

RISK FACTORS FOR RECURRENT SEXUALLY TRANSMITTED INFECTIONS IN UGANDA

F. NUWAHA

ABSTRACT

Objective: To identify predictors of recurrent sexually transmitted infections (STIs)

Design: A cross-sectional interview survey.

Setting: STD Clinic, Old Mulago Hospital, Kampala.

Methods: Eligible patients answered questions about their socio-demographic situation; STI symptoms; sexual behaviour; sexual partner referral; health seeking behaviour and whether they had a recurrent infection or not. Bivariate and multivariate stepwise logistic regression models were used to identify independent predictors of recurrent STIs.

Results: Fifty two (38%) out of 138 patients had recurrent STIs. On bivariate analysis the predictors of recurrent STIs were: being male; age ≥ 25 years; inability to read in English; presenting with genital itching; attributing source of symptoms to sexual partner; not being asked to refer sexual partners at previous treatment site; having more than five lifetime partners; knowing how to use a condom; ever using a condom; and using a condom at least once in the previous three months. On multivariate analysis, independent risk factors for recurrent infection were: age ≥ 25 years (Adjusted Odds Ratio [AOR] = 2.70, 95% CI 1.20, 5.88); inability to read English AOR = 3.09, (95% CI 1.38, 6.92); and having more than five, lifetime partners AOR = 2.56 (95% CI 1.11, 5.88).

Conclusion: Reducing the number of sexual partners and targeting people who do not speak English with health education messages in the local language may reduce the frequency of recurrent STIs.

INTRODUCTION

People who suffer from recurrent sexually transmitted infections (STIs) are at an extremely increased risk of acquiring the HIV infection(1,2). Such persons are also very likely to develop other complications of STIs such as ectopic pregnancy and infertility(3). The limiting of recurrent STI reduces the sexual transmission of HIV and the other STIs complications(2,3). Reports on risk factors for recurrent STIs are very rare. This study was, therefore, undertaken to understand the determinants of recurrent STIs with a view of suggesting remedial measures.

MATERIALS AND METHODS

Fifty eight men and eighty women with STI symptoms were interviewed at a public STD clinic in Old Mulago, Kampala during December, 1997. The STD clinic is part of the national referral Mulago Hospital complex located in Kampala, the capital city of Uganda. This clinic has been treating STI patients since the beginning of this century. The STD clinic mainly serves the population of Kampala city (about 1.5 million people) and the surrounding districts. Though the clinic is a national STI referral centre, it mainly serves as a primary level treatment clinic with only five per cent of the patients referred from other health units.

Patients who at a first attendance received treatment for an STI and fulfilled the inclusion criteria of having one or more STI

symptoms such as urethra/vaginal discharge, genital ulcer, dysuria, genital itching, inguinal swelling, and/or genital growth were asked to participate. The patients were included in the study after they had received medical care and given informed consent. A male clinical officer interviewed the men while a female clinical officer and/or midwife/nurse interviewed the women. A pre-tested semi-structured interview schedule was used to collect the data. The schedule comprised of questions about socio-demographic situation; STI symptoms; types of partner; knowledge about STIs, attitudes towards STIs and about partner referral; sexual behaviour; health seeking behaviour; use of condoms; and whether the patients had ever had an STI before or not.

Ethical considerations: The study was approved by Mbarara University Faculty of Medicine-research committee and the Uganda National Council for Science and Technology.

Statistical analysis: The Chi-square (χ^2) and/or Fisher's exact test were used to compare proportions. To identify independent predictors of having had a recurrent STI, stepwise multivariate logistic regression procedures were used. All variables that were significant on bivariate analysis ($p < 0.05$) were used in the multivariate analyses. Both forward selection and backward elimination methods were used to enhance the robustness of the model. The two procedures produced the same model. Variables that did not improve the fit of the regression (as measured by log likelihood) were left out. The percentages of cases correctly classified were examined at each stage and adequacy of the fitted models was assessed by the Chi-square (χ^2) test. Statistical packages Epi-info version 6 and SPSS/PC+ were used in the analyses.

