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SEXUAL RISK BEHAVIORS AND RISK OF HIV INFECTION AMONG ADULT MALE IN NEPAL



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HEL 3950

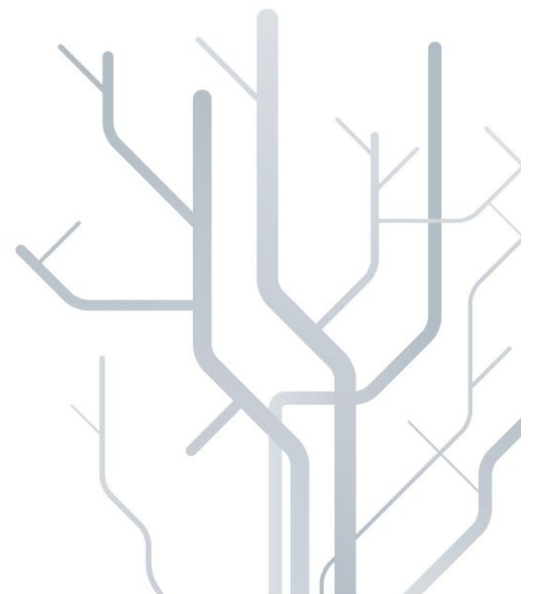
Master's Thesis in Public Health

May, 2013

Supervisor: Ranjan Parajuli, MD, MIH

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ABSTRACT

Background: The HIV infection among adult male is high in Nepal. The chances of HIV infection from heterosexual route and infecting close partners are high due to their risky sexual behaviors. This study aimed to assess the risk of HIV Infection and risk factors associated with high risk of HIV infection among adult male in Nepal.

Methodology: An analytical cross-sectional study was conducted from the data of Nepal Demographic and Health Survey 2011. Out of 4121 adult men aged between (15-49) years interviewed in the survey, 2837 who had at least one sexual experience was included in the study. The risk of HIV infection was calculated using two sexual risk behaviors; multiple sex partners in last 12 months and condom used in last sexual intercourse. The univariate and multivariate analysis was done to assess the factors associated with high risk of HIV infection.

Results: About 4% of adult male have high risk of HIV infection in Nepal. The high risk of HIV infection was significantly associated with young age, middle wealth class, having paid for sex and being sexually active in last 4 weeks preceding the survey.

Conclusion: There was substantial high risk of HIV infection among adult male in Nepal. The high risk and its associated factors needed a comprehensive response in order to reduce the risk.

Key words: Risk of HIV, HIV infection, adult male, Nepal

TABLE OF CONTENTS

| | |
|--|---------------|
| ACKNOWLEDGEMENT..... | i |
| ABSTRACT..... | ii |
| TABLE OF CONTENTS..... | iii-iv |
| LIST OF TABLES..... | v |
| LIST OF FIGURES..... | v |
| LIST OF ANNEXES..... | v |
| LIST OF ABBREVIATIONS..... | vi |
| CHAPTER I | |
| INTRODUCTION..... | 1-7 |
| 1.1 General Background..... | 1 |
| 1.2 Global Scenario of HIV Epidemic | 1-2 |
| 1.3 Situation of HIV Epidemic in South Asia..... | 2-3 |
| 1.4 Country Profile, Nepal..... | 3-4 |
| 1.5 HIV Epidemic in Nepal..... | 4-6 |
| 1.6 Rationale of the study | 6 |
| 1.7 Purpose of Study..... | 7 |
| General Objectives..... | 7 |
| Specific objectives..... | 7 |
| CHAPTER II | |
| METHODOLOGY..... | 8-12 |
| 2.1 Data and methods..... | 8-9 |
| 2.2 Study design..... | 9 |
| 2.3 Study Variables..... | 9-11 |
| Outcome Variables..... | 9-10 |

| | |
|---|--------------|
| Independent Variables..... | 10-11 |
| 2.4 Study Population..... | 11 |
| 2.5 Study Area..... | 11 |
| 2.6 Data processing and statistical analysis..... | 11-12 |
| 2.7 Ethical Clearance..... | 12 |
| CHAPTER III | |
| RESULTS..... | 13-20 |
| 3.1 Socio-demographic characteristics of the adult male..... | 13-14 |
| 3.2 Sexual behaviours of the adult male..... | 15-16 |
| 3.3 Risk of HIV infection..... | 17 |
| 3.4 Association between risk of HIV infection and independent risk factors..... | 17-20 |
| CHAPTER IV | |
| DISCUSSIONS..... | 21-25 |
| STRENGTH AND LIMITATIONS..... | 25 |
| CHAPTER VI | |
| CONCLUSIONS AND RECOMMENDATIONS..... | 26-27 |
| REFERENCES..... | 28-35 |
| ANNEXES..... | 36-39 |

LIST OF TABLES

Table 1: Socio-demographic characteristics of adult male.....13

Table 2: Unadjusted and adjusted odds ratio, p-value and confidence interval (CI) for the association between risk of HIV infection and independent variables among adult male...17-18

LIST OF FIGURES

Figure 1: Ecological zone map of Nepal.....3

Figure 2: Multiple sex partners among adult male in last 12 months.....15

Figure 3: Condom use in last sex.....16

Figure 4: Risk of HIV infection among adult male.....17

LIST OF ANNEXES

Annex 1: Questionnaires related to this study.....36-38

Annex 2: Hosmer and Lemeshow test result39

LIST OF ABBREVIATIONS

| | | |
|--------|---|--|
| AIDS | - | Acquired Immunodeficiency Syndrome |
| ART | - | Anti Retroviral Treatment |
| CFSWs | - | Client of Female Sex Workers |
| CI | - | Confidence Interval |
| DOHS | - | Department of Health Services |
| EA | - | Enumeration Area |
| FSW | - | Female sex workers |
| HIV | - | Human Immunodeficiency Syndrome |
| IDU | - | Intravenous Drug Users |
| MOHP | - | Ministry of Health and Population |
| MSM | - | Men having Sex with men |
| NCASC | - | National Centre for AIDS and STD Control |
| NDHS | - | Nepal Demographic Health Survey |
| OR | - | Odds Ratio |
| PLWHA | - | People Living With HIV and AIDS |
| PMTCT | - | Prevention from Mother to Child Transmission |
| SPSS | - | Statistical Package for Social Sciences |
| STIs | - | Sexually Transmitted Infections |
| UN | - | United Nations |
| UNAIDS | - | Joint United Nation Programme on HIV/AIDS |
| VDC | - | Village Development Committee |
| WB | - | World Bank |
| WHO | - | World Health Organization |

