

Original article

Sexual Risk Behaviours Among Patients Living with HIV/AIDS in Douala in 2012

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Abstract

PURPOSE

The establishment of a positive HIV serologic status of an individual could have been an inhibitory factor to prevent risk behaviours in people living with HIV/AIDS. We conducted a cross-sectional study in order to assess the prevalence and predictors of risk behaviors among HIV-positive people in Douala-Cameroon.

METHODS

We used pre-checked questionnaires to systematically collect data from four HIV Treatment centers in Douala. This was done to some of them during the distribution of drugs, and to others during their classical rendezvous, between the months of May and July 2012.

The Chi-Square and Student t-test were used for cross tabulation of variables; multiple regression analysis was performed to identify predictors of risky sexual behaviours.

RESULTS

Of the 330 persons interviewed. Sixty percent were reported to have had sexual intercourse after the diagnosis of HIV. We obtained 37% HIV-positive partners and 63% had HIV-negative partners or partners with unknown status. Among our patients, 45% of the subjects with regular partners reported to have had anal or vaginal sex. Those, whose score on the knowledge about HIV / AIDS was < 50% and where 90% of them were less susceptible to the condom during intercourse (p: 0.01). About 74% of patient on ARV were less susceptible to the use of condom during sexual inter course (p: 0.03).

CONCLUSION

Risk sexual behaviours among people living with HIV/AIDS are common and potentially expose their partners. For HIV-positive partners these habits pose a real risk of suprainfection by other strains of HIV. The need to increase awareness and education among people living with HIV is therefore highly recommended.

KEY WORDS:

HIV / AIDS, Behaviours, HIV positive, Douala, 2012

Résumé :

OBJECTIFS

La découverte de la sérologie positive au VIH devrait se présenter comme un inhibiteur des comportements à risque chez des personnes infectées. Nous avons mené une étude transversale dans le but d'étudier la prévalence et les facteurs prédictifs des comportements à risque chez des personnes séropositives à Douala.

MÉTHODES

La collecte des données s'est effectuée à l'aide d'un questionnaire sur des patients vivant avec le VIH lors de la dispensation des médicaments et lors des rendez-vous de routine, entre mai et juillet 2012. Les tests de Chi-2 et de Student ont été utilisés pour la mesure des associations entre variables, le test d'analyse de régression multiple a permis de faire des prédictions.

RÉSULTATS

Au total, 330 personnes ont été interrogées. Ainsi, 60% ont déclaré avoir eu des rapports sexuels après la découverte de leur séropositivité. Parmi eux, 37% avaient des partenaires séropositifs et 63%, des partenaires séronégatifs ou de statut inconnu. En plus, 45% de sujets ayant de partenaires réguliers ont déclaré avoir des rapports anaux ou vaginaux non protégés. Ceux dont le score relatif à la connaissance sur le VIH/SIDA était < 40%, ont été 90% moins susceptibles d'avoir utilisé un préservatif lors des rapports sexuels (P=0,01). Les patients sous ARV étaient à 74% moins susceptibles d'avoir utilisé un condom lors des rapports sexuels (p=0,03).

CONCLUSION

Les comportements sexuels à risque des personnes infectées par le VIH sont assez courants et exposent leurs partenaires. Pour les partenaires séropositifs ces habitudes présentent un réel risque de surinfection par d'autres souches de VIH. La nécessité de renforcer la sensibilisation et l'éducation chez les personnes infectées s'impose.

MOTS CLÉS

VIH/SIDA, Comportements, Séropositifs, Douala, 2012

INTRODUCTION

After several years for the fight against HIV/AIDS, we can remark that prevention and treatment have not totally limit the propagation of HIV (Human Immune deficiency virus). At any point in time, this pandemic remains a priority to the government using new health policies to ameliorate the quality of life of PLWHIV. Today the worlds prevalence of PLWHIV is relatively low, with an exponential increase in the years 1991-2009, and a mild stationary level in 2000 [1]. In 2010 we estimated 3.3 million of PLWHIV in the world, that is 2.6 million new infections contracted in 2009 [2]. Amongst the 33 most infected countries, 22 are found in sub-Sahara Africa [3]. Results equally show that 22 million of PLWHIV live in Africa, out of the 33.3 million in the world in 2010[4].

