International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2015): 78.96 | Impact Factor (2015): 6.391

Alcohol and Tobacco Use among the HIV/TB Co-Infected Individuals: A Case of Nepal

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Abstract: ***TB is the most common opportunistic infection among HIV infected individuals. Moreover, alcohol and tobacco use also facilitate to develop TB in patients with HIV. Both alcohol and tobacco use act as barrier to access preventive and therapeutic services of HIV/TB illness. The main objective of the study was to identify the effect of alcohol and tobacco use to access the health care services among HIV/TB co-infected individuals. Quantitative techniques were adopted to collect data in five districts (Jhapa, Morang, Sunsari, Parsa, and Kavre) of Nepal . The study was conducted over one year period from May 2015 to April 2016. During the period 343 samples were enrolled above the age of 18 or older, who had history of HIV/TB co-infection. Convenient and snowballing sampling methods were used to collect the data till the desired sample size was reached. Pretested questionnaire was used to gather socio-demographic characteristics (residence, age, sex, marital status, religion) and behavior pattern (alcohol and smoking consumption) of respondents. This research used liner regression analysis and ANOVA test association among categorical variables. The result shows that the demographic variables only explain 13.9 % of the variation use of tobacco smoking and 7.2 % of variation of consumption of alcohol among HIV/TB co-infected individuals. The findings of ANOVA showed that there was significance difference (p=0.029) between alcohol consumption and ART/DOTS non-adherence. The study revealed that the prevalence of alcohol and smoking consumption was found among study population and both contributes significant difference between ART/DOTS non-adherence.***

Keywords: Alcohol / tobacco use, HV/TB co-infection, ART/DOTS

1. Introduction

Tuberculosis (TB) is the most common opportunistic infection among *Human Immunodeficiency Virus* (HIV) infected individuals, as HIV infection weakens human immune system [17]. The emergence of HIV/TB co-epidemic poses diagnostic and therapeutic challenges tohealth care system and HIV/TB co-infection becomes serious public health problem especially in developing countries [2]. Moreover the prevalence of alcohol and tobacco use among People Living with HIV/AIDS (PLHIV) also facilitate this problem to be more complex. Many studies reveal that the heavy use of alcohol and tobacco can exert high incidence and prevalence of TB in community. In addition to this, the alcohol and tobacco use are not only associated with TB infection, but also considered in infectivity or reactivation of TB disease among the PLHIV [6] .

TB is considered as major challenge to Acquired Immune Deficiency Syndrome (AIDS) people. In Nepal, the problem of HIV/TB co-infection seems to a small but it is growing at alarming rate [9] . The various socio-economic factors , use of alcohol and tobacco smoking are playing vital role to develop active TB among PLHIV[6]. Several studies revealed that heavy alcohol and tobacco consumption usually finds to be strong predictor of poor treatment outcome of TB and considered one of the risk factor of developing MDR TB as well [13] . In addition to this, use of alcohol and tobacco is life threatening and wasting money of individuals and government of Nepal spends 16 million rupees annually for treatment of smoking related patient [12]. Therefore, cessation of tobacco and alcohol use would help to reduce health expenditure and promotion of health of who have HIV infection. The health worker also should initiate to identify the alcohol and tobacco user and counsel them to quit smoking and alcohol use while they are on DOTS and ART services [3].

Alcohol using and smoking becomes serious problem of parents and community people in Nepal. In fact, the data on tobacco and alcohol user among HIV/TB co-infected individuals in Nepal are not available. A survey revealed that overall current smoking prevalence was 27% of men and 10.3 % of women were current smoker; whereas more than 28.0 % of men and 71 % of women were current alcohol user [18]. However, government of Nepal subsequently banned smoking and tobacco use in public places [5] and National Policy on Regulation and Control of Alcohol-2017 has set fixed area for sales of alcoholic product and barred for public places, schools and colleges, religious and holy places. Therefore, brief advice smoking and alcohol cessation was found significant association among patients of National Tuberculosis Center(NTC) lead Direct Observed Treatment Short course (DOTS) clinic in Nepal [3].

