total	+ve	%	Total	+ve	%
HIV	500	4	0.8	500	2	0.4	700	3	0.4	300	1	0.3
Syphilis	500	8	1.6	500	3	0.6	700	1	0.1	300	2	0.6
Candida	500	4	0.8	500	0	0.0	700	1	0.1	300	1	0.3
T.vaginalis	500	1	0.2	500	1	0.2	700	1	0.1	300	1	0.3
Gonorrhoea	500	0	0.0	500	0	0.0	700	0	0.0	300	1	0.3

Table (8).Distribution of the Different STD According to Educational Background:

Type of STD:	Literate:			Illiterate:		
NO:	Total	Literate	%	Total	Illiterate	%
HIV	1500	2	0.1	500	8	1.6
Syphilis	1500	6	0.4	500	8	1.6
Candida	1500	2	0.1	500	4	0.8
T.vaginalis	1500	1	0.06	500	2	0.4
Gonorrhoea	1500	0	0.0	500	1	0.2

Table (9).Distribution of the Different STD According to Marital Status:

Type of STD:	Married & Widow:			Single:		
NO:	Total	Married & Widow	%	Total	Single	%
HIV	1600	9	0.5	400	1	0.25
Syphilis	1600	12	0.75	400	2	0.5
Candida	1600	5	0.3	400	1	0.25
T.vaginalis	1600	3	0.1	400	0	0.0
Gonorrhoea	1600	0	0.0	400	1	0.25

Table (10).Distribution of CD4 Count in Participants Tested Positive for HIV with other STDs:

Disease:	CD4 Count 50 - 100	CD4 Count 110 – 150	CD4 Count 160 - 200	CD4 Count Above 200
HIV	4	5	1	0
Syphilis	0	2	3	9
Candida	0	1	2	3
T.vaginalis	3	0	0	0
Gonorrhoea	0	0	0	1

2. Discussion.

In this study the overall seroprevalence of HIV among the studied population was found to be (0.5%). This is in agreement with what was reported by JUNP and UNAIDS (JUNP, 2006 and UNAIDS, 2012). There was no different in rate of infection with HIV among the two age groups which both revealed seroprevalence of 0.5%, also there was no sex variation regarding rate of HIV infection as both sex showed seroprevalence of 0.5%.

The rate of HIV infection was higher in Malakia, this can be explained by high percentage of foreigners from the nearby countries with high prevalence of HIV infection.

Illiterates were found to be more affected by HIV than the educated participants. This is due to the fact that literates are not aware about HIV and other STD.

The married group of participants has a higher rate of HIV infection compared to unmarried (single). This can be explained by the fact that married individuals were practicing sex to multiple partners if we consider the tradition of inheritance of wife. In fact four of the HIV infected participants were inherited wives. Two studies done in Kenya revealed similar result (Luginaah *et al*., (2005) and Sakala *et al*., (1996).

The overall seroprevalence of syphilis was found to be 0.7% among pregnant women and VCT Attendants. This is very much lower than what was obtained in the 10 states of South Sudan by ANC Surveillance (2009) and (Stamm, 2010; Mullooly and Higgins, 2010).

The rate of infection with syphilis among the group of 18 – 20 is higher 2.0%.

There was sex variation regarding rate of syphilis as males showed seroprvalence of 1.0% compared to 0.6% females. This is in agreement with studies done in USA, Canada, the UK and Australia by (Kent and Romanelli, 2008; Stamm, 2010). This can be explained that males were having multi partners.

In Malakia the rate of syphilis was found higher 1.6%. This can be explained by high percentage of foreigners, sex workers and inherited wives.

Illiterates were found to be more affected by syphilis than the educated participants. This is due to the fact that illiterates are not aware about syphilis and other STD.

The married group of participants has a higher rate of syphilis infection compared to unmarried (single). This can be explained by the fact that married individuals were having unsafe sex with multiple partners.

The prevalence of candidiasis was found to be 0.3% among pregnant women and VCT Attendants. This is in agreement with study done by (Park, 2007; Ribud, 2005; Harvey *et al*., 2007). But very much lower than what was reported by Tortora *et al.*, (2006).

The rate candidiasis among the two age groups was observed higher in the age group of 18 – 20 years.

There was sex variation regarding rate of candidiasis infection as female revealed prevalence of 0.37%.