CHAPTER I

INTRODUCTION

1.1 General Background

Human Immunodeficiency virus, commonly known as HIV infects the cells of human immune system and destroys them which later develop into an advanced condition called Acquired Immunodeficiency Syndrome (AIDS) [1, 2]. This condition declines the capacity of human body to fight against the diseases making person vulnerable to all kind of infections which may eventually lead to death. HIV is transmitted from one person to other through unprotected anal or vaginal sex, transfusion of contaminated blood and blood products, transplantation of contaminated body organs, sharing of contaminated needles. HIV can also be transmitted from mother to her infant during pregnancy, childbirth and breast feeding [1, 2].

The World Health Organization (WHO) has identified ‘heterosexual transmission’ as the most common route of HIV transmission throughout the world [3]. The major risky behaviors for heterosexual transmission of HIV are [2]:

- a) Not using condoms during sex with person having HIV
- b) Having sex with multiple partners

1.2 Global scenario of HIV Epidemic

HIV remains as one of the major threat to public health since last three decades claiming the lives of more than 25 million worldwide [4]. The United Nation revealed that there are 34 million People living with HIV (PLWHA) in the world at the end of the year 2011 which is 17% more than in 2001 [5, 6]. There were 2.7 million new infections globally in the year 2010 despite

various efforts to reduce HIV infections [5, 6]. The increased access to antiretroviral therapy in recent years has reduced AIDS related deaths which led to the increase in number of people living with HIV [6]. Furthermore, It has also been revealed that there is gradual decrease in number of new infections worldwide [5, 6]. The global percentage of adults (15-49 years) living with HIV is estimated to be 0.8 percent [5]. This age group is the most vulnerable age group as they constitute major human resources in terms of national productivity thus; HIV infection in this age group has a substantive negative impact on socioeconomic development of countries [7].

The sexual behavior patterns are changing worldwide with practices like later marriage, premarital sex and multiple sex partners. These changes in sexual behaviors are more prevalent among men than in women [8]. The developing countries are at more risk of HIV infection as these changes in sexual behaviors are more common among them. Similarly, low condom usage has further worsened the situation in many developing countries [8]. Some positive signs of changes in sexual behaviors have been observed in sub Saharan Africa and Caribbean which is linked with declines in HIV prevalence among young people of 15-24 years age group [9].

1.3 Situation of HIV Epidemic in South Asia

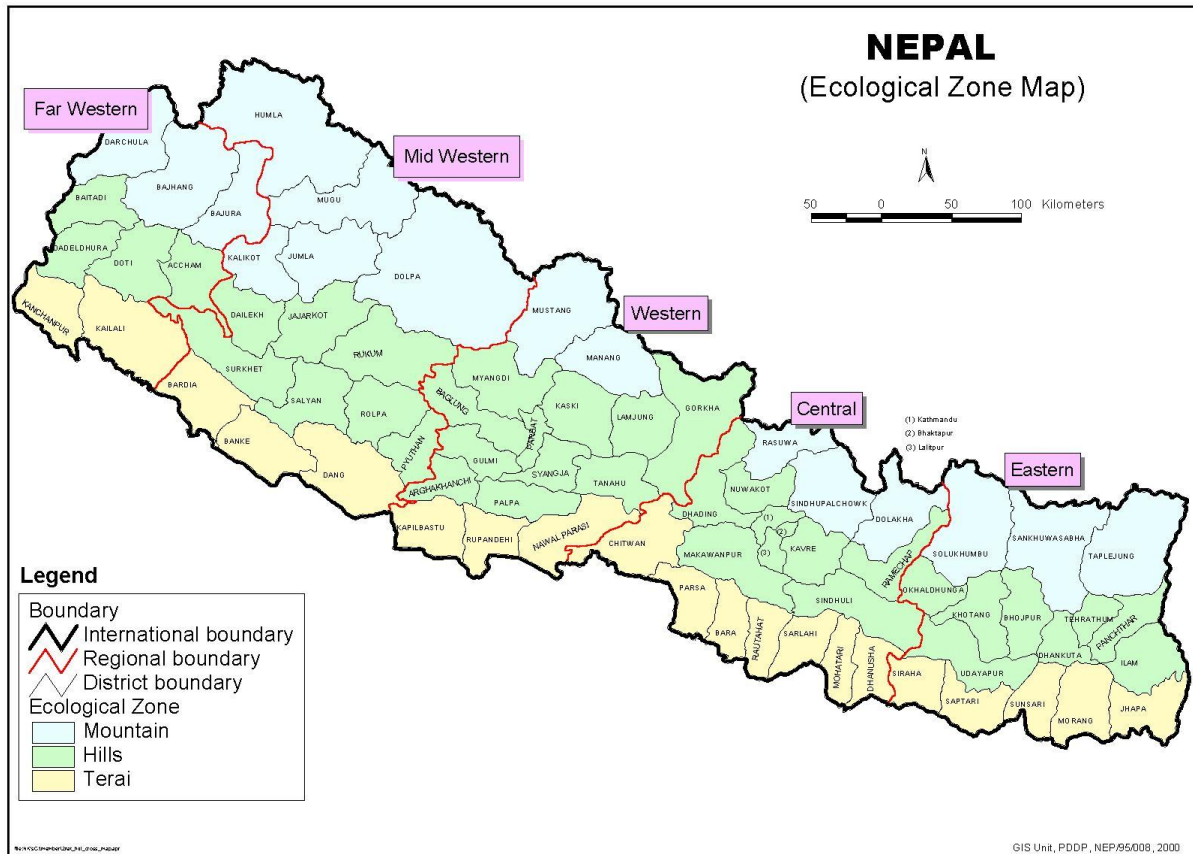
There are about 4.8 million people living with HIV in South Asia [6]. India is home to most of those living with HIV in Asia [10, 11]. The HIV epidemic in this region has low prevalence among general population and concentrated within high risk groups [10, 11]. The major portion of HIV transmission in South Asia is through heterosexual transmission [10]. The UNAIDS estimation shows that more than 90 percent of women living with HIV in Asia have been infected by their husband or long term intimate partners [12]. The epidemic in South Asia is

more among those with high risk behaviors such as paid sex, injecting drug use and sex between men [11].