Among these 22 million of PLWHIV, about 560 000 live in Cameroon [5]. The AIDS pandemic is still remain a real public health problem in this country, despite the efforts made by public authorities, supported by more and more development partners. Even that this infection today seems to be in relative regression, with a national prevalence of 4.3% and slightly more than 120.000 patients are on antiretroviral (ARV) [5]. Therapeutic protocols follow WHO recommendations with a diversity of molecules for which universal access remains a true challenge for the Cameroon government and its partners. However, the incidence of new infections persists despite the worries for the different actors involved in the fight against HIV and one of the reasons could be the unilateral orientation of sensitization in the direction of sero-negative persons or of unknown status. Sexual risk behaviours of PLWHIV remain neglected in our different strategies supported. We mean by risky sexual behaviours, sexual habits that cause reinfection, and that can expose sero negative partners to the HIV.

Very few studies in Africa have been conducted in these aspects in PLWHIV. Most available studies on PLWHIV are oriented towards therapeutic aspect. Whereas, the few studies done on sexual risk behaviours among PLHIV showed a high prevalence of unprotected sex in Kenya, in South Africa and Uganda [6,7]. In a South African study, more than 50% of Subjects had vaginal or anal intercourse, and amongst them, more than 30% had unprotected sex [8]. That is why, the need to do interventional education targeting for PLHIV is a daily issue.

The present study therefore has as aim to identify the sexual risk behaviours among PLWHIV followed-up in Douala 2012. It is for us to describe the demographic profile of these patients, the knowledge, attitudes, practices linked to sexual behaviors and the associations between risk factors and the different profile. It will certainly enable us to appreciate the risks that emerge. It would as a starting point for new interventional strategies, conceived for PLWHIV towards the dangers encountered by risk sexual behaviours in this population.

METHODS

Type and period of study

We conducted a cross sectional descriptive study which took place from 1st May to 31st July 2012.

Place of study

It was a prospective follow-up in four HIV treatment centers (HIVTCs). An HIVTC is a specialized center for global support for PLHIV. These are units in the hospital. We chose, HIVTC of District Hospitals of Nylon (HDN), District hospital of Soboum (CSS), District hospital of New Bell (HDW), and District hospital of Bonassama (HDB), all located in Douala.

These treatment centers were chosen in our study for the qualities of services offered to the users. Also, because they cover the most densely demographic zones. For a total of more than 2 million inhabitants. Patients who go there are from diverse origins, socio economic as well as demographic point of view.

Amongst these, Nylon is shown to be one of the most appreciated in the country with about 3 706 active files of patients' today [7] and with one the best therapeutic committees with, less than 5 years following its creation.

Carrying out such a study in these HIVTC guaranteed the results thanks to their individual performances and to their diversity of frequency.

Sampling

The required sample size of 323 was obtained using an appropriate statistical formula for estimating minimum sample size in descriptive health studies [$n=Z^2 pq/d^2$] [6]. The minimum sample size was inflated by 10% to take care of non-response, incomplete responses and refusals.

In terms of geographical coverage, our four UPECs cover eleven health districts. We decided to include consecutively in our study in each site, ninety patients presenting to retrieve their medications for the month or those for classical rendezvous. Thirty cases could not be used because of the poor quality of answers. We have thus been able to use 330 records. All the patients were aged 15+. These patients consented to participate to this study, by signing an informed consent form. Were excluded from this study, all PLHIV less than 15 years of age, for ethical reasons, and those who have not consented to participate in the study.

Data collection and statistical analysis

Data was collected using a pre-checked self-administered questionnaire, on about fifty individuals and readjusted. Participants were invited to fill the questionnaire where some variables were taken into consideration: socio-demographic characteristics, treatment data: last CD4 count, (Viral load was not taken into consideration due to the fact that very few patients in Douala can afford to pay for this test.), opportunistic infections, different drugs used). But also symptoms linked to AIDS: diarrhoea, weight loss,

persistent fever, dermatitis, others. We also took in consideration the number of sexual partners during the last 03 Months, the notion on the use of condoms or not, the knowledge of sero status of partners, the disclosure of serological status to partner(s), the perceptions of HIV transmission risk. Data collected were validated beforehand by the Regional Technical Group for fight against AIDS (GTRL).