The rate of candidiasis infection was higher in Malakia. This can be explained that there is association with other STD due to unsafe sex with multiple partners.

The married group has a higher rate of candidiasis infection than unmarried (single) group of participants.

Illiterates were found to be more affected by candidiasis than the literate participants. This is due to the fact that illiterates are not acknowledgeable about candidiasis and other STD.

Prevalence of trichomoniasis was found to be 0.15% among pregnant women and VCT Attendants. This is in agreement with what was reported by (Park, 2007; Ribud, 2005; Harvey *et al*., 2007). But very much lower than what was reported in USA by (Vos, 2012; Associated Press, 2007).

The rate of infection with T.vaginalis among two age groups showed prevalence of 0.5% in the age group 18 – 20 years.

Females showed higher rate of infection with T.vaginalis. This is agreement with studies done in USA by (Vos, 2012; Associated Press, 2007).

Higher rate of trichomoniasis was in Lwakat. This can be explained by lack of personal hygiene and unsafe sex measures.

Illiterates were found to be more affected by trichomoniasis than literates. This is due to lack of knowledge about the disease.

Married group of participants have a higher rate of infection than unmarried (single) individuals. This can be explained by the fact that married practiced sex than single.

The overall prevalence of gonorrhea was to be 0.05% among pregnant women and VCT Attendants. This is in agreement with studies done by (Park, 2007; Ribud, 2005; Harvey *et al*., 2007). But very much lower than what was reported in USA by CDC (2008).

Only one participant (0.25%) was found to have *N.gonorrhoea* and she was a female in the age group of 18 – 20 years.

That participant with gonorrhea was from Lwakat.

The only case was found to be an illiterate married woman.

The overall prevalence of the studied different STD among pregnant women were HIV (0.3%), syphilis (0.6%), candidiasis (0.6%), trichomoniasis (0.16%) and gonorrhea (0.08%). This can be explaine by bad habits like inheritance of wife, removal of lower teeth and multiple sex partners, unsafe sex or lack of personal hygiene.

Con-infection of HIV positive with other STD was as follows; syphilis (75%), candidiasis (50%) and trichomoniasis (50%).

Prevalence of the studied different STD among VCT Attendants was HIV (0.75%), syphilis (0.75%), candidiasis (0.25%) and trichomoniasis (0.125%). This can be explaine by bad habits like inheritance of wife, removal of lower teeth and multiple sex partners, unsafe sex or lack of personal hygiene.

Con-infection of HIV positive with other STD was as follows; syphilis (33.3%), candidiasis (33.3%) and trichomoniasis (100%).

$CD4^+$ count was found to be less than 200 cells / mm^3 in all HIV positive participants and 3 of the participants with trichomoniasis. This result is expected in HIV patient, but no reason can be stated regarding trichomoniasis patient.

Knowledge about risk factors of 500 participants was assessed by such as condom use, abstinence and faithfulness, but none of those using condoms was found to be positive for any of the sexually diseases tested for. Concerning condom, 100 (20%) participants were found to be condom users and those at risk were 400 (80%). Of those who reported condom use, 4 (4%) stated that they used condoms to protect themselves from contracting sexually diseases, 10 (10%) used it to prevent their girlfriends from getting pregnant, 6 (6%) used it because their partners wanted to use it and of those reported non-condom use, 40 (10%) said it has bad oil, 200 (50%) said it has no pleasure and 80 (20%) because of tearing off. This is in agreement with report by Brody (2004); however most of the respondents think that condom does not give full protection which is in agreement with report by Lawrence *et al.*, (2006).

Feelings about abstinence, 200 (40%) thought that it was possible to abstain while 300 (60%) did not think it was possible to abstain and they are considered at risk. The reasons given for the inability to abstain are pressures from friends were 30 (10%), pressures from my partner were 90 (30%) and my own need and desire to have sex were 180 (60%). This is in agreement with report by Genuis SJ and Genuis SK (2005).

Feelings about being faithful, when asked if it was possible to be faithful to one trusted partner 400 (80%) thought this was possible while 100 (20%) did not think it was possible and they are also at risk. The reasons given for not being faithful are as stated three (3%) said this was because they like to have sex with a variety of partners, five (5%) reported that because sex is boring with one partner while twelve (12%) reported that because they would like to change sex.

The information obtained from this study reflect that the studied population lack basic information about the sexually transmitted diseases, more over bad traditions are being practiced.

