

## SELF-ASSESSED RISK OF BEING SEXUALLY INFECTED WITH HIV AND ITS INCIDENCE IN SINDH, PAKISTAN

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### ABSTRACT

Sexually transmitted diseases (STDs), including HIV, are a significant global public health concern. In Pakistan, high-risk groups experience high prevalence rates, yet public knowledge and awareness remain inadequate. This study aimed to analyze the self-assessed risk of being sexually infected with HIV and its incidence in Sindh, Pakistan. Using a nationally representative dataset, we examined self-reported vulnerability (categorized as 'high', 'intermediate', 'low', and 'none') and its association with demographic characteristics and risk factors. Statistical analysis, including ordered logistic regression, was used to model these relationships. The findings reveal a critical disconnect between knowledge and personal risk perception. Despite 74% of participants demonstrating good knowledge of HIV transmission, self-perceived vulnerability was low. Only 16.7% of respondents reported a 'high' chance of infection, while a considerable 13.3% perceived 'no risk at all.' A higher self-perceived risk was associated with a recent history of STIs and having multiple sexual partners. This low self-assessed vulnerability, despite high-risk behavior and good general knowledge, highlights a significant public health challenge. The study concludes that existing awareness campaigns are insufficient to translate knowledge into personal risk perception and behavioral change. To address this, there is an urgent need for targeted public health interventions, emphasizing comprehensive sexual education and ensuring accessible and affordable HIV prevention methods to bridge the gap between awareness and action.

**Keywords:** HIV, Sexually Transmitted Infections, Self-Assessed Risk, Sindh, Pakistan, Public Health, Awareness.

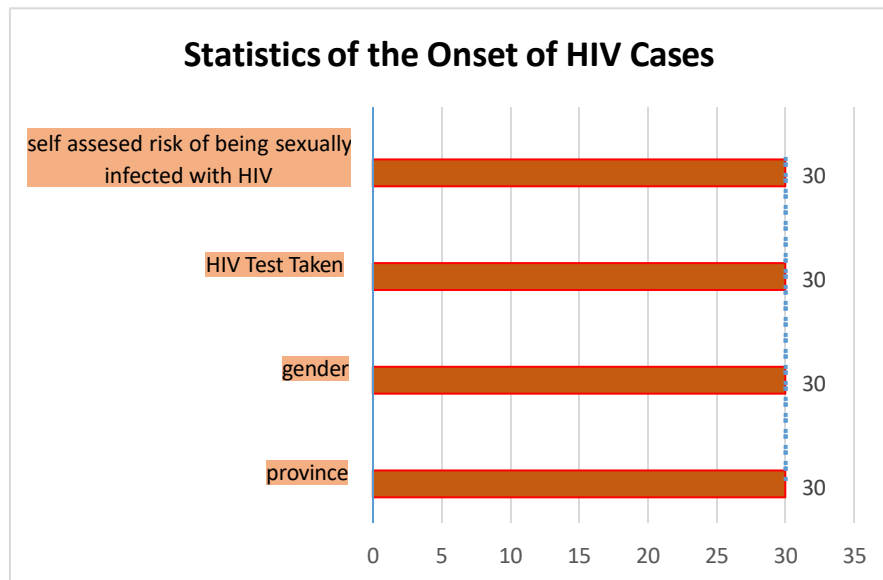
## INTRODUCTION

Sexually transmitted diseases (STDs) are a major public health concern of the 21st century, affecting more than one million population globally.<sup>1</sup> Although, sexually transmitted infections (STIs) have a high incidence rate and they also promote the risk of transmission of human immune-deficiency virus (HIV), less attention has been devoted to the control of STIs to reduce the risk of HIV transmission.<sup>2</sup> These STDs differ in their course and prognosis, as most STIs remain asymptomatic and do not progress while few of these infections result in life-long complications ranging from pelvic inflammatory disease (PID), infertility and carcinomas of the reproductive tract to oral cancers.<sup>3</sup> Regarding sexual and reproductive complications, STDs impose an additional risk of cancer, sterility, disability adjusted life years (DALYs) and mortality.<sup>4</sup> In addition, these diseases also wreak socioeconomic and psychological strains on economies and societies. Globally, 12 million people are reported to be affected by STDs annually. In a study conducted, the prevalence of STDs was found to be 4.4% in Pakistani males. The incidence of sexually-acquired infections (SAIs) was as high as 60%

