

# Risk Behaviours associated with Urethritis in Prison Inmates, Sindh

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## Abstract

**Objective:** To identify sexual risk behaviours associated with lifetime risk of urethritis in prison inmates.

**Design:** A cross-sectional study using a pre-designed questionnaire. Setting Fourteen prisons throughout the Sindh Province, Pakistan.

**Subjects:** Three thousand three hundred ninety-five prison inmates incarcerated during July, 1994.

**Main outcome measure:** Lifetime risk of urethritis occurrence (whether or not the subject was ever affected with urethritis up to his present age)

**Results:** Lifetime risk of urethritis occurrence in the study population was 20.8% (706/3395). The final multivariate logistic regression model indicated that risk behaviours associated with lifetime risk of urethritis in this population were 'sexual intercourse with a female' (adjusted OR = 2.18; 95% CI 1.60, 2.95), 'multiple female sexual partners' (adjusted OR = 1.67; 95% CI 1.28, 2.18) and 'sexual intercourse with man' (adjusted OR = 2.75; 95% CI 2.29, 3.31).

**Conclusion:** The prevalence of urethritis in this population was very high. High prevalence of various risky sexual behaviours among inmates indicates, their unawareness as to what precautions they might take to avoid risk of acquiring STDs including HIV. The study subjects meet the characteristics of a core group of STDs transmitters and provides short window of opportunity for STD/HIV control programs to intervene, while they are in detention to reduce the risk not only for this group but also for general population (JPMA 49:268, 1999).

## Introduction

Sexually transmitted diseases (STDs) are among the most commonly recorded medical problems in prison population<sup>1,2</sup> that may serve as reservoir for STDs in the general population<sup>3</sup>. Furthermore, a recent evidence suggested that STDs may facilitate the transmission of human immunodeficiency virus (HIV)<sup>3-7</sup>. The increased risk for acquiring STDs and HIV infection in prison inmates results from their risky sexual behaviours. Several risk behaviours for transmission of STDs include male-to-male sexual intercourse<sup>8</sup>, that occurs in prison<sup>2</sup>, illicit drug use<sup>7,9-11</sup>, contact with commercial sex workers<sup>12</sup>, inconsistent or no condom use and multiple sex partners<sup>13</sup>.

Among the STDs, urethritis (gonococcal and nongonococcal) is the most frequently reported STD in men attending STD clinics<sup>14</sup>. Information on the prevalence of STDs and high risk behaviors of any target population is a pre-requisite for health care planning and interventions. Several studies conducted elsewhere have reported the prevalence and associated risk factors for urethritis<sup>15,16</sup>. However, no definitive research had been reported from within Pakistan's prison system, despite the fact that prisons have high background rate of STDs, because of prevailing high-risk behaviours among inmates. Only one study has reported 21% prevalence of urethritis, but there is paucity of documented data describing risk behaviours associated with urethritis. The objective of the present investigation, therefore, was to characterize the relationship of drug use and risky sexual behaviors with urethritis in prison inmates population of Sindh.

## **Methods**

### **Study Subjects and Data Collection**

The study setting and sampling technique used to select the study population has been described elsewhere. Briefly, 3395 male prison inmates were included in the present analysis. They were selected using one-in-three systematic random sampling technique from among 10600, Inc., Chicago, IL, USA).

## **Results**

The prison inmates in the study sample (n = 3395) were evenly distributed in four quartiles of age, duration of imprisonment and two main ethnic groups i.e., Urdu and Sindhi speaking. Fifty percent of the inmates had no formal school education and were nearly in equal proportions of ever married and never married groups (Table 1).