However, this study aims to identify the present condition of use of alcohol and tobacco among HIV/TB co-infected individuals and it would be an opportunity to provide the update information of available HIV/TB services to them with a view of motivating to access early diagnosis and treatment of TB among PLHIV.

2. Methods

During the period of one year (May 2015 to April 2016) ,a cross-section study was conducted in Five districts (Jhapa,Morng, Sunsari, Parsa and Kavre) of Nepal. The objective of the study was to identify the use of health care services in relation to their alcohol /tobacco consumption

habit of the HIV/TB co-infected individuals. Of the 343 HIV/TB co-infected individuals, who were followed in the 5(five) Community Care Centers(CCC) and home visit done by researcher himself with the help of peer educators and Community Home Based Care(CHBC) workers. The respondents were enrolled above the age of 18 or older who had been on DOTS and who had history of completed DOTS prior to study. The respondents were approached with pretested questionnaire at 5 (five) CCCs of five districts and rest of respondents were approached at their home. The interviews were taken till the desired sample size was reached.

Data were collected through the pretested questionnaire. The questionnaire included socio-demographic characteristics like residence, age, sex, marital status, religion, behavioral pattern included alcohol and smoking consumption and available health care services, information on the adherence to ART/DOTS service. The content validity was maintained by the researcher after piloting of survey done in another area having the same socio-demographic characteristics of study area. An informed written consent was taken from each participant after verbal explanation was clearly stated by the research team. For each interview, the objective, benefits of the participants in the survey and progress of the investigation clearly stated before conducting survey. For conducting research, we also obtained ethical approval for Nepal Health Research Council, Kathmandu Nepal. The respondents name was not recorded to ensure their confidentiality and the separate code was generated to replace the name of respondents. To ensure level of non-adherence, three measurement criteria were used: i) self-reporting of missed dose ii) counting of the remaining tablets and iii) the rate of prescription renewed. PLHIV who had failed in any appointment classified as non-adherent. Data entry and analysis were performed using SPSS 20.0 version. This research used regression analysis, ANOVA test to analyze the relationship between socio-demographic variables and other variables of interest in the study area, Nepal.

3. Results

Table 1: Regression analysis of socio-demographic variables and tobacco smoking

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.395[a]	.156	.139	.465
a. Predictors: (Constant), Marital status, Ethnicity, Residence, Age, Gender, District, Religion				

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F values	Sig.
1	Regression	13.390	7	1.913	8.863	.000[b]
	Residual	72.301	335	.216		
	Total	85.691	342			
a. Dependent Variable: Tobacco smoking						
b. Predictors: (Constant), Marital status, Ethnicity, Residence, Age, Gender, District, Religion						

Coefficients [a]

Model	Unstandardized Coefficients		Standardized Coefficients	t values	Sig.
	B	Std. Error	Beta		
(Constant)	1.109	.168		6.584	.000
District	.107	.020	.285	5.452	.000
Residence	.122	.055	.113	2.212	.028
Gender	-.093	.052	-.093	-1.813	.071
Age	.085	.035	.125	2.429	.016
Ethnicity	-.005	.018	-.015	-.275	.783
Religion	.022	.019	.064	1.154	.249
Marital status	-.081	.036	-.117	-2.236	.026

Source: Field survey 2016

The regression analysis of table no 1 revealed that the R Square (R^2) value is 0.156 which means that socio-demographic variables explain only 15.6% of the variation in the use of tobacco use. The adjusted R^2 value is 0.139 means that the different demographic variables contributed only13.9 % of total value of tobacco smoking to the HIV/TB co-infected. The remaining 86.1 % were contributed by other factors which are not included in the study.

Regression analysis on all seven socio-demographic characteristics were found significant association at F (7,335) = 8.863, p =0.000 to total value of consumption of tobacco smoking after being HIV/TB co-infected. However, it was found that only four variables namely district, residence, age, and marital status were significant association ($p \leq 0.05$) with consumption of smoking after being HIV/TB co-infected. Rest of three other variables i.e. gender, ethnicity, and religion were not significant association the total value of consumption of tobacco smoking after being HIV/TB co-infected , since the p- value of each was greater than p=0.05 . So , we can conclude that at least four variables such as district, residence, gender, age, and marital status have impact on total value of consumption of tobacco smoking after being HIV/TB co-infected.