1.4 Country profile: Nepal

Nepal is a small landlocked country in south asia located between two big countries India and China [13]. The figure 1 is map of Nepal showing ecological zones, five development regions and 75 districts.

Figure 1: Ecological zone map of Nepal



Nepal has population of about 26.5 million and more than 80% of them are living in rural areas [13, 14]. The per capita income in 2010 is about \$1210 [15]. It is ranked 157th on Human

Development Index out of 187 countries in 2012 [16]. The national living standard survey of 2010/2011 revealed that about 25% of population is poor [17]. The life expectancy of male is 67 years and that of female is 69 years [15]. The literacy rate is about 66 percent according to the census of 2011. However, female literacy rate is low in comparison to male literacy rate which is 57% and 75% respectively [18]. The government of Nepal is spending 5.5 percent of its total expenditure in health sector [15].

1.5 HIV Epidemic in Nepal

The HIV/AIDs in Nepal was first reported in 1988. Nepal had low prevalence of HIV in the initial years of epidemic but now has changed into concentrated epidemic among high risk population [19, 22, 23]. The ‘concentrated epidemic’ is the situation of epidemic in which any of the high risk groups have more than 5% prevalence over a time period while the prevalence among general adult population is lower than 1 percent [24].

The key population at higher risk of HIV prevalence are injecting drug users (IDUs), female sex workers(FSWs) , client of female sex workers(CFSWs), men having sex with men(MSM) and seasonal male labour migrants [21-23,25]. Among these higher risk groups, the male labour migrants visiting sex workers in India and client of FSWs are responsible for transmitting HIV to general population thus fueling the HIV epidemic in Nepal [23, 26]. The recent reports show that these higher risk groups accounted 58% of all HIV infections among adults [21, 23, 25]. Over 85% of HIV infections occurred through heterosexual transmission which is the most common mode of transmission of HIV in Nepal [26, 27].

The national estimation of 2012 revealed that approximately 50000 people are living with HIV and the estimated prevalence among adult population (15-49) to be 0.3 percent [26]. The adult

male population (15-49years) shared 58% of estimated HIV infections among adults whereas female population of reproductive age group (15-49 years) shared 28 percent [23, 28]. The latest cumulative data of HIV/AIDS from National Centre for AIDS and STD control shows that total of 20,583 cases of HIV have been diagnosed of which 64 % are among male population [27].

The government of Nepal launched the National AIDS prevention and control program against HIV/AIDS for the first time in 1988[19-21]. It also endorsed a national HIV/AIDS policy comprising important statements and supportive structures for national and district level response in 1995. Similarly, Nepal has formulated different strategic plans and policies during the past decades such as national policy on blood safety, strategic plan for HIV/AIDS prevention in response to epidemic. Furthermore, Nepal has incorporated the HIV/AIDS concerns in its long term and short term development programs [19, 20].

The different rounds of national HIV/AIDS strategic plans have been implemented in order to address the HIV epidemic in Nepal. The National HIV/AIDS Strategy (2011-2016) is the ongoing strategy guiding all the plans and policies in Nepal [21]. The programs on HIV have been supported by different multi-lateral and bilateral organizations along with local non-governmental organizations and community based organizations in Nepal. These organizations have provided technical support and financial assistance for health promotion, behavior change, prevention, care, support and anti retroviral treatment in Nepal [22]. All these collective efforts had resulted in the significant reduction of new HIV infections in the recent years [23]. Despite these positive signs, Nepal need to address the improvement in coverage of ongoing prevention interventions among high risk populations in order to meet the goal of halving the number of new infections by 50% by 2015 [23].

The services of HIV counseling and testing in Nepal are provided from 196 sites throughout the country and are free of cost. In order to provide ART services, 36 ART centers have been established [20, 21]. About 5800 people living with HIV were on antiretroviral treatment by July 2011 [21].

1.6 Rationale of the Study

The contemporary studies aimed at identifying and analyzing risk of HIV infection in Nepal particularly focus on most at risk population and women. These studies have not focused on 'general adult male' despite high percentage of HIV estimation and higher number of diagnosed cases among them. A study of risk of HIV infection among adult male population and associated factors holds potential to stimulate new discussions about prioritizing effective interventions and prevention programs for changing their risky sexual behaviors. Furthermore, identifying factors associated with risk of HIV infection in adult male population is necessary to prevent them from risky sexual behaviors fueling HIV epidemic in Nepal.

This study can address the information gap on risk of HIV due to risky sexual behaviors and factors involved in the high risk of HIV infection among general adult male. This will be helpful to the future researchers and organizations working in this sector. This study will be useful for the government and other non government organizations to review the ongoing plan and programmes in better response to HIV epidemic in Nepal.

1.7 Objectives of the study

General Objectives

The general objective of this study is to determine the risk of HIV infection among adult male of Nepal and find out its associated risk factors.

Specific Objectives

To determine the risk of HIV infection among adult male in Nepal.

To assess the association between risk factors and high risk of HIV infection.