We analyzed data using SPSS 16 for Windows. Data was stratified by gender and presented as means and SDs or percentages. Beliefs, attitudes and knowledge about HIV were evaluated using the "yes" (1 point) or "no" (0 points). On issues related to knowledge and beliefs about AIDS, ten questions were proposed to the subjects. Scores were the number of correct answers provided. Example: 10% for a single correct answer obtained, 40% for four corrects answers. We measured the differences in socio demographic, treatment data,

knowledge related to HIV / AIDS, attitudes and sexual practices, using the student's test. Multiple regression analysis was performed to identify predictors about the use of condoms during sexual intercourse and condom use with regular partners. ORs and confidence level of 95% were calculated.

RESULTS

Socio-demographic characteristics

In this study, 330 PLHIV were included, 225 (68%) men and 105 (32%) women. The mean age of participants was 29 ± 6 yrs. Forty two percent of subjects had a professional occupation, 146 (44%) were living in couple (married and in concubine), 135 (60%) of men had at least a secondary school level against only 27 (25%) of women. (Table I)

Tableau I : Socio-demographic Characteristics

Variable	Men (n=225)		Women (n= 105)		P-value	
	Number (n)	Percentage (%)	Number (n)	Percentage (%)		
Age	<20yrs	42	18,7	33	0,04	
	20- 30	68	30,3	34		
	30-40	87	38,6	20		
	> 40yrs	28	12,4	18		
Total	225	100	105	100		
Level of Educational	Primary	90	40	78	0 ,02	
	Secondary university	135	60	27		25,8
	Total	225	100	105		100
Employed	Yes	106	47,1	33	0,7	
	No	119	52,9	72		68,6
Total	225	68,1	105	100		
Household	Yes	107	47,5	39	< 0,01	
	No	118	52,5	66		62,9
Total	225	100	105	100		

Profile linked to post medical History

In this study, 255 (77%) of participants were on ARV with a mean treatment time of 5 ± 3 yrs. The average last CD4 count was more significant in men (405 ± 361) than in women (301 ± 226) ($p = 0, 02$). About 37(11%) patients declared having contracted an STI after discovering of seropositivity. While 215 (65%) of subjects acknowledged having experienced symptoms of AIDS. (Table II)

Knowledge, attitudes, practices linked to sexual behaviors

We obtained 159(48%) of subjects who scored more than 80% satisfactory answers on the questionnaires relative to knowledge on HIV/AIDS, notably, modes of transmission and prevention, sexual behaviors. Among our subjects, 198 (60%) declared having had sexual intercourse after announcing their seropositivity with several partners, but 175 (53%) had a regular partner. Among these partners, 109 (33%) were positive to HIV, and 221 (67%) were seronegative or had an

unknown sero-status. In more than 148 (45%) of regular partners, anal and vaginal intercourses were not always protected. Sero-status was revealed by 241(73%) of subjects to their regular partners.

Aspects linked to use of condoms during sexual intercourse and condom use with regular partners.

Our results showed that the use of condoms for the singles was not significant, comparing to widows and divorced (OR=3; 95% CI: 1.1- 4.5). It is the same for those who had several partners (OR = 5.5; 95% CI: 1.3- 11.7). Subjects whose relative score on HIV knowledge was less than 40% were less susceptible to have used condom during intercourse. For the patient on ART, 234 (71%) didn't present a significant score

with respect to the use of condom. (OR = 2.9; 95% CI: 0.7-3.8). Use of condom was not significant for the subjects of the age interval of 20-30 during sexual intercourse (OR = 2.7; CI 95%: 0.6-3.0). Subjects having a secondary educational level and/or university revealed to be more susceptible to use condoms with their regular partners than those with a lower educational level (OR = 0.03; CI: (0.01- 0.9)). Divorced subject and widows were more apt in the use of condoms with their regular partner (OR = 0.02; 95%: CI 0.01-0.7). We also noted a statistically significant susceptibility to the use of condom during sexual intercourse with regular partners, in subjects who revealed their serologic status (OR = 0.05; CI 95%: 0.03-0.8) (table IV)

Tableau II : Profile of Health of Participants.