**Table 1. Baseline characteristics of prison inmates recorded during a cross-sectional study of urethritis, Sindh, July, 1994 (n = 3395).**

Variable	n	%
<b>Demographic variables</b>		
Age (years)*		
<23	846	24.9
23-26	686	20.2
26-33	1006	29.6
33+	857	25.2
Duration of imprisonment (months)*,**		
<3	843	24.8
3-9	846	24.9
9-24	841	24.8
24+	845	24.9
Education (# of school years)*		
0	1711	50.4
1-5	416	12.3
6-10	916	27.0
>10	352	10.4
Ethnicity (mother tongue)		
Urdu	1659	48.9
Sindh	1687	49.7
Others	49	1.4
Marital status*		
Unmarried	1561	46.0
Married	1754	51.7
Separated/widow	80	2.4
Sexual risk behaviours		
Do you inject drug intravenously?		
No	3274	96.4
Yes	121	3.6
Do you share needles?		
No	3349	98.6
Yes	46	1.4
Do you have sexual intercourse with a female?		
No	1349	39.7
Yes	2046	60.3
Do you have sexual intercourse with more than one female?		
No	1791	52.8
Yes	1604	47.2
Do you have sexual intercourse with a prostitute?		
No	2503	73.7
Yes	892	26.3
Do you have sexual intercourse with a man?		
No	2496	73.5
Yes	899	26.3
Do you have sexual intercourse with more than one man?		
No	2695	79.4
Yes	700	20.6
Did You have sexual intercourse with a man prior to incarceration?		
No	2652	78.1
Yes	743	21.9
Did you have sexual intercourse with a man during this incarceration?		
No	3284	96.7
Yes	111	3.3
Do you think that any of your sexual partner has more than one sexual partners?		
No	2309	68.0
Yes	1086	32.0
Do you think that any of your sexual partners injects drugs?		
No	3322	97.8
Yes	73	2.2
How often do you use condom during sexual intercourse?		
Always/occasionally	243	7.2
Never	3152	92.8

\* = Decimals do not add up to zero due to rounding problem.

\*\* = Twenty inmates have incomplete data on duration of imprisonment.

The distribution (%) of various risk behaviours reported by inmates is also given in Table 1. The reported lifetime risk of urethritis in the study population was 20.8% (706/3395). Results of bivariate analyses (Table 2),

**Table 2. Frequency distribution, bivariate odds ratio and their associated 95% confidence limits of demographic, sexual risk behaviours from a cross-sectional study of lifetime risk of urethritis among prison inmates, Sindh, July, 1994 (n = 3395).**