Chapter II

METHODOLOGY

2.1 Data and methods

The data used in this study has been taken from Nepal demographic and health survey 2011 [14]. This is a nationally representative population based survey by Ministry of Health and Population (MoHP) of government of Nepal [14].

The sampling frame in the survey was updated form of the list of enumeration Areas (EA) with population and household information used by the Central Bureau of Statistics of Nepal for the 2001 population census. The 75 districts of Nepal were divided into Village development committees (VDCs) and municipalities. These VDCs and municipalities were further divided into wards. The wards were taken as Enumeration Areas (EA). However, larger wards of urban areas were divided into sub wards and these sub wards were taken as Enumeration Areas. The cross-section of 3 ecological zones and 5 development regions gives 15 eco-development regions which were referred as domains in the survey. The mountain zones of three development regions were merged into one domain having comparatively less population size thus, 13 domains were selected. These domains were stratified by separating them on the basis of urban and rural areas. The urban areas were oversampled to meet the national urban estimates, as most of the population in Nepal lives in rural areas [14].

The survey consisted of 25 sampling strata and sample selection was done through two stage stratified cluster sample process. Probability proportional to size strategy was followed in the first stage selecting 289 EAs comprising 95 urban and 194 rural EAs in 1:2 ratio. In the second

stage, 35 household in each urban EAs and 40 households in each rural EAs were selected randomly. The survey had collected data from 10826 households in which 12,674 women of reproductive age group (15-49) from selected households and 4121 men (age 15-49) from every second household who completed interviews [14].

2.2 Study Design

This was analytical cross-sectional study.

2.3 Study Variables

The operational definitions of outcome variable and all independent variables are described below. The questionnaires related to all variables including other used in this study are listed in annex.

Outcome Variable

Risk of HIV Infection- Risk of HIV infection was the outcome variable calculated by adding scores from two sexual risk behaviours which have very great role in determining the sexual transmission of HIV. They were:

Condom used during last sex -The condom used during last sex was scored '0' for using condom and '1' for not using condom. A score of '0' indicates low risk of HIV infection and the score '1' indicating high risk of HIV infection.

Multiple sex partners in last 12 months -The multiple sex partners in last 12 months was scored '0' if less than or equal to 1 partner and scored '1' for 2 and more partners. A score of '0' indicates low risk of HIV infection and the score '1' indicating high risk of HIV infection.

Thus, outcome variable 'Risk of HIV Infection' was produced by adding the scores for above two sexual risk behaviours. The score of 0 and 1 represents low risk and 2 represents high risk for HIV Infection. This variable was then recoded as '0' for low risk of HIV infection and as '1' for high risk of HIV infection [29-31].

Independent Variables

Age - This variable was classified into five years age group which was generated from the exact date of birth and month of respondent. This was recoded into three groups for analysis as: 1= (15-24), 2 = (25-34), 3 = (35 and above).

Education - This variable was coded from the respondent's educational level. The respondent having no education was coded for those not attending school and all others with their highest grade completed was coded accordingly. For the analysis this variable was recoded as: 0 = No education, 1 = Primary, 2 = Secondary and Higher.

Place of residence - This variable used to identify the type of place of residence (city, town or rural area) of respondents. This was coded as: 1 = Urban and 2 = Rural.

Wealth index - The wealth quintiles were divided from 1= poorest to 5= richest. These quintiles are generated from the household asset data. This was recoded as: 1= poor, 2 = middle, 3 = rich.

Current job - This variable was asked for the respondents to know if they were working or not. The variable was coded as: 0= Yes and 1= No.

Marital Status – This variable was used to know the union status of respondents. The variable was coded as 0= married/living with partner and 1 = unmarried/widowed /divorced/ separated/not in union.

Paid sex – This variable was used to know that respondents had paid for sex in last 12 months. This was coded as: 0 = No, and 1= Yes.

Sexual Activity – This variable was recorded from the sexual activities of the respondents in last 4 weeks of the survey. This variable was coded as: 0 = Not active in last 4 weeks and 1 = Active in last 4 weeks.

History of STI – This variable was asked to know if the respondents have any sexually transmitted infection in the last 12 months before the survey. The variable was coded as: 0 = No and 1 = Yes.

2.4 Study population

The study populations were the adult male having at least one sexual experience at the time of survey. Out of 4121 men of age group (15-49) interviewed in the survey, 3017 male who have at least one sexual experience were included in this study. Also, 180 respondents were excluded from the study for incomplete data on determinant of outcome variable. Thus, total study population used in the analysis was 2837.

2.5 Study Area and study period

The study area was Nepal. The data was collected in January 2011.

2.6 Data Processing and Statistical Analysis

The data of NDHS 2011 was analysed using the statistical package for social sciences (SPSS) version 16.0 software (SPSS Inc., Chicago, IL., USA). There were 2837 adult male included in the analysis for this study. The logistic regression analysis was used to assess the strength of

association between high risk of HIV infection and risk factors and was reported as odds ratio (OR) with 95% confidence interval (CI). The univariate logistic regression was performed using one variable in the model at a time in order to find the association between risk of HIV infection and each independent variable. Then, multivariate logistic regression was performed using all the independent variables at a time. The fitness of the final logistic model was tested using Hosmer and Lemeshow goodness of fit test. The Hosmer and Lemeshow test was not significant indicating that the logistic regression model fit the data ($C = 8.388$; $df = 8$; $p\text{-value} = 0.397$). The p value < 0.05 was considered as the criteria for statistically significant association and interpretation was done accordingly.

2.7 Ethical Clearance

The data was of open access and obtained on request from the MEASURE DHS. This anonymous data had no restrictions on use so no ethical clearance was required.

