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Prevalence and risk factors of smoking among Health Care Workers and Non-Health Care workers in Zambezi Region, Namibia: a cross-sectional study

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ABSTRACT: Smoking is a major risk factor for non-communicable diseases and remains a significant public health challenge in many lower- and middle-income countries (LMIC) including Namibia. The purpose of the study was to estimate the prevalence of smoking and its associated risk factors among HCWs and non-HCWs in Zambezi region.

An exploratory cross-sectional survey was conducted between March and October 2020 among residents of the eight (8) constituencies of Zambezi region. Four hundred and sixty-one (461) respondents who had been residents of the selected constituencies for over five years and aged between 17-60 years were selected for the study. The main outcome measure was current cigarette smoking status. Descriptive statistics were used to summarize the socio-demographic characteristics of the respondents. We stratified data analysis by individual being health workers or non-health workers. A bivariate Pearson Chi-square test was used to determine the association between socio-demographic characteristics and the smoking status. Statistically significant variables in the bivariate analysis were used as predictors in the univariate and multivariate models.

The response rate of potential participants was 95% (n=434). The mean (±SD) age of participant's was 32.5 (± 11.34 years). Significant relationships were observed between smoking status and area of residency (constituency), gender, age category, level of education, age of onset of smoking and the daily smoking frequency. The majority of smokers (n=108) were none-HCWs with males being the majority (n=62). Age (p=0.001), education levels (p=0.001) and area of residency (p=0.022) were highly associated with smoking among none-HCW while marital status was

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associated with smoking among HCWs (p=0.013). In the final multivariate model, the odds of smoking among female non-HCWs were significantly lower (OR: 0.386; 95% CI: 0.228 – 0.655). Furthermore, the odds of smoking among this same group were lower among those who had secondary level education (OR: 0.178; 95% CI: 0.0659 – 0.483), post-secondary (OR: 0.117, 95% CI: 0.0412 – 0.330) and first stage tertiary (OR: 0.306: 95% CI: 0.106 – 0.881) compared to those who had primary school education.

In conclusion, smoking prevalence among none HCWs and HCWs working in Zambezi included in the study was similar to that of the general Namibian population but higher than other neighboring countries within SADC. The results showed a need for the establishment of specific smoking related strategies that target HCWs to address smoking use parallel to the running of none HCWs which would ultimately decrease the smoking prevalence and improve health.

Keywords

Zambezi; Health Care Workers; cigarette smoking; Cigarettes; Gender differences; Prevalence; Tobacco use; Vulnerable populations; Risk factors.

Introduction

Tobacco use is one of the leading risk factor for various short and long term respiratory disease, cancer, and heart disease (1–3) and account for about five million tobacco used related deaths annually (4). Furthermore, according to the World Health Organization, over 80% of tobacco users globally are from Low and Middle Income (LMIC) (5), where both tobacco-related deaths and reduced productivity have been on the rise (6,7). The global prevalence of smoking has been observed to reduce between 1980-2012 (7) however , there are still approximately over one billion adult tobacco smokers (4). Furthermore, the prevalence of tobacco smoking appears to be increasing in the African Region and the Eastern Mediterranean Region (8,9), increasing the risks of tobacco smoking related mortality and morbidity (4,5).

According to the World Health Organisation (WHO), the prevalence of smoking in Namibia has been projected around 20 % (10). Furthermore, a study by the Ministry of Health and Social

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Services (MoHSS) and the Council of Churches in Namibia (CCN) suggested that approximately 16% of children above the age of nine, 50% of the youths, and 40% of adults in Namibia smoke cigarette (10). Thus, this suggests the need to develop strategies against tobacco use especially among socio-economically disadvantaged or less educated communities of Namibia. Understanding the factors associated with smoking both among health workers responsible for health promotion and community member would be crucial in design tobacco use mitigation strategies. Although the causes of smoking are complex and multifaceted, understanding these factors from the perspective of a health worker in charge of strategy implementation and among those who are the beneficiaries of the control strategies.