and 36% among eunuchs and commercial sex workers respectively.<sup>6</sup> Likewise, the prevalence rates of STIs in males residing in urban areas. Also indicated by the Pakistan Demographic and Health Survey (PDHS) 2012-13,<sup>9</sup> a negligible proportion of the population comprising about 2% females and 0.4% males reported having contacted an STI in the preceding 12 months, while PDHS 2017-18 reported the knowledge of HIV as an STI only, where the knowledge levels were 23% and 67% among females and males respectively.<sup>10</sup> Despite high prevalence STI rates in the community, knowledge and awareness levels of the population have remained inadequate over the years. On the global level, the Sustainable Development Goals (SDGs) emphasize the need for dissemination of comprehensive sexual and reproductive health services to render strategies aimed at controlling and effectively preventing the prevalence of STDs. Without deviation, the prevention and control of STDs have the potential to influence and improve the other SDGs, including reduction in child and neonatal mortality (SDG 3.2), the end of acquired immune-deficiency syndrome (AIDS) and other communicable diseases epidemics.

### Statistics

	province	gender	HIV Test Taken	self assesed risk of being sexually infected with HIV
<b>Valid</b>	30	30	30	30
<b>Missing</b>	0	0	0	0



### INCIDENCE OF HIV TEST TAKEN AND SELF-ASSESSMENT IN EACH PROVINCE OF PAKISTAN

The HIV epidemic in Pakistan has been predominantly concentrated in adults among groups with high-risk behavior such as people who inject drugs (PWID), men who have sex with men, transgender and sex workers. An estimated 160 000 people were living with HIV in Pakistan.

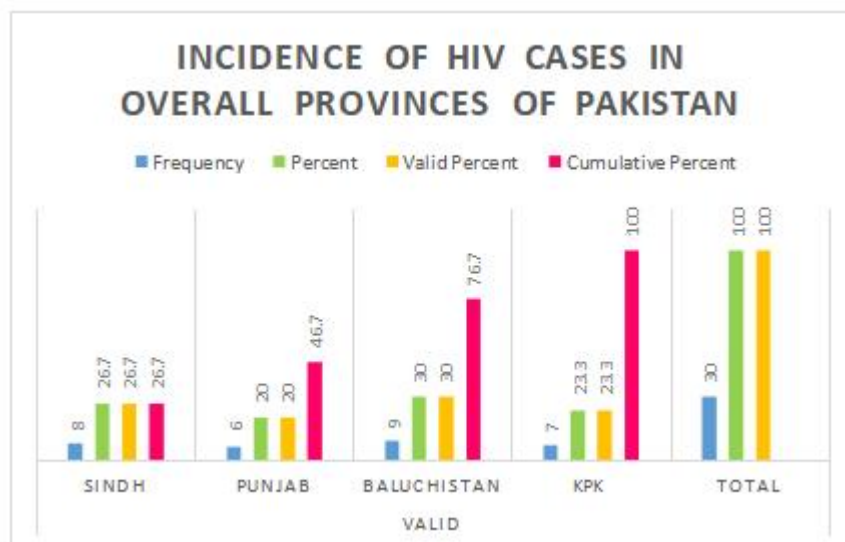
Highlighting District Larkana in the Sindh province of Pakistan diagnosed with HIV, based on clinical suspicion. As part of the response, the federal and provincial established an HIV screening camp at Tehsil Hospital Ratodero, a public-sector hospital, with voluntary counselling and testing offered to any individual attending the camp regardless of age HIV had been identified (personal communication: Sindh AIDS Control Program (SACP)). Although there have been several HIV outbreaks over the past two decades, none has ever been so large nor significantly affected children.

The scale of the outbreak and the age of the individuals affected by the outbreak raise important questions about the epidemiology of

HIV infection and the mode of transmission of HIV infection. The most widely accepted cause of this outbreak is thought to be the reuse of needles by health practitioners and transfusion of contaminated blood products. Nosocomial outbreaks of HIV infection have previously been reported in Pakistan and other countries, but have mostly been related to a specific health facility and have not been at this scale. In a report of the outbreak, we reported that the proportion of infants with an HIV-positive mother was significantly higher than that among older children, implying that vertical transmission may have contributed to transmission. Although there has been an unexpectedly high number of pediatric HIV diagnoses, it is by no means certain that the acquisition of infection by children was recent or from one source. It is possible that transmission of HIV may have been ongoing in the community for some time and the increased detection may be a consequence of the vigorous screening efforts implemented by the provincial AIDS Control Program in response to the initial diagnoses. Thus, this 'outbreak' may be an indicator of the bridging of the concentrated