CHAPTER III

RESULTS

3.1 Socio demographic characteristics of adult male

Table 1: Socio-demographic characteristics of adult male (n = 2,837)

| Socio-demographic characteristics | Frequency (n = 2,837) | Percentage (%) |
|--------------------------------------|--------------------------|-------------------|
| Age Groups | | |
| 15-24 | 587 | 20.70 |
| 25-34 | 949 | 33.45 |
| 35 and above | 1301 | 45.85 |
| Place of Residence | | |
| Rural | 1961 | 69.12 |
| Urban | 876 | 30.88 |
| Education | | |
| No education | 444 | 15.65 |
| Primary | 693 | 24.43 |
| Secondary and Higher | 1700 | 59.92 |
| Wealth Index | | |
| Poor | 1013 | 35.70 |
| Middle | 531 | 18.72 |
| Rich | 1293 | 45.58 |
| Current Job | | |
| Yes | 2508 | 88.40 |
| No | 329 | 11.60 |
| Marital Status | | |
| Married/In union | 2595 | 91.47 |
| Unmarried/Not in union | 242 | 8.53 |
| History of STI | | |
| Yes | 3 | 0.10 |
| No | 2834 | 99.90 |
| Paid for sex (last 12 months) | | |
| Yes | 46 | 1.62 |
| No | 2791 | 98.38 |
| Sexual activity | | |
| Active | 2381 | 83.93 |
| Not active | 456 | 16.07 |

The socio-demographic characteristics of the 2837 respondents with the frequency and percentages are shown in the table 1. The above table shows that the age group (15-24) had lowest percentage of respondents (20.70%) whereas age group (35 and above) had highest percentage of adult male (45.85%). The majority of the adult i.e. 1961 (69.12%) were from rural areas of Nepal.

Most of the adult males (59.92%) have completed the secondary or higher education. However, almost 16% (444) of them had no education.

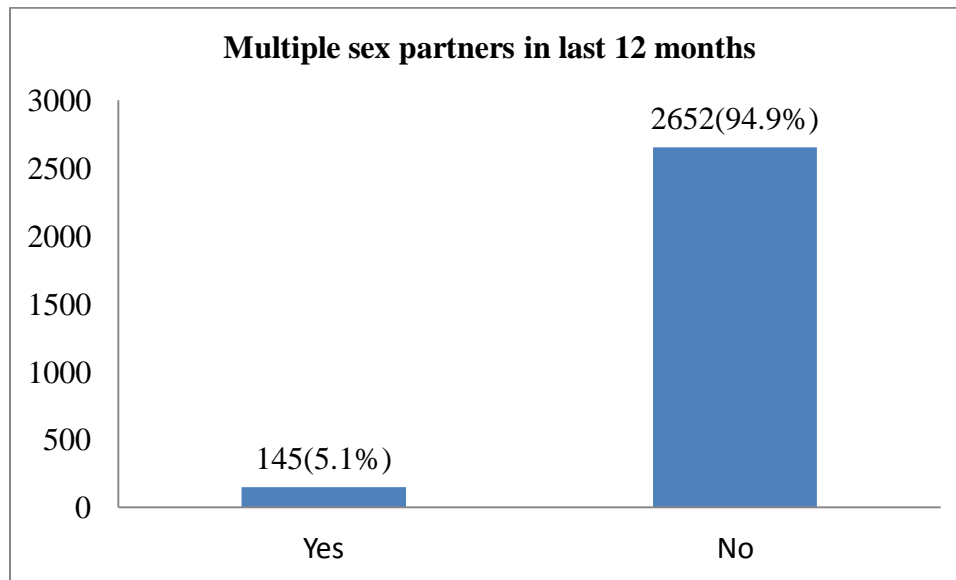
The table shows that about 46% of adult male were in rich wealth index followed by 35.70 % of poor wealth index and least were from the middle wealth index. Most of the adult (88.4%) were working whereas about 12% of them were jobless during the survey. Almost 92% of the adult were married or in any form of union whereas 8% were unmarried/divorced/separated/widowed or not in union.

Only few adults (3) had history of STI in a year before the survey. Among the adults, 1.62% (46) had paid for sex in last 12 months before the survey. Most of the adults (83.93%) were sexually active before one month from the survey.

3.2 Sexual behaviors of adult male in Nepal

3.2.1 Multiple sex partners in last 12 months (n = 2837), NDHS 2011

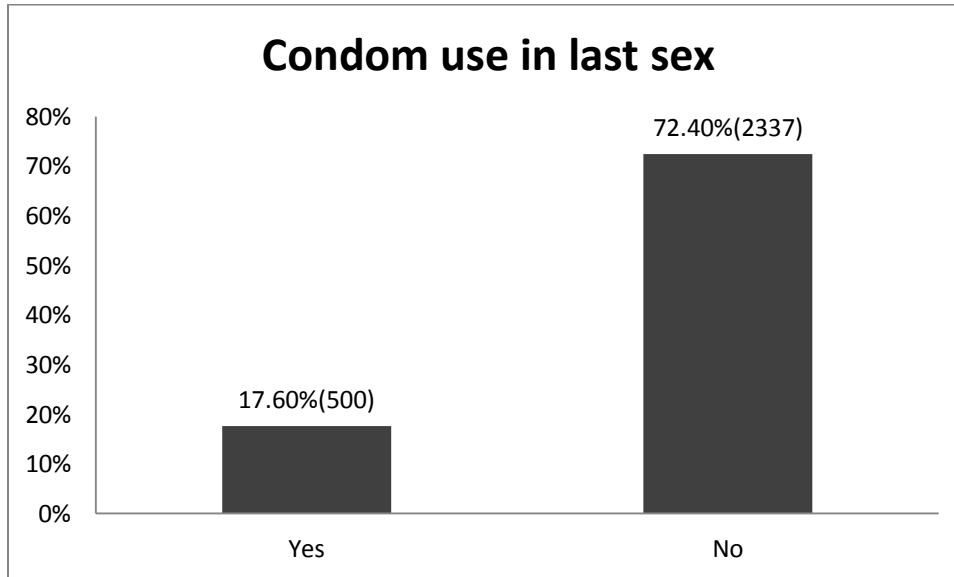
Figure 2: Multiple sex partners in last 12 months (n = 2837), NDHS 2011



The figure 2 shows the multiple sex partners among adult male in last 12 months. About 5% (145) of adult male have multiple sex partners in last 12 months before the survey.