RESULTS

Patients were categorised as recurrent if they reported more than one episode of STI symptoms and incident if the index infection was the first ever. Out of the 138 patients with STIs, 52 (38 %) had a recurrent STI. Of the 52 who had a recurrent STI, 20 (39%) had the recurrent infection in the previous six months, 13 (25%) in the previous one year, eight in the previous five years and nine (17%) within more than five years. Regarding the number of recurrent infections, 30 out of the 52 (68%) had one recurrent infection, 12 (23%) two recurrent infections and 10 (19%) more than two recurrent infections.

Social and demographic variables: Of the 138 patients studied, eighty (58%) were females and 58 (42%) were males. The ages of the 138 patients ranged from 15-45 years with a mean age of 30 years for men and 24 years for women. Seventy four (54 %) of the 138 study participants were Baganda and the rest belonged to other ethnic groups. Eighty one (59%) of the total sample were at that time married; 44 (32%) were never married and 13 (9%) were either widowed, separated or divorced. Thirty (22%) of the 138 study participants were unemployed or students; 57 (41%) could read English; 20 (14 %) never attended school; 62 (45%) attended up to primary level; and 56 (41%) attended up to secondary school level or higher. The religions of the 138 study participants were: catholic 44 (32%); Protestant 60 (43%); Muslim 27 (20%) and others seven (5%). A minority of the sample 17 (12%) used electricity for cooking, with the remainder using

charcoal stove (62%); paraffin (7%); and firewood (19%). A majority of the participants lived in an urban area 122 (81%) and the rest (19%) were from rural areas around Kampala city.

On bivariate analysis, place of residence, ethnicity, marital status, fuel for cooking, religion, level of education and employment status were not associated with a changed risk of recurrent STI as they did not reach statistical significance ($p > 0.05$; Table 1). The inability to read English crude Odds Ratio [OR] = 2.71, (95 % CI 1.29, 5.71); being male OR = 2.17, (95% CI 1.08, 4.39); and being 25 years or older OR = 3.26 (95 % CI 1.59,6.67) were associated with an increased risk of recurrent STI.

STIs symptoms: The symptoms of the 138 patients were vaginal discharge 51/80 (51%), genital ulcer 40/138 (29%), genital itching 83/138 (60%), urethral discharge 24/58 (41%), low abdominal pain 30/80 (38%) and others that included inguinal swelling, skin rashes, genital growth 30/138 (12%). More than fifty per cent of the patients had more than one symptom. A majority of the 138 patients (70%) had STI symptom for more than two weeks before coming to the clinic and only twenty per cent presented to the clinic within one week of the STI symptoms.

On bivariate analysis, the duration of symptoms and presenting with either vaginal discharge, low abdominal pain, urethral discharge or with other symptoms were not associated with changed risk of recurrent STI (Table 2). The only symptom that was associated with an increased risk of recurrent STI was genital itching OR = 2.17 (95% CI 1.03,4.55)

Table 1

Socio-demographic variables of patients with STIs who had recurrent or incident STI episode

Variable	% with recurrent (n=52)	% with incident (n=86)	Crude Odds ratio (95 % * CI)	P-level
Sex (male)	48	40	2.17 (1.08 - 4.39)	0.03
Place of residence (urban)	86	78	1.82 (0.71 - 4.69)	0.21
Age in years (> 25)	63	35	3.26 (1.59 - 6.67)	0.001
Ethnicity (Baganda)	44	59	0.65 (0.3 - 1.17)	0.30
Current civil status (not married)	56	60	0.82 (0.41 - 1.66)	0.60
Lives with spouse	48	55	0.44 (0.10 - 1.86)	0.21
Fuel for cooking (not electricity)	92	81	2.68 (0.95 - 7.57)	0.06
Religion (Catholic)	35	30	0.91 (0.38 - 2.15)	0.80
Level of education (secondary and above)	31	47	0.51 (0.25 - 1.06)	0.07
Unable to read in English	73	50	2.71 (1.29 - 5.71)	0.01
Work (not employed)	21	22	0.95 (0.40 - 2.19)	0.90