HIV epidemic in key populations into the general population  
PROVINCE

	Frequency	Percent	Valid Percent	Cumulative Percent
Sindh	8	26.7	26.7	26.7
Punjab	6	20.0	20.0	46.7
Baluchistan	9	30.0	30.0	76.7
KPK	7	23.3	23.3	100.0
Total	30	100.0	100.0	



#### HIV TEST TAKEN AMONG SUBJECTS

Baseline data and outcome data were summarized separately. For continuous variables, we examined the distribution of the observations; if normally distributed we summarized as means and standard deviations (SDs). If the variables were not normally distributed, we calculated medians and interquartile ranges. For discrete variables, numbers and percentages were reported. We calculated the prevalence of different type of violence in HIV-positive participants and 95% confidence interval (CI) with Epi Info, version 6.04.

To evaluate the association between different types of violence in HIV-positive participants and

demographic characteristics and HIV-related factors, the chi-squared test was used. We did univariate and multivariate logistic regression analyses to identify the variables associated with violence. The analyses were performed using SPSS, version 19. Participation in the interview was on voluntary basis. Respondents were provided with an informed consent form, to sign or put their thumbprint on. In view of the sensitive nature of the study, the data collectors were trained and approached the patients with the help of doctors working in the clinic. This helped to develop rapport between the data collectors and the participants and kept the patients at ease.

Patient safety and confidentiality were ensured.

## **SPECIMEN COLLECTION AND TRANSPORTATION**

Blood will be collected from participants in EDTA and gel top tubes (total volume 3–5 mL) labelled with the study ID number and packed in a Biohazard Zip-lock Bag. Blood samples will be maintained in an upright position at 2°C–4°C with frozen ice packs and transported within 6–8 hours to the Aga Khan University (AKU) Infectious Disease Research Laboratory (IDRL) in Matiari (an AKU satellite research laboratory in Sindh) where the sample condition (temperature and evidence of leakage) will be checked and the sample details will be confirmed with those on the accompanying laboratory form. Samples will subsequently be dispatched daily to AKU in Karachi. Hepatitis B and C serology and viral lineage studies will be performed at the IDRL and the Department of Basic Biological Sciences at AKU respectively.

## **VIRAL LINEAGE AND DRUG RESISTANCE STUDIES**

Viral nucleic acid will be extracted from the blood sample of cases using commercially available kits (Qiagen) following the manufacturer's instructions, and the Gag-Pol region of the HIV genome will be amplified by PCR using previously optimized protocols. The amp icons will be purified and undergo Sanger sequencing (Macrogen, Korea). The sequences will be edited, the HIV subtype determined and the phylogenetic relationship between different HIV subtypes will be analyzed.

## **GEOSPATIAL DATA**

GPS coordinates of the households of participants will be obtained and recorded using smartphones. Location data of all known local government and private health facilities including hospitals, primary healthcare clinics, local laboratories, local blood banks, informal healthcare providers/pharmacists, local barbers

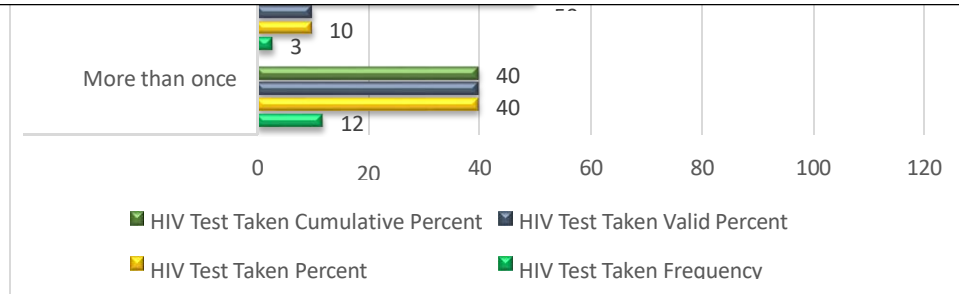
and body piercing outlets in the town and surrounding area will be collected

## **DATA MANAGEMENT**

Data will be collected on paper forms and each completed data form will be checked by the field supervisor for missing or incorrect data prior to data entry. Data will be double entered into a password-protected database (Visual FoxPro V.9.0). Data cleaning will include range checks and checks for missing values and the final cleaned dataset will be identified for analysis. Where possible, the transmission of data through email will be avoided and a secure file transfer server will be used to transmit the data. Data files will be de identified with unique study identifiers (study IDs) incorporated. All electronic files will be password protected. Data will be backed up on a server (with weekly offsite backup) and paper forms will be stored in locked cabinets for 3 years after study completion. Passwords will be assigned to all machines storing data and only accessible to authorized personnel. GPS data will be collected using mobile phone devices that will be stored securely during the study. All GPS data will be deleted from devices after entry on to data forms.