3.2.2 Condom use in last sex among adult male (n= 2837), NDHS 2011.

Figure 3: Condom use in last sex among adult male (n= 2837), NDHS 2011.

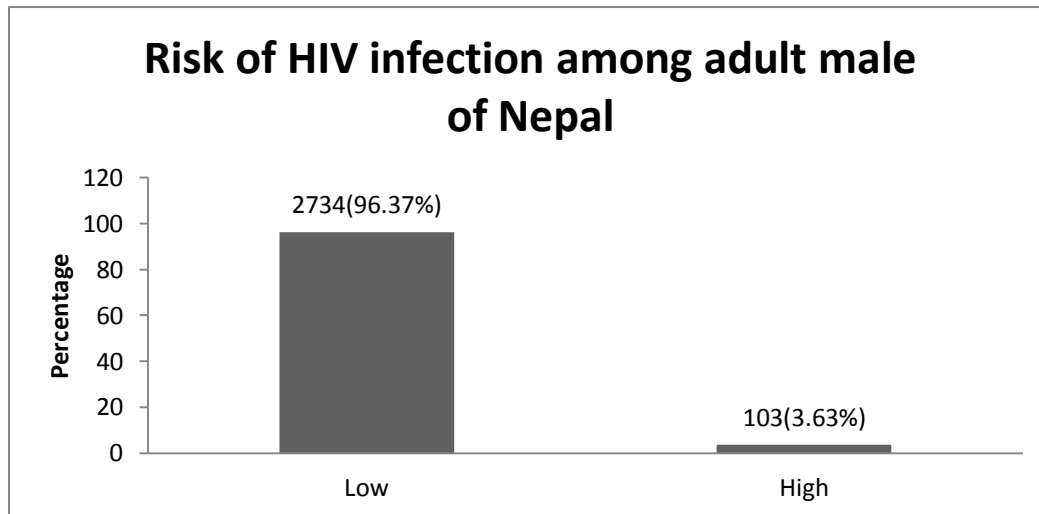


The figure 3 shows the percentage of adult male using condom in their last sex before the survey.

The adult male who did not use condom in their last sex were almost 72% which was about 4 times more than who used condom in their last sex.

3.3 Risk of HIV Infection

Figure 4: Risk of HIV Infection among adult male, (n = 2837)



The figure 4 shows that 3.63% (103) of adult males of Nepal were in high risk of HIV Infection compared to 96.37% (2734) of respondents who were in low risk.

3.4 Association between High Risk of HIV Infection and Independent risk factors

Table 2: Odds ratio, p-value and confidence interval (CI) for the association between Independent risk factors and high risk of HIV infection among male adults (n = 2837), (NDHS 2011).

| Independent variables | Risk of HIV | | Univariate | | Multivariate | |
|-----------------------|-------------|------|--------------------------|--------------|--------------------------|--------------|
| | Low | High | Odds Ratio (95% CI) | P Value | Odds Ratio (95% CI) | P Value |
| Age | | | | | | |
| 15-24 | 555 | 32 | 1(Ref.) | | 1(Ref.) | |
| 25-34 | 908 | 41 | 0.78(0.48 – 1.25) | 0.312 | 0.81(0.47 – 1.40) | 0.454 |
| >35 | 1271 | 30 | 0.40(0.24 – 0.68) | 0.001 | 0.45(0.25 – 0.81) | 0.008 |

Table 2 continued.....

| | | | | | | |
|---------------------------|------|-----|-----------------------------|--------------|---------------------------|--------------|
| Marital status | | | | | | |
| Married/union | 2509 | 86 | 1(Ref) | | 1(Ref) | |
| Unmarried/Not union | 225 | 17 | 2.20(1.28 – 3.77) | 0.004 | 1.88(0.84 - 4.20) | 0.125 |
| | | | | | | |
| Place of residence | | | | | | |
| Urban | 843 | 33 | 1(Ref.) | | 1(Ref.) | |
| Rural | 1891 | 70 | 0.94(0.62 – 1.44) | 0.795 | 1.02(0.62 – 1.66) | 0.947 |
| Education | | | | | | |
| No education | 425 | 19 | 1(Ref.) | | 1(Ref) | |
| Primary | 674 | 19 | 0.63(0.33 – 1.20) | 0.163 | 0.53(0.27 – 1.04) | 0.066 |
| Secondary & Higher | 1635 | 65 | 0.88(0.52 – 1.49) | 0.660 | 0.64(0.36 – 1.15) | 0.135 |
| Wealth index | | | | | | |
| Poor | 987 | 26 | 1(Ref.) | | 1(Ref.) | |
| Middle class | 502 | 29 | 2.19(1.27 – 3.76) | 0.004 | 2.26(1.29 – 3.95) | 0.004 |
| Rich | 1245 | 48 | 1.46(0.90 – 2.37) | 0.123 | 1.59(0.88 – 2.88) | 0.122 |
| Paid for sex | | | | | | |
| No | 2700 | 91 | 1(Ref.) | | 1(Ref) | |
| Yes | 34 | 12 | 10.47 (5.25 - 20.88) | 0.000 | 9.23(4.16 – 20.51) | 0.000 |
| Current job | | | | | | |
| Yes | 2421 | 87 | 1(Ref.) | | 1(Ref.) | |
| No | 313 | 16 | 1.42(0.82 – 2.45) | 0.206 | 1.31(0.72 – 2.36) | 0.374 |
| Sexual Activity | | | | | | |
| Not active | 444 | 12 | 1(Ref.) | | 1(Ref.) | |
| Active | 2290 | 91 | 1.47 (0.79 - 2.70) | 0.216 | 3.45(1.56 - 7.64) | 0.002 |
| History of STI | | | | | | |
| No | 2732 | 102 | 1(Ref.) | | 1(Ref.) | |
| Yes | 2 | 1 | 13.39 (1.20-148.89) | 0.035 | 2.25(1.12 – 43.52) | 0.590 |

(Ref) = Reference, 95% CI = 95% Confidence Interval, All significant P value's i.e. $P < 0.05$ is in bold letters.