* CI confidence interval N=138

Table 2*Symptoms among patients with STIs who had recurrent or incident STI episode*

Variable	% with Recurrent (n=52)	% with Incident (n=86)	Crude Odds Ratio (95 % CI)	P-level
Vaginal discharge	23	34	0.93 (0.32 - 2.69)	0.83
Low abdominal pain	23	21	2.11 (0.71 - 6.29)	0.13
Urethral discharge	21	15	0.90 (0.28 - 2.88)	0.85
Genital ulcer	25	26	1.54 (0.73 - 3.26)	0.26
Genital itching	71	53	2.17 (1.03 - 4.55)	0.04
Other symptoms	25	20	1.35 (0.59 - 3.08)	0.47
Duration of symptoms (<14 days)	31	29	1.08 (0.51 - 2.30)	0.83

Table 3*Knowledge and experiences of STIs among patients with STIs who had recurrent or incident STI episode*

Variable	% with recurrent (n=52)	% with incident (n=86)	Crude Odds Ratio (95 % CI)	P-level
Kind of disease patients thinks she/he has (STI)	73	67	1.31 (0.61 - 2.80)	0.49
Source of disease (sexual partners)	60	40	2.26 (1.12 - 4.56)	0.02
Previously treated for current STI episode	38	41	0.91 (0.45 - 1.84)	0.79
Asked to refer partner at previous treatment site	25	10	3.19 (1.05 - 9.91)	0.02
Named at least one curable STI	96	87	3.67 (0.80 - 17.25)	0.08
Named at least one incurable STI	87	84	1.25 (0.47 - 3.33)	0.66
Aware of need for abstaining from sex for treatment period? (Yes)	75	72	1.39 (0.41 - 4.06)	0.55
Preferred protection measure for STIs in future (condoms)	50	37	1.68 (0.83 - 3.39)	0.14

N=138

Knowledge and experience of STIs: Of the 138 patients interviewed, 96 (70%) said that their disease was an STI; 37 (28%) said that they did not know the nature of their disease; and five (4%) said they had no disease. Sixty five out of 138 (47%) attributed their symptoms to a sexual partner(s); 15 (13%) to their parents; eleven (8%) to contact with inanimate objects; 37 (28%) said they did not know the source of their symptoms and five (4%) gave no answer. Knowledge of STIs was high with 125 (91%) able to name at least one curable STI and 117 (85%) able to name an incurable STI. A fairly high percentage (40%) of the 138 patients had treatment before coming to the clinic.

Regarding the preferred method of protecting oneself against STIs in future 58 (42%) mentioned condoms; 37 (27%) stick to one partner; 22 (16%) said it depended on the partner; seven (5%) mentioned abstinence and four (3%) medical check-ups.

On bivariate analysis, the type of disease the patient thought they had; previous treatment for current STI, being aware of the need to abstain from sex during treatment period, preferring condoms for future prevention of STIs, and being able to name at least one incurable or curable STI did not affect the risk of recurrent STI (Table 3). Not being asked to refer a sexual partner at previous treatment site OR = 3.19, (95 % CI 1.05, 9.91) and attributing the source of the STI to a sexual partner

OR = 2.26 (95% CI 1.12,4.56) increased the risk of recurrent STI.

Sexual behaviour and condom use: Of the 138 patients, 20 (15%) said they had one lifetime sexual partner, 57 (41%) between two and four sexual partners, and 61 (44%) said they had more than five lifetime partners. A majority (71%) of the 138 patients had had sex during the period they had symptoms. Most of the patients (67%) had had sex with one regular partner in the previous three months, 14 (10%) had had sex with more than one regular partner, and 32 (23%) did not have a regular partner. Of the sample, 112 (81%) did not have sex with a casual partner in the previous three months, 22 (16%) had sex with one casual partner, and four (3%) had sex with more than one casual partner. Eighty seven (63%) knew how to use a condom, 81 (59%) never used a condom, 34 (25%) used a condom at least once in the previous three months, 20 (14%) used a condom in the last sexual encounter and 87 (63%) accepted to take a free supply of the provided condoms.