Conclusions

The overall prevalence of the studied STDs was HIV (0.5%), syphilis (0.7%), *Candida* (0.3%), *T.vaginalis* (0.15%) and *Gonorrhea* (0.05%) among pregnant women and VCT Attendants.

Among pregnant women the prevalence of different STDs was HIV (0.3%), syphilis (0.6%), *Candida* (0.3%), *T.vaginalis* (0.16%) and *Gonorrhea* (0.08%).

Among VCT Attendants the prevalence of different STDs was HIV (0.75%), syphilis (0.75%), *Candida* (0.25%) and *T.vaginalis* (0.125%).

Co-infections of HIV positive with other STDs among pregnant women was (75%) with syphilis, (50%) with candidiasis and (50%) with trichomoniasis.

Co-infections of HIV positive with other STDs among VCT Attendants was as follows syphilis (33%), *Candida* (33%) and *T.vaginalis* (16%).

$CD4^+$ count was very low among all HIV and Trichomoniasis positive cases.

None of the participants who use condom was found positive for any of the investigated STD.

Recommendations

1. Further studies with large sample size and different communities are recommended.
2. Health education campaigns encouraging safe sex, abstaining, faithfulness and the use of condoms consistently and correctly.
3. Measures that aim to combat bad habits and traditions like wife inheritance and other malpractices such as removal of teeth, tattooing and scarification of forehead, ears and lips are recommended.
4. Training of people living with HIV and AIDS on positive living to create supportive environment
5. Involvement of youth in and out of school for positive prevention through health education.

HIV and STD Among Pregnant Women in Malakal Town, Upper Nile State, South Sudan

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Abstract

Background:

HIV is the causative agent of AIDS. In 2009, there were approximately 2.2 million new infections in adults; nearly 1million of them were in East-South Africa. The HIV indicator in South Sudan shows that the HIV prevalence estimate for the country is 3.1% making the estimated people living with HIV/AIDS (PLWHA) to be 155,000. The HIV epidemic is likely to grow worse due to existence of several factors that favor the transmission of the disease (AIDS) in South Sudan. These include the lack of access to HIV prevention and care service, lack of awareness among the communities, polygamy, wife inheritance and traditional malpractices. This study was conducted to estimate the seroprevalence of HIV and other STDs among pregnant women in Malakal Town and to determine the risk factors associated with disease transmission.

Material and Methods: A total of 1200 pregnant women were recruited in this study. From each subject under study, 2 - 3 milliliters of venous blood, cervical swab and urine specimen were collected. The blood specimens were allowed to clot, and then centrifuged to separate sera which were tested for HIV by Determine HIV 1 / 2, Uni-Gold HIV 1 / 2, and confirmed by ELISA. Syphilis was tested for sera by RPR. The urine and cervical swab were tested T.vaginalis, candida and N.gonorrhea, using wet preparation, Gram's stain then culture on Modified New York City (MNYC) Medium.

Results: The overall prevalence of the studied STDs among pregnant women was as follows: HIV (0.3%), Syphilis (0.6%), Candidiasis (0.3%), Trichomoniasis (0.16%) and gonorrhea (0.08%).The most frequent STDs in age group 18 – 20 years was syphilis (2.0%) followed by Candiasis (1.0%) while HIV was (0.5%) in both age groups each. HIV and syphilis were high in illiterates. This study showed an association of HIV with other STDs evident by the co-infections. Lack of knowledge, wife inheritance, multiple sex partners and lack of personal hygiene are important risk factors for transmission of STDs in the studied population.

Key words: HIV, AIDS, Syphilis, Candidiasis, Trichomoniasis, Gonorrhea.

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Introduction

Human Immunodeficiency Virus (HIV) is a retro virus (member of the genus Lenti virus), part of the Retroviridae family that causes Acquired Immunodeficiency Syndrome (AIDS), a condition in which the immune system begins to fail, leading to life – threating opportunistic infections. Infection with HIV occurs by transfer of blood, semen, vaginal fluid and pre-ejaculate or breast milk. HIV infection in humans is considered pandemic by World Health Organization (WHO). From its discovery in 1981 to 2006, AIDS killed more than 25 million people. HIV infects about 0.6% of the world's population [(1)].