**HIV TEST TAKEN**

	Frequency	Percent	Valid Percent	Cumulative Percent
Once	12	40.0	40.0	40.0
More than once	3	10.0	10.0	50.0
Valid				
Never	15	50.0	50.0	100.0
Total	30	100.0	100.0	



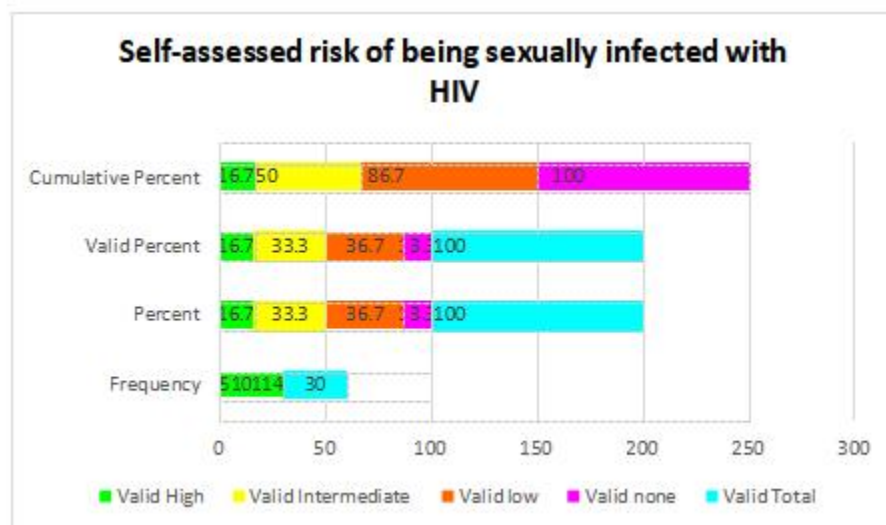
**SELF-ASSESSED RISK OF BEING SEXUALLY INFECTED WITH HIV**

Globally, individuals' self-assessment of vulnerability to HIV infection is important to maintain safer sexual behavior and reduce risky behaviors. However, determinants of self-perceived risk of HIV infection are not well documented and differ. We explored a recent nationally representative data with self-reported vulnerability ('high', 'low' and 'no risk at all') to HIV infection as the outcome of interest. Data were weighted and association between the outcomes and the risk factors determined. We used simple ordered logit regression to model relationship between the outcome variable and risk factors, and controlled for the significant variables. About 74% had good knowledge of HIV transmission and 30% had experienced STI recently. The likelihood of assessing oneself as having 'no risk at all' was 13.3% and for 'high chances' was 16.7%. Self-perceived high risk of HIV was higher among those who recently experienced STI (5%) than those who did not

(4%), and also higher among those who recently engaged in transactional sex and had multiple sexual partners.

**SELF-ASSESSED RISK OF BEING SEXUALLY INFECTED WITH HIV**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High	5	16.7	16.7
	Intermediate	10	33.3	50.0
	low	11	36.7	86.7
	none	4	13.3	100.0
	Total	30	100.0	100.0



**CONCLUSION**

High vulnerability to HIV infection was reported among genders on which Baluchistan was at the higher level among that. Most of the positive number of cases were reported there with history of STIS and those who engage in multiple sexual relations. Despite high level of risky sexual behavior and good knowledge of HIV transmission and prevention found in this study, and people had under gone with the self-assessment test that were taken for once and

more than once as well, self-perceived vulnerability to HIV generally is low for those who had never any test whereas intermediate level was reported as 50% and low level was reported as 86%. For the low perception found in this study to translate to low chance of HIV infection, there is need for all stakeholders and with the several provinces to embark on risk reduction initiatives through sexual education that would minimize risky sexual practices and ensuring availability and affordability of HIV

prevention methods.

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