Table 2: Regression analysis of socio-demographic variables and alcohol consumption

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.302[a]	.091	.072	.478
a. Predictors: (Constant), Marital status, Ethnicity, Residence, Age , Gender, District, Religion				

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F value	Sig.
1	Regression	7.719	7	1.103	4.818	.000
	Residual	76.683	335	.229		
	Total	84.402	342			
a. Dependent Variable: Alcohol consumption						
b. Predictors: (Constant), Marital status, Ethnicity, Residence, Age, Gender, District, Religion						

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t value	Sig.
	B	Std. Error	Beta		
Constant	1.818	.174		10.478	.000
District	-.075	.020	-.202	-3.732	.000
Residence	-.128	.057	-.119	-2.261	.024
Gender	.102	.053	.102	1.917	.056
Age	-.031	.036	-.046	-.854	.394
Ethnicity	-.006	.019	-.018	-.318	.750

Religion	-.028	.020	-.081	-1.422	.156
Marital status	.063	.037	.091	1.676	.095

Source: Field survey 2016

Above table no. 2 revealed that the value of R Square (R^2) is 0.091 which means that socio-demographic variables explain only 9.1 % of the variation in the consumption of alcohol among HIV/TB co-infected individuals. However, the adjusted R^2 value is 0.072, which means that the different demographic variables contributed only 7.2 % of total value of consumption of alcohol to the HIV/TB co-infected. The remaining 92.8 % were contributed by other factors which are not included in the study.

Regression analysis on district, residence, gender, age, ethnicity, religion and marital status of respondents were found significant association at F (7,335)=4.818 ,p=0.000 to total value of alcohol consumption after being HIV/TB co-infection. However, it was found that only two variables namely district and residence status of respondents had significant association ($p \leq 0.05$) with use of alcohol after being co-infected by HIV/TB. Rest of other variables i.e. gender, age, ethnicity, religion and marital status of respondents were not significant association the total value of alcohol consumption after being HIV/TB co-infected , since the p- value of each was higher than p=0.05. So , we can conclude that at least two variables such as district and residence of respondents have impact on total value of consumption of alcohol after being HIV/TB co-infected.

Table 3: ANOVA test for alcohol consumption and access to HIV/TB services

Variables		F values	P values
Alcohol Consumption	Access to counseling	.016	.900
	Know about NGOs' service	2.024	.156
	Access to awareness training	1.645	.200
	Access to network meeting	2.877	.091
	Access to viral load service	.518	.472
	Access to CD4 service	.400	.527
	ART/DOTS non-adherence	4.828	.029

Source: Field survey 2016

Table 3 shows the association of alcohol consumption and access to HIV/TB services . The study found that there was significant difference at F=4.828, p=0.029 between alcohol consumption and ART/DOTS non-adherence. The association between alcohol consumption and access to counseling for HIV/TB services was not significant difference found (F=0.16, p=0.900) among the respondents. Similarly, there was no significance difference at (F= 2.024, p=0.156) between alcohol consumption and knowledge about NGO's service among the respondents. The alcohol consumption and access to awareness training was not significant at F=1.645,p=0.200 among the respondents. Likewise, the alcohol consumption and access to network meeting of PLHIV was not significant at F=2.877, p=0.091 among HIV/TB co-infected. In addition to this, there was no significant difference (F=0.518, p=0.472) between alcohol consumption and access to viral load service. The alcohol consumption was not significant difference (F=0.400, p=0.527) between access to CD4 services among the respondents.