Variable	Number % of inmates		Total	P value	Odds ratio	
	Urethritis affected				Point estimate	95% confidence limits
<b>Demographic variables</b>						
<b>Age (months)</b>						
<23	154	53.5	846	0.016	1.00	-
23-26	153	46.9	686		1.29	1.00, 1.66
26-33	236	43.4	1006		1.38	1.10, 1.73
>33	163	56.1	857		1.06	0.83, 1.35
<b>Ethnicity (mother tongue)</b>						
Urdu	307	18.5	1659	0.005	1.00	-
Sindhi	389	23.1	1687		1.32	1.12, 1.56
Others	10	20.4	49		1.13	0.56, 2.29
<b>Education (years in school)</b>						
0	355	20.7	1711	0.948	1.00	-
1-4	91	21.9	416		1.07	0.82, 1.39
5-10	188	20.5	916		0.99	0.81, 1.20
1-4	72	20.5	352		0.98	0.74, 1.31
<b>Marital status</b>						
Unmarried	316	20.2	1561	0.285	1.00	-
Married	368	21.0	1754		1.05	0.88, 1.24
Separated/widowed	22	27.5	80		1.49	0.90, 2.48
<b>Duration of imprisonment (months)</b>						
<3	149	17.7	843	<0.001	1.00	-
3-9	169	20.0	846		1.16	0.91, 1.48
9-24	181	21.5	841		1.28	1.00, 1.63
>24	206	24.4	845		1.50	1.19, 1.90
<b>Sexual risk behaviours</b>						
<b>Do you inject drug intravenously?</b>						
No	675	20.6	3274	0.183	1.00	-
Yes	31	25.6	121		1.33	0.87, 1.01
<b>Do you share needles?</b>						
No	696	20.8	3349	0.874	1.00	-
Yes	10	21.7	46		1.06	0.52, 2.14
<b>Do you have sexual intercourse with a female?</b>						
No	120	8.9	1349	<0.001	1.00	-
Yes	586	28.6	2046		4.11	3.33, 5.07
<b>Do you have sexual intercourse with more than one female?</b>						
No	203	11.3	1791	<0.001	1.00	-
Yes	503	31.4	1604		3.57	2.98, 4.28
<b>Do you have sexual intercourse with a prostitute?</b>						
No	381	15.2	2503	<0.001	1.00	-
Yes	325	36.6	892		3.19	2.68, 3.80
<b>Do you have sexual intercourse with a man?</b>						
No	361	14.5	2496	<0.001	1.00	-
Yes	345	38.6	899		3.68	3.09, 4.38
<b>Do you have sexual intercourse with more than one man?</b>						
No	424	15.7	2695	<0.001	1.00	-
Yes	282	40.3	700		3.61	3.01, 4.34
<b>Did you have sexual intercourse with a man prior to incarceration?</b>						
No	413	15.6	2652	<0.001	1.00	-
Yes	293	39.4	743		3.52	2.95, 4.23
<b>Did you have sexual intercourse with a man during current incarceration?</b>						
No	654	19.9	3284	<0.001	1.00	-
Yes	503	31.4	111		3.54	2.42, 5.20
<b>Do you think that any of your sexual partner has more than one sexual partners?</b>						
No	331	14.3	2309	<0.001	1.00	-
Yes	375	34.5	1086		3.15	2.66, 3.74
<b>Do you think that any of your sexual partners injects drugs?</b>						
No	668	20.1	3322	<0.001	1.00	-
Yes	38	52.1	73		4.31	2.70, 6.88
<b>How often do you use condom during sexual intercourse?</b>						
A/O	62	25.5	243	0.060	1.00	-
Never	503	31.4	1604		0.75	0.56, 1.01

\* P value = Probability value associated with  $\chi^2$  statistics computed for the test of homogeneity.

\*\* Twenty inmates have incomplete data on duration of imprisonment.

\*\*\* A/O = Always/Never.

showed that urethritis-affected inmates tended to be 23-33 years old ( $P = 0.016$ ), Sindhi speaking ( $P = 0.005$ ) and were incarcerated for more than 9 months ( $P < 0.005$ ). None of the two injecting drug use variables (i.e., Do you inject drugs intravenously? Do you share needles?) were related with the lifetime risk of urethritis. All other risk behaviours including promiscuous heterosexual contacts, male-

to-male sexual contact, knowledge of risk behaviours of sexual partners and use of condom were significantly ( $P < 0.001$ ) related to lifetime risk of urethritis in inmates in bivariate analysis.

**Multivariable logistic regression model**

The final model (Table 3)

**Table 3. Multivariable logistic regression model for risk factors associated with lifetime risk of urethritis occurrence among prisons' inmates, Sindh, July, 1994, (n = 3375)\*.**

Variable	b**	Se**	Adjusted odds ratio	
			point estimate	95% confidence limits
Do you have sexual intercourse with a female?				
No			1.00	-
Yes	0.777	0.156	2.18	1.60, 2.95
Do you have sexual intercourse with more than one female?				
No			1.00	-
Yes	0.513	0.135	1.67	1.28, 2.18
Do you have sexual intercourse with a man?				
No			1.00	-
Yes	1.013	0.093	2.75	2.29, 3.31
Constant	-2.507			

Hosmer-Lemeshow  $\chi^2 = 2.831$  (df = 5, P value = 0.726)

\* Twenty of the inmates had missing observations on duration of imprisonment, therefore, sample size reduced to 3375 for multivariable model.