The Republic of South Sudan shares borders with countries reported to have high rates of HIV/AIDS in Uganda 6.5%, Kenya 6.3%, Ethiopia 1.1%, Democratic Republic of Congo 3.4%, and Central African Republic 4.9% [(2)].

Syphilis is a sexually transmitted disease caused by the spirochetal bacterium *Treponema pallidum* subspecies pallidum. The route of transmission of syphilis is almost always through sexual contact, although there are examples of congenital syphilis via transmission from mother to child in utero. Enormous evidences are available indicating that syphilis increases the risk of HIV infection [(3)].

Gonorrhoea is one of the most frequently reported infectious diseases in the United States. The causal agent, *Neisseria gonorrhoeae*, a gram-negative dipolococcus, is frequently observed inside polymorphonuclear leukocytes of clinical samples obtained from infected patients. N. *gonorrhoeae* is usually transmitted during sexual contact through an infected birth canal. It does not survive long outside the human body because it is highly sensitive to dehydration [(4)].

Candidiasis (candidosis) is caused by the yeast *Candida albicans*, and other Candida species, which are normal body flora found in the skin, mouth, vagina, and intestines. Although consideredyeast, C. *albicans* is dimorphic, and can form a true mycelium Infections occur when competing bacterial flora are eliminated, for example, by antibiotics, allowing the yeast to overgrow Candida infections have various manifestations depending on the site. For example, oral candidiasis (thrush) presents as raised, white plagues on the oral mucusa, tongue, or gums. The plagues can become confluent and ulcerated and spread to the throat. Most HIV- positive individuals eventually develop oral candidiasis, which often spreads to the esophagus. The later condition is considered an indicator of full-blown AIDS. Vaginal candidiasis presents an itching

and burning pain of the vulva and vagina, accompanied by a thick or white discharge. HIV-positive females often experience recurrent vaginal candidiasis [4].

Although information is available regarding the prevalence of HIV, information regarding the other STDs is few or even lacking in South Sudan. This study is conducted to determine the rate of infection with HIV, syphilis and other STDs among pregnant women in Malakal Town, South Sudan.

South Sudan is described as having a low generalized epidemic with an average HIV prevalence rate of 3% among pregnant women [5]. The prevalence shows wide disparities in geographical locations with some areas as high as 7.2% in Western Equatoria State (WES), 3.3% in Eastern Equartoria State, 3.0% in Jonglei and Upper Nile States and 0.7% in both Northern Bahr Elghazal and Warrap States ([5,6]).

Materials and Methods

During the period from February 2012 to July 2013, pregnant women in Malakal town were invited to be enrolled in research to identify epidemiologic and biologic determinants of HIV and STDs infections. One thousand and two hundred pregnant women were included from age 18-24 years old. The selection of participants was based mainly on attendance. Informed consent was obtained after proper counseling. There after a sample of venous blood 2 - 3 milliliters was collected from each individual by vacutianer tube and sera were separated within two hours. Cervical swabs were taken and urine was taken in a sterilized container. The diagnosis HIV was made when the specimen tested positive with three of the screening test and western blot. Syphilis was diagnosed based on positive RPR only. The diagnosis of trichomoniasis and candiiasis was based on microscopic examination of wet preparation and gonorrhea by gram's stain and culture on MNYC.

Results

In this study a total 1200 pregnant women were recruited to participate in this study. The most prevalent STD among pregnant women was syphilis 0.6% followed by HIV infection and candidiasis 0.3% each (Table 1). The most frequent STD in age group 18 – 20 years, was syphilis 4.0% followed by candidiasis 2.0 while was the most frequent STD in the age group 21 – 24

years was HIV 0.8% (Table 2). All the investigated STDs were higher among the illiterate participants (Table 3).

Table (1).Shows the Percentage of the STDs Investigated in the Studied Population (n = 1200).