The result of univariate and multivariate logistic regression analysis is shown in the above table

2. There was significant association observed (P value <0.05) between high risk of HIV infection and age, wealth index, sexual activity and paid for sex in multivariate analysis.

There was no significant association found in multivariate analysis between high risk of HIV infection and education, marital status, current job, place of residence and history of STI.

However, there was significant association found between high risk of HIV infection and marital status followed by history of STI in univariate analysis. Paid for sex, age and wealth were significantly associated with high risk of HIV infection in both models.

The high risk of HIV infection decreased by 55% in age group 35 and above compared to age group (15-24): (OR = 0.45; 95% CI: 0.25-0.81). The adult male of middle class wealth index had 2.26-fold increased high risk of HIV infection; (OR = 2.26; 95% CI: 1.29- 3.95) compared to the adult male of poor wealth index.

The adults who have paid for sex in last 12 months before the survey had 9.23 times high risk of HIV infection (OR = 9.23; 95% CI: 4.16 - 20.51) than those who had never paid anyone in exchange for sex. The adults who were sexually active in last month before the survey had 3.45 times increased high risk of HIV infection; (OR = 3.45; 95% CI: 1.56 - 7.64) than those who were sexually inactive in that period.

In univariate analysis, marital status was found to be significantly associated with the high risk of HIV infection. There was 2.2 fold increased in high risk of HIV infection among unmarried and not in union adult male than those who were married or in any form of union. However, marital status was not significantly associated in multivariate analysis.

There was significant association between history of STI and risk of HIV infection in univariate analysis. The adult male having history of STI was found to be 13.39 times increased high risk of HIV infection than those not having STI history. However, no significant association was observed in the multivariate analysis.

CHAPTER IV

DISCUSSION

The high risk of HIV infection was prevalent among 3.63% of adult male. About 5% of adult male have multiple sex partners in last 12 months and almost 72% of them did not use condom in last sex. The high risk of HIV infection was significantly associated with young age, middle wealth class, being sexually active and having paid for sex.

External validity

This study is the first study of its kind on risk of HIV infection among general adult male in Nepal. The sample was nationally representative population based survey [14]. This study can improve the understandings of risk of HIV among adult male which can be useful in planning HIV prevention programs. Thus, this study can also be the reference for the further studies intended to find the risk of HIV infection in Nepal.

Risk of HIV Infection

The risk of HIV infection among adult male due to risky sexual behaviors was 3.63%. Most of the adult male did not use condom in their last sex and about 5% of them had multiple sex partners in last 12 months preceding the survey. Low condom use among adult male might be due to lack of availability, having trust in sex partners, unplanned sex, young partner, influence of alcohol and interference with sexual pleasures [32]. The traditional societal role of adult male is going out of home for job opportunities and for other purposes which might be the reason for having multiple partners. Also many adult male migrate to other places within and outside countries for seasonal jobs which might have exposed them to multiple partners [22].

Independent Risk factors for high risk of HIV Infection

The adult males who were 35 years and above have low risk of HIV infection compared to younger age group (15-24). This scenario however, is different from the findings of a study in rural Tanzania which revealed that older age groups are at higher risk of HIV infection compared to younger age group (15-24) [33]. Similarly, another study done in national adult population in Kenya reported that those who were more than 25 years old were more likely to be in risk of HIV infection than those in the age group (15-19) [34]. This difference might be due to the different cultural context. For educational and job opportunities, young males stay outside home which might have increased the risk behavior of HIV infection among them. The result of this study quite varied with the overall national estimates of Nepal which estimated that higher infection is in the age group 25-49 [21]. This might be due to that this study only includes the adult male population and not the adult female population.

The adult males who were married or in union were in lower risk compared to unmarried or not in union but no significant association was established between marital status and high risk of HIV infection after adjusting other risk factors. The adjustment with other risk factors might have affected the association. This result was similar with a study in rural Tanzania [33].

However, the evidence from a study in South Africa found significant association between marital status and high risk of HIV infection [35]. A study done in India reported that the risk of HIV was associated with being divorced or widowed [36]. This might be due to the differences in methodological issues and study settings.

Education was not significantly associated with risk of HIV infection in this study but risk of HIV infection decreases as the level of education increases. A study done in Tanzania revealed

that the low education was significantly associated with higher risk of HIV infection [33]. Similar, result was observed in another study which was done in India where low education was significantly associated with high risk of HIV infection [36]. The study done in Brazil among blood donors also found that the low level of education were associated with high risk of HIV infection [37] However, a systematic review of developing countries revealed contradictory results showing higher educational status associated with high risk of HIV infection [38]. In this study, adjustment of other factors like wealth, age, sexual activity and paid sex might have affected the association between education and risk of HIV infection.

Socioeconomic status can make differences in our life choices and behaviours which can determine the risk of HIV infection [39]. Wealth index was found to be significantly associated in this study. In comparison to poor wealth index male the middle class male have almost twice high risk of HIV infection. This result is supported by the previous study done in Kenya among national adult population which reported that the middle class and richer wealth index groups have increased risk of HIV infection in comparison to poor [34]. This might be due to the reason that middle class people are opportunistic in nature and stay outside home for job and educational opportunities which might have increase the risk behaviors.

There was significant association between paid for sex and high risk of HIV infection. Those adult male who paid for sex have 9 times higher risk of HIV infection compared to those who had not paid for sex in last 12 months. A systematic review on sexual risk factors of HIV infection in sub Saharan Africa showed that the odds of infecting with HIV increased by almost 2 fold for those ever paid for sex than those never paid for sex in general population [40]. A study in Nepal among MSM also explored the significant association between involvement in paid sex and high risk of HIV infection [30]. The recent evidences from the sub Saharan

countries have shown that the unprotected paid sex was one of the significant factors responsible for HIV epidemics [9]. The adult males are the clients of female sex workers for paid sex which might have increased their risk of HIV infection.