\*\* b = Partial logistic regression coefficient, Se = standard error of b.

indicates that risk behaviours associated with the lifetime risk of urethritis occurrence in this population were 'sexual intercourse with a female' (adjusted OR = 1.67; 95% CI 1.60, 2.95), 'multiple female sexual partners' (adjusted OR 1.67; 95% CI 1.28, 2.18) and 'sexual intercourse with a man' (adjusted OR = 2.75; 95% CI 2.29, 3.31). The Hosmer-Lemeshow goodness-of-fit test demonstrated an adequate model fit (Hosmer-Lemeshow  $\chi^2 = 2.87$ ,  $df = 5$ , P value 0.726).

## **Discussion**

### **Prevalence of sexual risk behaviours**

Male prison inmates place themselves at risk of acquisition of STDs, including gonococcal/non-gonococcal urethritis by engaging in unsafe sexual practices<sup>23</sup>. The proportion of inmates who had more than one lifetime sexual partners and had sex with commercial sex workers ranged from 26-60%. Also, the inmates who admitted to various aspects of male-to-male sexual contact during their lifetime up to present age ranged from 20-26%, which is consistent with reports on prison inmates from other parts of the world. However, inmates who had had sex during present incarceration was only 3.3%, a proportion that differed from the earlier findings<sup>24,25</sup>, that up to 17-30% inmates indulge in homosexuality during imprisonment. Prevalence of drug related behaviours such as injecting male prisoners incarcerated in judicial custody as indicted criminals in 14 prisons of Sindh during July, 1994. The subjects interviewed comprised mainly two self-identified ethnic groups. The subgroups were identified based on their mother-tongue i.e., Sindhi, Urdu. However, a small proportion also comprised other ethnic groups. Inmates were eligible to participate in the study, if they spoke Urdu, being a national language. Because of the varying literacy levels of the prison inmates, a structured risk behaviour interview was administered to each study subject in confidence by trained research interviewer in a private area within the prison. The interview focused on seeking information on demographic, sexual and drug use behaviours during the subject's lifetime up to his present age. The questions on sexual behavior solicited information on number and type of sex partners, homosexuality both before and after incarceration, condom use and illicit drug use. Inmates were asked, if they had painful purulent urethral discharge in the past (lifetime risk of urethritis occurrence i.e. if the respondent ever had this condition up to his present age). The question concerning the past history of urethritis was phrased to deliver a concise description of the common signs and symptoms associated with gonococcal and non-gonococcal urethritis<sup>17-19</sup>. Specifically, the question asked was: have you ever had a painful, purulent urethral discharge a few days after sexual intercourse?

### **Ethics and Confidentiality**

Informed verbal consent of each study subject was sought and to ensure frank and complete answers, they were assured about complete confidentiality of all interview questionnaire responses. This study was approved by the Institutional Committee for Human Subjects Protection.

### **Data Analysis**

For all analysis, the dependent variable, lifetime risk of urethritis occurrence had two categories: ever affected and never affected. We categorized the continuous variables such as age and duration of imprisonment into quartiles to reduce the influence of outliers. Frequencies (%) of demographic variables and sexual behaviours were computed<sup>20</sup>. The relationship between the dependent variable and the independent variables was examined by using two-way and multi-way contingency comparisons; the  $\chi^2$  test was used to compare proportions<sup>21</sup>. The crude measure of association between a single putative risk factor and inmates urethritis status was expressed as the odds ratio (OR) and the corresponding 95% confidence intervals (CI) was derived by means of first-order Taylor series approximations method<sup>20</sup>.

A multivariable logistic regression model was used to estimate the effect of each variable on the

lifetime risk of urethritis adjusting for the effects of other variables in the model. For multivariate analysis, a full model was specified with all independent variables significantly ( $P < 0.001$ ) related with outcome variable in univariate analysis.