Type of STD:	Positive for Disease	
	Frequency	Percentage %
HIV	4	0.3
Syphilis	8	0.6
Candida	4	0.3
T. vaginalis	2	0.16
Gonorrhoea	1	0.08

Table (2).Distribution of the Different STDs According to Ages of Pregnant Women:

Type of STD:	Age: 18 – 20.			Age: 21 – 24.		
NO:	Total	Positive +ve	%	Total	Positive +ve	%
HIV	200	2	1.0	1000	8	0.8
Syphilis	200	8	4.0	1000	6	0.6
Candida	200	4	2.0	1000	2	0.2
T.vaginalis	200	2	1.0	1000	1	0.1
Gonorrhoea	200	1	0.1	1000	0	0.0

Table (3).Distribution of the Different STDs According to Educational Level of the Participants:

Type of STD:	Literate:		Illiterate:	
	Positive for the STD		Positive for the STD	
	Frequency	Percentage %	Frequency	Percentage %

NO:	Total	Literate	%	Total	Illiterate	%
HIV	900	2	0.2	300	8	2.6
Syphilis	900	6	0.6	300	8	2.6
Candida	900	2	0.2	300	4	1.3
T.vaginalis	900	1	0.1	300	2	0.6
Gonorrhoea	900	0	0.0	300	1	0.3

Discussion

In this study the overall seroprevalence of HIV among the studied population was found to be (0.3%). This is in agreement with what was reported by JUNP and UNAIDS [7, 8]. But very much lower than what was reported in South Sudan by SSAC [9]. The seroprevalence of HIV was 1.0% higher in age group 18 – 20 and can be explained that they are sexually active. Illiterates were found to be more affected by HIV than the educated participants. This is expected by fact that literates are not aware about HIV and other STDs. This can be explained by the fact that married individuals were practicing sex with possibly multiple partners if we consider the bad tradition of wife inheritance. In fact four of the HIV infected participants were inherited wives. Two studies done in Kenya revealed similar results [10, 11].

Conclusion

The overall prevalence of the studied STDs was HIV (0.3%), syphilis (0.6%), *Candida* (0.3%), *T.vaginalis* (0.16%) and *Gonorrhea* (0.08%) among pregnant women. This study showed other STDs as co-infection of HIV positive or risk factors. Therefore, Further studies with large sample size, health education campaigns encouraging (safe sex, abstaining, faithfulness and the use of condoms consistently) and correctly and measures that aim to combat bad habits and traditions like wife inheritance and other malpractices such as removal of teeth, tattooing and scarification of forehead, ears and lips are recommended.

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HIV and STD Among Voluntary Counseling Attendants in Malakal Town, Upper Nile State, South Sudan

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ABSTRACT

This study aimed to evaluate the seroprevalence of HIV and STDs among voluntary counseling and testing attendants in Malakal Town, and to determine the possible risk factors that might have promoted the rapid spread of HIV and AIDS among the local population.

The primary objectives of the study were three: First, to estimate the seroprevalence of HIV and STDs; second, to determine the risk factors associated with disease transmission; and third, assess the sexual behavioral pattern of the target group with regard to condom use, abstinence and faithfulness. A total of 800 participants were screened; and specimens were obtained from venous blood, cervical swab and urine. Specimen analysis was conducted through various methods, which included Determine HIV-1/2, Uni-Gol HIV 1/2, Enzyme-Linked Immunosorbent Assay (ELIA), Western Blot, Immunochromatographic Test (ICT), RPR and Microscope. Data were then analysed by computer SPBS then presented in form of tables, pie-charts and statistical significance checked by Chi-square.

The results showed that out the 800 participants who were screened, six (0.75%) were HIV-reactive, six (0.75%) were syphilis-reactive, two (0.3%) Candida and one (0.15%) Trichomonas Vaginalis. Every HIV-reactive was confirmed by Western Blot. Regarding the use of condoms, only 100 (20%) of the 500 subjects declared as regular condom users. However, six (6) HIV and six (6) syphilis-reactive were non-condom users. CD4 counts were found less than 200 mm^3 in HIV-reactive cases.

On the basis of the above stated findings, the study recommended that there was urgent need for ordinate efforts against HIV, Syphilis and other STDs in addition to sustained public awareness

campaigns that promote safe sex, abstinence, faithfulness and the use of condoms consistently and correctly.

KEYWORDS: HIV, AIDS, Syphilis, Candidiasis, Trichomoniasis.

المستخلص

هدفت هذه الدراسة لتحديد معدل الانتشار المصلى لفيروس فقدان المناعة الانساني ومعدل الاصابة بالامراض المنقولة جنسيآ بين المترددين على مراكز الفحص الطوعي بمدينة ملكال. و كذلك لتحديد العوامل التى يمكن أن تساهم في انتشار الفيروس في المجتمعات المحلية.

الاهداف الأساسية لهذه الدراسة تمثلت في الأتية.