Variable	Men (n=225)		Women (n=105)		P-value	
	Number	%	Number	%		
ARV	Yes	170	75,5	85	80,9	0,03
	No	55	24,5	20	19,1	
Total		225	100	105	100	
Past history of sexually transmitted infection	Yes	26	11,5	11	10,5	0,42
	No	199	88,4	94	89,5	
Total		225	100	105	100	
Past history of AIDS symptom	Yes	126	56	89	84,7	0,64
	No	99	44	16	15,2	
Total		225	100	105	100	

Tableau III : Knowledge, attitudes, practices linked to sexual behaviors

Variable	Men (n=225)		Women (n= 105)		P-value	
	Number (n)	Percentage (%)	Number (n)	Percentage (%)		
Level of HIV knowledge (%)	>75	108	48	51	48,5	0,6
	74-50	51	22,6	16	15,2	
	< 50	66	23,9	38	36,1	
Total	225	100	105	100		
Sexual intercourse after knowing VIH+ status	yes	157	69,7	41	39,1	0,4
	No	68	30,2	64	60,9	
Total	225	100	105	100		
Regular sexual Partner	yes	122	54,2	53	50,5	0,3
	No	103	45,8	52	49,5	
Total	225	100	105	100		
Number of sexual partners	1	148	65,7	79	75,2	0,6
	2	72	32	15	14,2	
	3 or +	5	2,2	11	10,4	
Total	225	100	105	100		
Use of condom with regular sexual partner	yes	56	24,8	23	21,9	0,5
	No	169	75,1	82	78,1	
Total	225	100	105	100		

Tableau IV : Basic and Adjusted Ratios of the Association between Selected Variables and the Use of Condoms during Sexual Intercourse

Variables		Basic Ratios	Adjusted Ratios	Confiance interval at. (95%)
Age	< 20 ans	Ref	Ref	
	20- 30	3.3	2.7	(0,6- 2,8)
	30-40	1.6	0.3	(0.4- 2.9)
	> 40	1.3	0.8	(0.2- 2.8)
Level of education	≤ primary education	Ref	Ref	(0.01- 0.9).
	≥ secondary education	1.9	0.03	
Marital Statuts	Single	Ref	Ref	
	Married or In couple	0.6	0.9	(0.8- 2.4)
	Divorced or widow	1.6	0.02	(0.01- 0.7)
Several sexual partners	Yes	2.4	5.5	(1.3- 11.7)
	No	Ref	Ref	
Patients on ART	Yes	2.8	2.5	(0.7- 3.8).
	No	Ref	Ref	
Knowledge on HIV (%)	>75	Ref	Ref	
	74-50	0.4	1.3	(0.7- 3.7)
	< 50	3.2	0.01	(0.7- 3.8).
Revealed serological status	No	Ref	Ref	
	Yes	0.8	0.05	(0.03-0.8)
	Yes	0.7	0.4	

DISCUSSION:

The aim of our study was to assess the prevalence and predictors of risk behaviors among HIV-positive people in Douala-Cameroon.

The results of our study will certainly help to reduce the incidence and spread of this disease in our country. Almost all actions against HIV / AIDS are oriented towards prevention of new infections by leaving the certain reservoirs of viruses, which are people that are already infected. This study takes its value because it explores an aspect of the fight most often under looked. Moreover, in the Cameroonian context, we are not aware of another study that has addressed this issue.

Our objectives were attained in this study. We succeeded to describe the sexual habits of PLHIV in Douala in 2012 and do some predictions. The dangers encountered in our study on sexual habits are equally found in several studies of the world [10, 11, 12], what seems to reveal the importance of this study and especially the existence of new methods of sensitization of PLWHIV in our context.

Meanwhile this study was a descriptive analysis of sexual behaviours among PLWHIV in Douala in 2012. The most important thing to note of, is the role played by sexual risk behaviour among PLWHIV in the propagation of HIV infection in our context. This study for example reveals to us that, more than 70% of PLWHIV had insufficient knowledge (<50%) on this pandemic, which is in line with results of Kalichman et al (13, 14). In our study, 60% of subjects declared having sexual intercourse after knowing they are sero-positive, this percentage is equally found by Dia et Bateganya (6, 15). Moreover, 27% of participants did not reveal their sero-positivity and 45% had intercourse with a regular partner did not always protect themselves during Sexual intercourse. It seems there's an absolute risk of exposure of individuals in cases where they appear to ignore the status of their partner. The need to develop a forum of sensitization particularly oriented towards PLHIV is required.

However, widowers, divorced subjects and those having other sexual partners were respectively 3 and 5.5 times more susceptible to have used condom during sexual intercourse. Divorced and widows were equally 3 times susceptible to have used condom during sexual intercourse with a regular sexual partner. These results were only found in Uganda, Tanzanian and Nigerian studies [16, 17]. Lopman et al in Zimbabwe equally described the complexity of sexual behaviours among widows and divorcees, due to multiple sexual partners with whom they are engaged. These partners who are always negative or unknown serological status they concluded in their study that the high use of condoms in this population comes from their complexity.