Backward stepwise multiple logistic regression analysis was carried out to arrive at the final multivariable model relating the variables simultaneously to the lifetime risk of urethritis occurrence<sup>22</sup>. In addition to significant ( $P < 0.001$ ) main effects, identified through univariable analysis, some interaction terms were considered for possible inclusion in the final model. Selection of the final model was based on parsimony, biological interpretability and statistical significance. The parameters of the logistic regression model were estimated by the maximum-likelihood method. The adjusted odds ratios (ORs) and their 95% confidence interval (CIs) were computed using the estimates of parameters of final logistic regression model and were the main focus for substantive interpretation of the model. In all the analyses 5% significance level ( $\alpha = 0.05$ ) was used unless stated otherwise. All the analyses were carried out using SPSS/PC windows version 7.5 (SPSS drugs and sharing needles was 1.4% and 3.6% respectively and comparatively far below than what was reported from prisons of some other countries<sup>26-28</sup>, where 18% to 35% injecting drug users were found among prison inmates. The proportion of inmates who never used condom during sexual intercourse was 92.8%. This high proportion of non-users of condom in our sample is certainly a cause of concern and most likely reflects cultural aspects, since explicit information about condom use on electronic and print media is nearly unavailable.

### **Predictors of lifetime risk of urethritis**

Prison inmates are considered at high-risk for STDs including gonococcal/non-gonococcal urethritis. The lifetime risk of occurrence of urethritis among inmates in our study sample was 20.8%. The variables subjected to analysis were those, which we thought would adequately capture sexual behaviours potentially associated with lifetime risk of urethritis occurrence. The inmates who reported having had sex with a female or with more than one female were significantly more likely to report of having been affected with urethritis in their lifetime.

A high number of lifetime sexual partners is considered to be a major indicator of high risk sexual behaviour and is probably the most studied<sup>29</sup>, marker in measuring risk of acquiring STDs including urethritis. The present study confirmed the findings of previous studies<sup>13,16</sup>. These studies have reported that men having multiple sex partners and/or sex with commercial sex workers were more likely to have all types of urethritis. The consistency of our findings with our expectation and prior studies provides some assurance that our database and analysis are valid.

The inmates who reported to have had male-to-male sexual intercourse were nearly three times more likely to report of being affected with urethritis in their lifetime. The findings of high lifetime risk of urethritis among inmates having male-to-male sexual intercourse coincide with the results of previous studies<sup>30-32</sup>. These studies reported that despite overall trends towards safer sex practices in bisexual men, they remain at high risk for STDs acquisition. For example *Neisseria gonorrhoea* was isolated in 11% homosexual men compared with 6% exclusively heterosexual men who attended the STD clinics during the same time period. In another study<sup>8</sup>, homosexual men were found at increased risk of urethritis and urinary tract infections due to coliform bacteria, presumably acquired during anal intercourse. We believe that homosexual men in the study group need to be counseled that this sexual practice carries a risk of acquiring STDs for the receptive partner and urethritis by the insertive partner. Our study had several limitations that must be considered in the interpretation of the findings. One limitation is our reliance on self-report for history of sexual behaviours. Self-report of past sexual behaviours, drug use and the characteristics of sex partners may be subject to recall bias and results and misclassification. In particular, drug use may be under-reported because of the issues related to social desirability or fear of negative repercussions, if this behaviour was reported. The extent of this or other information bias cannot be quantified and was beyond the scope of this study. Our study subjects were

a highly selected group and not representative of general population. This study was cross-sectional, therefore, cause-and-effect relationship is difficult to ascertain for the observed associations. Some of our findings were neither unexpected or new. However, multivariate logistic model did provide insight into risk behaviour profile of prison inmates, which affects the lifetime risk of urethritis, the syndromic assessment of a disease which is a consequence of many specific and non-specific infections. A population specific STD education/prevention program for the inmates in detention could have formidable impact on STDs control. Subsequently such a control program may help in subsiding the HIV/AIDS epidemic which is still at an early stage in this country, since improved sexually transmitted disease control program reduces HIV infection rates<sup>33</sup>. Also, our study subjects meet the characteristics of a core group of STDs transmitters described in literature<sup>34</sup> and provides short window of opportunity for STDs control programs to intervene through behaviour change, while they are in detention.

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