اولآ: حساب الانتشار المصلى لفيروس فقدان المناعة الانساني ومعدلات الاصابة بالامراض المنقولة جنسيآ.

ثانيآ: لتحديد العوامل المصابة لانتشار هذه الامراض.

ثالثآ: قياس مدى قبولهم لاستخدام العازل الذكري.

تم مسح 800 مشارك. اخذ من كل مشارك عينة دم وريدي، مسحة من عنق الرحم و عينة بول. اخضعت هذه العينات للفحص المعملي باستخدام عدة طرق منها فحص ديتارمن، فحص يوني جل، فحص الاليزا و فحص الوسترن بلوت، فحص الكروماتوغرافي المناعي.

تم تحليل المعلومات وعرضها في شكل جداول و منحنى بيانى.

اظهرت النتائج ان 6 من المشاركين في الدراسة مصابين بفيروس فقدان المناعة الانساني، 6 بالزهري، 2 بكانديدا، وشخص واحد بتراكوموناس المهبلي.

اوضحت الدراسة ايضآ ان 20% من 500 شخص، كانوا لايستخدمون العازل الذكري بصورة منتظمة، بينما كل الاشخاص الذين اتضح اصابتهم بالامراض المنقولة جنسيآ كانوا لايستخدمون العازل الذكري.

INTRODUCTION

Human Immunodeficiency Virus (HIV) is a retro virus (member of the genus Lenti virus), part of the Retroviridae family that causes Acquired Immunodeficiency Syndrome (AIDS), a condition in which the immune system begins to fail, leading to life – threating opportunistic infections. Infection with HIV occurs by transfer of blood, semen, vaginal fluid and pre-ejaculate or breast milk. HIV infection in humans is considered pandemic by World Health Organization (WHO). From its discovery in 1981 to 2006, AIDS killed more than 25 million people. HIV infects about 0.6% of the world's population [(1)].

The Republic of South Sudan shares borders with countries reported to have high rates of HIV/AIDS in Uganda 6.5%, Kenya 6.3%, Ethiopia 1.1%, Democratic Republic of Congo 3.4%, and Central African Republic 4.9% [(2)].

The HIV indicator in South Sudan shows that the HIV prevalence estimate for the country is 3.1% making the estimated people living with HIV/AIDS (PLWHA) to be 155,000. The HIV epidemic is likely to grow worse due to existence of several factors that favor the transmission of the disease (AIDS) in South Sudan. These include the lack of access to HIV prevention and care service, lack of awareness among the communities, polygamy, wife inheritance and traditional malpractices. This study was conducted to estimate the seroprevalence of HIV and other STDs among pregnant women in Malakal Town and to determine the risk factors associated with disease transmission [(3)].

Syphilis is a sexually transmitted disease caused by the spirochetal bacterium *Treponema pallidum* subspecies pallidum. The route of transmission of syphilis is almost always through sexual contact, although there are examples of congenital syphilis via transmission from mother to child in utero. Enormous evidences are available indicating that syphilis increases the risk of HIV infection [(4)].

Candidiasis (candidosis) is caused by the yeast *Candida albicans*, and other Candida species, which are normal body flora found in the skin, mouth, vagina, and intestines. Although consideredyeast, C. *albicans* is dimorphic, and can form a true mycelium Infections occur when competing bacterial flora are eliminated, for example, by antibiotics, allowing the yeast to overgrow Candida infections have various manifestations depending on the site. For example, oral candidiasis (thrush) presents as raised, white plagues on the oral mucusa, tongue, or gums. The plagues can become confluent and ulcerated and spread to the throat. Most HIV- positive individuals eventually develop oral candidiasis, which often spreads to the esophagus. The later condition is considered an indicator of full-blown AIDS. Vaginal candidiasis presents an itching and burning pain of the vulva and vagina, accompanied by a thick or white discharge. HIV-positive females often experience recurrent vaginal candidiasis [(4)].

Although information is available regarding the prevalence of HIV, information regarding the other STDs is few or even lacking in South Sudan. This study is conducted to determine the rate

of infection with HIV, syphilis and other STDs among pregnant women in Malakal Town, South Sudan.

South Sudan is described as having a low generalized epidemic with an average HIV prevalence rate of 3% among pregnant women [(5)]. The prevalence shows wide disparities in geographical locations with some areas as high as 7.2% in Western Equatoria State (WES), 3.3% in Eastern Equartoria State, 3.0% in Jonglei and Upper Nile States and 0.7% in both Northern Bahr Elghazal and Warrap States ([5,6]).