Parallel to certain African studies (16, 17, 18, and 19), our findings show that, subjects with secondary and/or university level involved in the use condoms with their regular partners than those of lower educational level. This can easily be explained by the capacity to achieve a good mastering of certain knowledge related to AIDS made easier by the good intellectual level. The

mastering of knowledge placed the latter, more than other, under the shade of risk behaviours as well as under the shade of STI and of supra infections.

The revelation of serological status seems to be an important point in the reduction of risk behaviours. In our study, subjects that revealed their serologic status were 4 times more susceptible to use condom during Sexual intercourse. Simbayi LC and Deribe et al in South Africa and Ethiopia respectively confirmed that, the revelation of serological status is strongly associated to reduction of behaviour risks, and especially to the increase of acts susceptible to protect the sexual partner (20, 21). On the contrary, studies by Deribe et al showed equally that a high level of anal and vaginal unprotected intercourse among PLHIV in Cape Town who did not reveal their serological status to their partners. Consequently, particular strategies should be derived, in order to bring PLHIV to reveal their serological status at least to their regular partners.

In our data, patients on ART were 74% less susceptible to the use of condom. Whereas one knows that ART have the particularity to reduce the morbidity and mortality rate of PLHIV and ART and sexual behaviours remain however, divergent. Certain studies (Stolte IG et Rice et al) showed an increase in sexual risk behaviours among patients on ART (22, 23) while others concluded that there is no association between ART and sexual risk behaviours, better in a reduction of sexual risk behaviours among patients on ARV (24, 25). Our findings however, showed that our subjects in ART lead to exposing sexual behaviours.

Whereas the contact with Health personnel during drug distribution, should be an occasion for the sharing of holy behaviours [26]. Studies have however shown that patients on ART who experienced an amelioration of their health state, do no longer consider AIDS as a dangerous and mortal disease [26, 27, 28], and in addition; do not consider themselves infected.

It would be judicious to integrate a behavioural approach in the medical care of PLHIV; this approach will certainly ameliorate the educational level of patients with respect to risk of supra infections and consequently the progression of the disease [27].

We came to realize that this study had a weakness most probable due to the sample size of our study. Surely we could have gained more grounds if a larger sample size was used and or if we had gone to many other treatment centers to carry on the study. Moreover we also think that the duration of our study could be a factor of bias and the fact that sensitive aspects of life (sexual habits) were implicated could still be another factor of bias. To minimize this aspect we engage our partners in charge of counseling to sensitize our subjects for the importance of their contributions in this study.

CONCLUSION

Our study enabled us to establish the fact that, low level of education, the low mastery of problems related to AIDS issues, the none revelation of serologic status,

the intake of ARV and the intension to have a child were associated to a low usage of condoms during sexual intercourse. These results came to reinforce the need to define a sensitization strategy toward PLHIV in Douala, Cameroon and Africa as a whole. An access to this strategy will be to integrate this education during care administration and particularly during the dispensation of ARV.