Table 4: ANOVA test for tobacco smoking and access to HIV/TB services

Variables		**F values**	**P values**
Tobacco Smoking	Access to counseling	.035	.851
	Know about NGOs' service	3.547	.060
	Access to training	7.008	.008
	Access to network meeting	11.684	.001
	Access to viral load service	.001	.981
	Access to CD4 service	5.219	.023
	ART/DOTS non-adherence	11.156	.001

Source: Field survey 2016

Table 4 shows the relationship between tobacco smoking and access to HIV/TB services. The study depicted that the tobacco consumption had significant difference between with access to training (F= 7.008, p= 0.008), access to network meeting (F=11.684), p= 0.001), access to CD4 service (F=5.219, p= 0.023), and access to ART/DOT non-adherence (F=11.156, p= 0.001) of HIV/TB co-infected respondents. The association between tobacco smoking and access to counseling for HIV/TB services had not significant difference found at (F=0.35, p=0.851) of HIV/TB co-infected respondents. Similarly, there was no significant difference (F= 3.547, p=0.060) between alcohol consumption and knowledge about NGO's service among the respondents. Likewise, the tobacco smoking had not significant difference (F=0.001, p= 0.981) found with access to viral load service among the respondents.

Table 5: ANOVA test of quit of smoking and alcohol among the HV/TB co-infected respondents

Variables	Description	F values	P values
Residence	Quit smoking	7.393	.007
	Quit alcohol	5.209	.023
Gender	Quit smoking	8.229	.004
	Quit alcohol	5.513	.019
Education status	Quit smoking	.739	.478
	Quit alcohol	2.276	.104
Socio-economic status	Quit smoking	4.477	.012
	Quit alcohol	2.618	.074

Source: Field survey 2016

Above table no 5 shows that data of ANOVA test and which gives F values and P values to measure the significant difference of study variables. The analysis of ANONA test shows that there was significant difference found between quit smoking and residence (F=7.393, p= 0.007), quit smoking and gender (F=8.229, p= 0.004), quit smoking and socio-economic status (F=4.477, p= 0.012) of HIV/TB co-infected respondents. Similarly, there was significant difference found between quit alcohol and residence (F=5.209, p= 0.023), quit alcohol and gender (F=5.513, p= 0.019) of HIV/TB co-infected respondents. On the other hand, there was no significant difference between quit smoking and education status (F=0.739, p= 0.478) and the alcohol consumption had not significant difference with education status (F=2.276, p= 0.104) and socio-economic status (F=2.618, p= 0.074) of HIV/TB co-infected respondents. Analysis of ANOVA test shows that gender,

education and socio-economic status were main determinants to alcohol and smoking consumption.

4. Discussion

TB remains common problem with PLHIV, although the treatment of TB is highly effective. Moreover, the use of alcohol and tobacco has threatened right to live healthy of PLHIV. The Government of Nepal has introduced the tobacco control and regulation act 2011, to regulate consumption of smoking habits. However, the prevalence of smoking among youth and general population are becoming a serious problem. There are various factors are responsible to be prevalence of using alcohol and tobacco consumption [12] (Maharjan, 2016). In our study , 13.9% of tobacco consumption was contributed by socio-demographic variables (i.e. marital status, ethnicity, residence, gender, districts and religion) and similarly, the study found that 7.2 % of alcohol consumption was contributed by socio-demographic variables (i.e. age, gender, residence, ethnicity, religion, marital status, ethnicity, residence, gender, districts and religion). Our study result may have underestimated that most of the Nepalese female hesitates to expose their alcohol and smoking habit freely in front others. However, a study found that the use of tobacco among girls are common to urban areas and this habit is contributed by poverty, weak social institution and influence of family , community and society[12] (Maharjan, 2016).

In this study tobacco smoking was higher than alcohol consumption. Tobacco smoking has many adverse health outcomes among HIV infected individuals. In various literatures support that current smoker had higher risk of morbidity and mortality among PLHIV than non-smoker. The morbidity and mortality can be minimized early initiation of ART therapy [7].Our study revealed that the history of smoking was significantly associated (p=0.001) with non-adherence to ART/DOTS service. A study carried out in western Nepal and established that the smoking appeared one of the risk factors of MDR-TB and 74% of the MDR-TB patient had reported history of smoking [14]. Similarly, a study carried out in Pakistan revealed that smoking consumption found to be significantly associated with MDR TB as compared to non smokers ($p<0.05$) [10]. It can also be concluded that the smoking is the most significant risk factor of developing TB among PLHIV. The smoking cessation counseling would be the most promising endeavor to prevent the development of TB.