MATERIALS and METHODS

A total of 800 voluntary counseling attendants were recruited in this study. From each subject under study, 2 - 3 milliliters of venous blood, cervical swab and urine specimen were collected. The blood specimens were allowed to clot, and then centrifuged to separate sera which were tested for HIV by Determine HIV 1 / 2, Uni-Gold HIV 1 / 2, and confirmed by ELISA. Syphilis was tested for sera by RPR. The urine and cervical swab were tested for *T.vaginalis, candida* using wet preparation.

RESULTS

In this study a total 800 voluntary counseling attendants were recruited to participate in this study. The most prevalent STD among voluntary counseling was syphilis 0.75% and HIV each followed by Candidiasis 0.3% (Table 1). The most frequent STD in age group 18 – 20 years, was syphilis 3.0% followed by HIV 2.0% while was the most frequent STD in the age group 21 – 24 years was HIV 0.5% (Table 2). All the investigated STDs were higher among the illiterate participants (Table 3).

The pattern of $CD4^+$ count among the participants positive for the investigated STD is shown in Table (4) which shows that all HIV patients (6) have $CD4^+$ count below 200/mm^3 and patients with trichomoniasis (1) has $CD4^+$ count also between 50 - 100/mm^3 below (Table 4).

Table (1).Shows the Percentage of the STDs Investigated in the Studied Population (n = 800).

Type of STD:	Positive for Disease

	Frequency	Percentage %
HIV	6	0.75
Syphilis	6	0.75
Candida	2	0.3
T. vaginalis	1	0.15

Table (2).Distribution of the Different STDs According to Ages of Voluntary Counseling:

Type of STD:	Age: 18 – 20.			Age: 21 – 24.		
NO:	Total	Positive +ve	%	Total	Positive +ve	%
HIV	100	2	2.0	700	4	0.5
Syphilis	100	3	3.0	700	3	0.4
Candidiasis	100	1	1.0	700	1	0.2
T.vaginalis	100	1	1.0	700	0	0.1

Table (3).Distribution of the Different STDs According to Educational Level of the Participants:

Type of STD:	Literate:			Illiterate:		
	Positive for the STD			Positive for the STD		
	Frequency		Percentage %	Frequency		Percentage %
NO:	Total	Literate	%	Total	Illiterate	%
HIV	600	2	0.3	200	4	2.0
Syphilis	600	3	0.5	200	3	1.5
Candida	600	0	0.0	200	2	1.0
T.vaginalis	600	0	0.0	200	1	0.5

Table (4).Distribution of CD4 Count in Participants Tested Positive for HIV with other STDs:

Disease:	CD4 Count 50 - 100	CD4 Count 110 – 150	CD4 Count 160 - 200	CD4 Count Above 200
HIV	4	5	1	0
Syphilis	0	2	3	9
Candida	0	1	2	3
T.vaginalis	3	0	0	0
Gonorrhoea	0	0	0	1

DISCUSSION

In this study the overall seroprevalence of HIV among the studied population was found to be (0.75%). This is in agreement with what was reported by JUNP and UNAIDS [7, 8]. But very much lower than what was reported in South Sudan by SSAC [9]. The seroprevalence of HIV was 1.0% higher in age group 18 – 20 and can be explained that they are sexually active. Illiterates were found to be more affected by HIV than the educated participants. This is expected by fact that illiterates are not aware about HIV and other STDs. This can be explained by the fact that married individuals were practicing sex with possibly multiple partners if we consider the bad tradition of wife inheritance. In fact four of the HIV infected participants were inherited wives. Two studies done in Kenya revealed similar results [10, 11].

CONCLUSIONS

The overall prevalence of the studied STDs was HIV (0.75%), syphilis (0.75%), *Candida* (0.3%) and *T.vaginalis* (0.15%) among voluntary counseling. This study showed other STDs as co-infection of HIV positive or risk factors. Therefore, Further studies with large sample size, health education campaigns encouraging (safe sex, abstaining, faithfulness and the use of

condoms consistently) and correctly and measures that aim to combat bad habits and traditions like wife inheritance and other malpractices such as removal of teeth, tattooing and scarification of forehead, ears and lips are recommended.

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