On bivariate analysis, having sex while symptomatic, type of partner in the previous three months or for the duration of symptoms (regular or casual), using a condom in the last sexual encounter, and accepting to take a free supply of the provided condoms were not associated with a changed risk of recurrent STI (Table 4). The factors that were associated with increased risk of recurrent STI were

Table 4*Sexual behaviour and condom use among patients with STIs who had recurrent or incident STI episode*

Variable	% with Recurrent (n=52)	% with Incident (n=86)	Crude Odds Ratio (95 % CI)	P-level
Life-time partners (five or more)	50	22	3.57 (1.67 - 8.33)	0.007
Having sex for the period with symptoms	71	71	0.98 (0.46 - 2.11)	0.98
Had sex with a regular partner for the period with symptoms	67	64	0.86 (0.42 - 1.78)	0.69
Had sex with a casual partner for the period with symptoms	10	14	1.52 (0.50 - 4.60)	0.45
Had sex with at least a regular partner in the previous three months	79	76	0.83 (0.36 - 1.90)	0.66
Had sex with at least a casual partner in the previous three months	19	14	0.96 (0.40 - 2.31)	0.93
Does not know how to use condoms	44	25	2.38 (1.11 - 5.07)	0.02
Never used Condoms	49	29	2.35 (1.13 - 4.91)	0.02
Did not use a condom at least once in past three months	81	65	2.32 (1.05 - 5.09)	0.03
Did not use a condom in last sexual encounter	87	83	1.43 (0.55 - 3.72)	0.46
Accepted to take condoms	69	59	1.54 (0.74 - 3.20)	0.24

Table 5*Attitudes, self-efficacy and intention to refer sexual partners among patients with STIs who had recurrent or incident STI episode*

Variable	% with Recurrent (n = 52)	% with Incident (n= 86)	Crude Odds Ratio (95 % CI)	P-level
Positive attitudes towards referring sexual partners	94	86	2.65 (0.71 - 9.87)	0.13
Self-efficacy towards sexual partner referral (easy)	50	48	1.09 (0.55 - 2.18)	0.79
Intends to inform partner to come for treatment	68	77	0.82 (0.37 - 1.81)	0.63
Thinks partner will accept to come for treatment	65	58	1.36 (0.67 - 2.78)	0.40

having five or more lifetime partners OR = 3.57 (95% CI 1.67,8.33), not knowing how to use condoms OR = 2.38 (95% CI 1.11,5.07), not ever using a condom OR = 2.35 (95% CI 1.13,4.91), and not using a condom in the last three months OR = 2.32 (95% CI 1.05,5.09).

Attitude, self-efficacy and intention to refer sexual partners: The majority of the sample 123 (89%) had a positive attitude towards sexual partner referral. However, only 67 (49%) said that partner referral would be easy. One hundred and four (75%) said that they intended to refer sexual partners whereas only 84 (61%) thought that the partner would accept to go for treatment.

On bivariate analysis, attitude, self-efficacy and intention to refer sexual partner were not associated with a change in risk of recurrent STI (Table 5).

Independent predictors of recurrent STI: In multivariate models, only three variables namely age of equal or greater than 25 years (Adjusted Odds Ratio [AOR] = 2.70, 95% CI 1.20,5.88, P = 0.02), inability to read in English (AOR = 3.09 95% CI 1.38,6.92, P = 0.006),

and having five or more life time partners (AOR = 2.56, 95% CI 1.11, 5.88, P = 0.03), were associated with an increased risk recurrent STI. These three variables predicted having a recurrent STI very well with an overall accuracy of ninety five out of 138 (69%) cases being correctly classified ($\chi^2 = 26.32$, 3 degrees of freedom, P-level < 0.001). Among the those who had a recurrent STI, the prediction accuracy (sensitivity) was 27 out of 52 (52%). Among those who did not have a recurrent STI, the prediction accuracy (specificity) was 68 out of 86 (79%).