The sexual activity of adult male was significantly associated with high risk of HIV infection. The adult males sexually active in a month before survey were 3.54 times more likely to be in high risk of HIV than those adults who were not sexually active in a month before survey. This might be obvious that those who have more sexual activities are in higher chances of risk of HIV infection than those who are not active. However, no such evidences have been found so far.

The risk of HIV infection doubled among adult male having history of STIs in comparison to those not having any history. However, the history of STIs was not associated significantly with high risk of HIV infection after adjustment with other variables in this study. A systematic review on heterosexual risk of HIV -1 infection per sexual act showed that the risk of HIV infection increased by 5 times among those having history of sexually transmitted infections [41].

Strengths and Limitations

The sample size used was relatively large to represent national adult male population. This study would probably give some insights in developing effective interventions programs to reduce the risk of HIV in Nepal.

There are some limitations of this study. This study could have been influenced by recall bias as the participants were interviewed for past sexual activities and conditions. The respondents may have hidden their past sexual activities and informations. This might have introduced information bias. Furthermore, the risk of HIV infection might have been affected by factors like regular and correct use of condom, types of partner i.e. either sex workers or other partners with low risk. These factors might have influenced this study. This is a cross sectional study therefore, causal relationships between independent and dependent variables (risk of HIV infection) cannot be established [42].

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The substantial population of adult males was found in high risk of HIV infection. The low condom usage and prevalent of multiple sex partners among them highlights the high risk of HIV infection. The risk factors associated with high risk of HIV infection were young age, middle wealth class, having paid for sex and being sexually active. This study identifies that the risk of HIV infection was higher among age group 15-24 than the age group 35 and above. The adult males of middle class wealth index have higher risk of HIV infection than that of poor class. The adult males who paid for sex and who were sexually active in last month before survey were linked with high risk of HIV infection. Thus, the situation signifies a clear need for intensified prevention efforts aimed at adult male and the associated factors need to be addressed to minimize the high risk of HIV infection in Nepal. Furthermore, larger studies are needed to explore more factors associated with the high risk of HIV infection.

Recommendations:

- The considerable percentage of adult male in high risk of HIV infection signifies that future prevention programs should more focused on the behavioral aspects of adult males.
- The younger age groups are in high risk of HIV infection than older age groups. Thus, integrated prevention approaches including knowledge of HIV, sexual education, risky sexual practices and access to reproductive health services should be started to protect them from HIV.

- Awareness raising programs on risky sexual behaviors should be intensified in the ongoing plans and programs in order to increase condom usage and reduce multiple sex partners.
- The effective behavioral change communication programs should be launched to target adult males involving in paid sex as they are more vulnerable to HIV.
- Further research should be done to assess the risk of HIV infection among adult male with high risk behaviors which can yield further more informations that can be worthy in response to HIV epidemic in Nepal.

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Annexes:

Annex 1: Man's Questionnaire for Nepal Demographic Health Survey 2011 (Questions related to the data used in this study)

103. How old were you at your last birthday? --- Age in completed years

105. What is the highest grade completed? --- Grade

(IF COMPLETED LESS THAN ONE GRADE, RECORD '00')

116. In the last 12 months have you been away from home community for more than one month at a time? ----- Yes.....1

No.....2

401. Are you currently married or living together with a woman as if married?

---- Yes, currently married.....1

Yes, living with a woman....2

No, not in union.....3

402. Have you ever been married or lived together with a woman as if married?

---- Yes, formerly married.....1

Yes, lived with a woman...2

No.....3

403. What is your marital status now: are you widowed, divorced, or separated?

---- Widowed.....1

Divorced.....2

Separated.....3

414. How old were you when you had sexual intercourse for the very first time?

Never had sexual intercourse.....'00'

Age in years

First time when started living with first wife/partner....95

416. When was the last time you had sexual intercourse?

Days ago:

Weeks ago:

Months ago:

Years ago:

418. The last time you had sexual intercourse, was a condom used?

Yes: ...1

No: ...2

427. In total with how many different people have you had sexual intercourse in last 12 months?

Number of partners in last 12 months:

Don't know: ...98

430. In the last 12 months, did you pay anyone in exchange for having sexual intercourse?

Yes:1

No:2

603. Have you done any work in last 12 months?

Yes:1

No:2

725. During the last 12 months have you had a disease which you got through sexual contact?

Yes:1

No:2

Don't know: ... 98

Annex 2: Results of Hosmer and Lemeshow test:

Hosmer and Lemeshow Test

| Step | Chi-square | df | Sig. |
|------|------------|----|------|
| 1 | 8.388 | 8 | .397 |

Contingency Table for Hosmer and Lemeshow Test

| | | RIskHIv infection = 0 | | RIskHIv infection = 1 | | Total |
|--------|----|-----------------------|----------|-----------------------|----------|-------|
| | | low | | high | | |
| | | Observed | Expected | Observed | Expected | |
| Step 1 | 1 | 330 | 331.742 | 5 | 3.258 | 335 |
| | 2 | 286 | 287.075 | 6 | 4.925 | 292 |
| | 3 | 239 | 240.407 | 7 | 5.593 | 246 |
| | 4 | 200 | 202.190 | 7 | 4.810 | 207 |
| | 5 | 289 | 287.716 | 6 | 7.284 | 295 |
| | 6 | 278 | 272.675 | 3 | 8.325 | 281 |
| | 7 | 260 | 261.470 | 11 | 9.530 | 271 |
| | 8 | 328 | 323.977 | 10 | 14.023 | 338 |
| | 9 | 297 | 295.915 | 15 | 16.085 | 312 |
| | 10 | 227 | 230.833 | 33 | 29.167 | 260 |

The chi-square goodness of fit for Hosmer and Lemeshow test was not significant indicating the appropriateness of the logistic regression model (C = 8.388; df = 8; p-value = 0.397).