REFERENCES

- [1] United Nation Joint Program on HIV/AIDS, World Report no AIDS epidemic, Geneva: 2010.
- [2] National program to fight against AIDS, Impact of HIV/AIDS in Cameroon horizon 2020, Yaoundé: 2010.
- [3] National program to fight against AIDS, Rapport de Progress on Declaration on Engagements on HIV/AIDS, UNGASS, Yaoundé: 2009.
- [4] United Nation Joint Program on HIV/AIDS, World Report no AIDS epidemic
- [5] Comité National de Lutte contre le SIDA, Rapport annuel 2011 des activités de lutte contre le VIH, le SIDA et les IST au Cameroun, Yaoundé : 2012.
- [6] Dia A, Marcellin F, Bonono RC, et al. Prevalence of unsafe sex with one's steady partner either HIV negative or of unknown HIV status and associated determinants in Cameroon. *STI*. 2009; 1-16.
- [7] Myer L, Morroni C, Rebe K. Prevalence and determinants of fertility intentions of HIV-infected women and men receiving antiretroviral therapy in South Africa. *AIDS Patient Care and STD's*. 2007; 21(4):278-285.
- [8] Kiene MS, Christie S, Corman DH, et al. Sexual risk behaviour among HIV-positive individuals in clinical care in urban KwaZulu-Natal, South Africa. *AIDS*. 2006; 20:1781-1784.
- [9] Groupe Technique Régional de Lutte contre le Sida du Littoral. Rapport d'activités de prise en charge deuxième trimestre 2012. GTRL : Douala ; 60
- [10] King-Spooner S. HIV prevention and the positive population. *Int J STD & AIDS*. 1999; 10:141-150.
- [11] Berhan A, Berhan Y. Is the Sexual Behaviour of HIV Patients on Antiretroviral therapy safe or risky in Sub-Saharan Africa? Meta-Analysis and Meta-Regression. *AIDS Res Ther*. 2012 May 14; 9(1):14.
- [12] Lertpiriyasuwat C, Plipat T, Jenkins RA. A survey of sexual risk behavior for HIV infection in Nakhonsawan, Thailand, 2001. *AIDS*. 2003 Sep 5; 17(13):1969-76.
- [13] Kalichman SC, Benotsch E, Suarez T, et al. Healthliteracy and health-related knowledge among personsliving with HIV/AIDS. *Am J Prev Med*. 2000;18(4):325-331.
- [14] Kalichman SC, Ramachandran B, Catz S. Adherenceto combination antiretroviral therapies in HIVpatients of low health literacy. *J Gen Int Med*.1999; 14:267-273.
- [15] Bateganya M, Colfax G, Shafer LA, et al. Antiretroviral therapy and sexual behaviour: A comparative study between antiretroviral-naïve and –experienced patients at an urban HIV/AIDS care and research center in Kampala, Uganda. *AIDS Patient Care and STD's*. 2005; 19(11):760-768.
- [16] Ukwuani FA, Tsui AO, Suchindran CM. Condom use for preventing HIV infection/AIDS in Sub-Saharan Africa. *J Acquir Immune DeficSyndr*. 2003; 34(2):203-213.
- [17] Ncube NM, Akunna J, Babatunde F et al. Sexual behaviour among HIV- positive persons in Kumasi, Ghana. *Ghana Med Jour*; 46(1):33-27.
- [18] Volk JE, Koopman C. Factors associated with condom use in Kenya: A test of the Health BeliefModel. *AIDS Edu&Prev*, 2001; 13(6):495-508.
- [19] Benefo KD. Determinants of condom use in Zambia:A Multilevel Analysis. *Study in Fam Plann*, 2010; 41(1):19-30.
- [20] Simbayi LC, Kalichman SC, Strebel A, Cloete A, Henda N, Mqeketo A. Disclosure of HIV status to sex partners and sexual risk behaviours among HIV-positive men and women, Cape Town, South Africa. *Sex Transm Infec*. 2007; 83:29-34.
- [21] Deribe K, Woldemichael K, Wondafrash M, HaileA, Amberbir A. High-risk behaviours and associated factors among HIV-positive individuals in clinical care in southwest Ethiopia. *Trop Doctor*.2008; 38:237-239.25.
- [22] Stolte IG, Dukers NH, Geskus RB, Coutinho RA, de Wit JB. Homosexual men change to risky sexwhen perceiving less threat of HIV/AIDS since availability of highly active antiretroviral therapy: a longitudinal study. *AIDS*. 2004; 18:303-309.
- [23] Rice E, Batterham P, Rotheram-Borus MJ. Unprotected sex among youth living with HIV beforeand after the advent of highly active antiretroviral therapy. *Perspect Sex Reprod Health*.2006; 38:162-167.
- [24] Kiene MS, Christie S, Corman DH, et al. Sexual risk behaviour among HIV-positive individuals in clinical care in urban KwaZulu-Natal, South Africa *AIDS*. 2006; 20:1781-1784.
- [25] Sarna A, Luchters SMF, Geibel S, et al. Sexual risk behaviour and HARRT: a comparative study of HIV-infected persons on HAART and on preventive therapy in Kenya. *Int J STD & AIDS*. 2008; 19:85-89.
- [26] Kennedy C, O'Reilly KO, Medley A, Sweat M. The impact of HIV treatment on risk behaviour in developing countries: A systematic review. *AIDS Care*.2007; 19(6):707-720
- [27] Crepaz N, Marks G. Towards an understanding of sexual risk behaviour in people living with HIV: are view of social, psychological, and medical findings *AIDS*. 2002; 16:135-149.
- [28] Kalichman SC. HIV transmission risk behaviours of men and women living with HIV-AIDS: prevalence, predictors, and emerging clinical interventions. *Clin Psychology Sci Practice*. 2000.