DISCUSSION

While interpreting this data, it is important to bear the following issues in mind. First this study represents a highly selected population of patients with STIs and may not necessarily be applicable to other populations. Secondly, the relatively small sample size may have decreased the power of the study. Third, the study was limited to patients who sought care at the STD clinic.

Patients who sought medical care elsewhere may have been different from this sample. Fourth there were patients who had had an STI episode in the distant past. This could have introduced a recall bias and also may have altered the behaviour with respect to some variables, for example condom use. Such biases reduces the estimate of odds ratios. Finally, for recurrent STIs, there was no way of determining if the infection was truly a new episode or a reactivation of an existing one.

This present study, however, provides information on the proportion and determinants of patients with STIs that had a recurrent STI. The high proportion (38 %) of patients admitting having a recurrent STI is worrying as it has serious consequences for further transmission of STIs/HIV and development of complications(3). Recurrent STIs may be due to infection by a new partner or by the same partner who was not treated. Eighty per cent of the patients who had been previously treated elsewhere in the current study were not asked to refer their partners so it is possible that even if they were cured, they could have been re-infected by untreated partners.

The independent predictors of having a recurrent STI were age \geq 25 years, inability to read English and having more than five lifetime partners. Age and number of sexual partners influencing recurrent STIs was expected and not surprising. These results are similar to findings elsewhere that found age and number of sexual partners as significant risk factors for recurrent STIs(4,5). The inability to read English as 'risk factor for recurrent STIs may reflect response to health education messages that are commonly presented in the electronic and print media using the English language. This ability may also imply use of STI prevention strategies such as condoms(6,7).

To reduce the chance of recurrent STIs, there is need to reduce the number of sexual partners, and to target illiterate people with appropriate health education materials and methods in local languages. Additional measures may include improving partner referral and providing effective treatment at the first level of contact for patients with STIs.

ACKNOWLEDGEMENTS

The author is grateful to the research assistants J. Kyamulabi and G. Swai who took part in interviewing the patients. Thanks are due to Mbarara University of Science and Technology, and the Swedish Agency for Co-operation with Developing Countries for the financial support.

REFERENCES

1. Laga, M, Diallo, M.O. and Buve' A. Inter-relationship of STI and HIV: where are we now? *AIDS* 1994; (8)suppl:S119-24
2. Grosskurth, H., Mosha, F. and Todal, J. *et al.* Impact of improved sexually transmitted disease treatment on HIV infection in rural Tanzania: randomised trial. *Lancet* 1995; **346**:530-536
3. Kissinger, P., Brown, R. and Reed, K, *et al.* Effectiveness of patient delivered partner medication for preventing recurrent *Chlamydia trachomatis*. *Sex. Transm. Inf.* 1998; **74**:331-333
4. Van Den Eden, S.K., Habel, L.A., Sherman, K.J., Mcknight, B., Stergachis, A. and Daling, J.R. Risk factors for incident and recurrent *Condylomata acuminata* among men: A population based study. *Sex. Transm. Dis.* 1998; **25**:278-84.
5. Habel, L.A., Van Den Eden, S.K., Sherman, K.J., Mcknight, B., Stergachis, A. and Daling, J.R. Risk factors for incident and recurrent *Condylomata acuminata* among women: A population based study. *Sex. Transm. Dis.* 1998; **25**:285-292.
6. Kanya, M., McFarland, W., Hudes, E.S., Ssali, A., Busuulwa, R. and Hearst, N. Condom use with casual partners by men in Kampala, Uganda. *AIDS*. 1995; **9**:745-50.
7. Asiimwe-Okiror, G., Opio, A.A., Musunguzi, J., Madraa, E., Tembo, G. and Carael, M. Change in sexual behaviour and decline in HIV infection among young pregnant women in urban Uganda. *AIDS* 1997; **11**:1757-63.