In Nepalese society, alcohol consumption is common and it is positively associated with smoking. Moreover males feel more exemption to drink alcohol and smoking consumption than females' counterpart. This study also revealed that there was co-prevalence of alcohol and tobacco consumption and alcoholic respondents more likely to use tobacco smoking. The study reported the alcohol consumption was significantly associated (p=0.024) with residence of HIV/TB co-infected individuals. A study found in South Africa that the use of alcohol depended upon location of residence and prevalence of tobacco smoking [11]. The use of alcohol has not only threatened healthy human life and alcoholism become serious problem to loss of money of individual [12]. Our finding of the study infers that there was insignificant association between alcohol consumption and access to counseling; know about NGOs' service, awareness training, network meeting, viral load service, and CD4 service. Moreover, this study found that the alcohol consumption was significant association with ART non-adherence (p=0.029). Earlier research indicates that heavy and chronic alcohol consumption alters human health and creates socio-medical problem. Therefore controlling alcohol has found high adherence of ART medication and good health out come.

Alcohol is common to PLHIV and who are on antiretroviral treatment (ART). The effect of alcohol on HIV progression is still on debate. A research found that alcohol dependence is associated with low CD4 cell count in HIV-positive patients [1] . This study also found that the alcohol user had insignificant association (p=0.527) with to access CD4 services. Hazardous use of alcohol is found to be associated the spread of HIV infection and substantial negative treatment outcome and also observed neuropathic pain in patients with HIV/AIDS [16]. A study found that there was high prevalence of alcohol use among HIV infected and significantly impact on all cause of morbidity and trend towards high morbidity and mortality [8] . It is evident that controlling alcohol have found high adherence of ART therefore practitioner should assess the alcohol users and strongly recommended them to minimize alcohol use [16]. Our study finding is also similar with previous findings; in which the participants reported that they quit alcohol after initiation of treatment of DOTS/ART. The relation of alcohol consumption was significant association with gender for HIV/TB co-infection.

Access to medical services is essential for individuals that have HIV infection. The behaviors patterns chronic smoking and alcohol consumption acts as barriers to access medical and supportive services and that facilitate to be TB among PLHIV. In previous study confirmed the importance of exposure to HIV testing and counseling services lead to high access medical care services [4]. This study confirmed that the alcohol consumption was not significantly association (p=0.900) with access to counseling services. Various literature shows that alcohol consumption increases health problems due to lowered the immunity and increases the rates of TB infection among PLHIV in terms of both incidence and severity [6]. Therefore, smoking and alcohol consumption cause problem and cessation of smoking improve the quality of life. But there are some obstacles observed to quit smoking among individuals [15]. However, our study found that quit smoking was insignificant association with education status and in contrast the study found that quit smoking was significant association with residence, gender and socio-economic status. Similarly, quit alcohol consumption was significant with residence and gender. Quit alcohol consumption was not significant association education and socio-economic status in the study area. Some evidence suggests that implementation of smoking banned intervention is highly effective against decrease smoking prevalence rates , but there has been no study focused on cessation smoking for HIV infect population [15].

5. Conclusion

The study found that the prevalence of alcohol and tobacco consumption was found among respondents and it was not significantly associated between tobacco consumption and gender, ethnicity, religion among the respondents. District, residence, age, marital status had significant association with tobacco consumption. On the other hand there was high prevalence of alcohol consumption with the respondents and the study found that there was significant association between alcohol consumption and districts and marital status of respondents. Alcohol consumption was not significantly associated with gender, age, ethnicity, religion, and marital status of respondents. In addition to this, alcohol consumption had significant association with ART non adherence. Similarly, there was significant association between tobacco consumption and ART non-adherence. Therefore, awareness and effective health education and health promotion programme should be launched to increase the participation in ART adherence. In addition to this, It is also equally important to highlight the health hazard due to tobacco and alcohol consumption. Advice to quit smoking and alcohol consumption which would help to get quality of life among the HIV/TB co-infected individuals.

6. Acknowledgements

I would like to express my thanks to respondents, the staffs of NGOs worker and Nepal Health research Council for their help to conduct the this survey. My sincere gratitude also extend to Mewar University, India for providing me platform to conduct this research.

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