Although various surveys have been conducted regarding smoking in Namibia (11,12), studies on the prevalence of smoking and factors associated with it are still missing thus increasing the difficulties associated with designing control interventions. Owing to the influence of local social and policy contexts in influencing tobacco use, understanding factors associated with tobacco use in a cultural dynamic country increases the success of designing an inclusive control programme (13). Therefore, the current study sought to estimate the prevalence of smoking among in Zambezi region, and to explore factors associated with smoking.

Methods section

Study setting

Zambezi region, formally known as Caprivi region is one of the fourteen regions of Namibia. It is located in the north-eastern part of the country, bordering Kavango region on the west, Botswana, Zimbabwe, Zambia and Angola. The region is divided into eight administrative constituencies—Kabbe north, Kabbe south, Judea Lyamboloma , Linyanti, Sibbinda, Kongola, Katima Mulilo Urban and Katima Mulilo Rural. The administrative capital of the region is Katima Mulilo. According to the Namibia Statistics Agency, the population size of Zambezi region in 2016 was 98 849 and of which 51% are females (14). According to the Namibia National Planning Commission, 69% of the population in this region is rural (15). Furthermore, the region is the third poorest region in Namibia In terms of regional ranking, the situation has changed, with Kavango

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being the poorest region in Namibia and the severely affected areas are Kongola and Sibbinda constituencies at where about 58 % and 55 % of the population live below the poverty line (15).

Study design, participants and sampling

An exploratory cross-sectional survey was conducted between March and October 2020 among residents of the eight (8) constituencies of Zambezi region. 461 respondents who had been residents of the selected constituencies for over five years and aged between 17-60 years were selected for the study. To determine the number of respondents from each area within the region, proportionate sampling using the Namibia statistics data for the year 2016 was used. All potentially eligible respondents from the regions between the selected age groups were approached introduced to the study and invited to participate. Only those who agreed and signed the consent forms were enrolled in the study.

Study instrument and data collection

A structured interview and self-administered pretested questionnaire was designed in English and translated to the locally spoken language silozi was administered to each respondent. Before being administered, the content of the questionnaire was explained to each participant. The study instrument collected data on the demographic and socioeconomic characteristics of the study participants. The instrument also collected data on risk factors of smoking, types of smoking methods used and smoking behaviour. A series of quality assurance processes were implemented to ensure data quality was not compromised but preserved, including data validation, data cleaning, questionnaire verification, as well as ensuring that questionnaires were tested for consistency. Daily administered questionnaires were checked by the principal investigator to ensure quality assurance of collected data and completeness of questionnaires.

Ethics

Ethical approval to conduct this study was obtained from the Ethics Ethical Committee (EC) at the University of Namibia (Ref No:OSHAC586/2020 and from the Ministry of Health and Social Services (Ref No: 17/3/3 SM).

Data analysis

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Data was coded, entered into an excel spread sheet and exported to Stata version 15 (16) where data cleaning and analysis were done. The dependent variable was the smoking status of the individual, a dichotomous variable. The smoking status as well as other socio-demographic characteristics were summarized using descriptive statistics. In estimating the influence of socio-demographic characteristics on smoking, data analysis was stratified by individual being health workers or non-health workers. Pearson Chi-square test was used to determine the association between socio-demographic characteristics and the smoking status. Statistically significant variables in the bivariate analysis were used as predictors in the Univariate model. Variables that were significant and those whose p-value was less than 0.15 were used as predictor variables in the multivariate logistic regression (17). The results were expressed as odds ratio (OR) with their 95% CI and statistical significance level, $P < 0.05$.

Results

Sample description

Overall, 461 respondent respondents were enrolled in the study but only 434 responded to the questionnaires giving a response rate of 95%. The sample comprised of 177 (40.9%) males and 257 (59.1%) females. The mean age of participants involved in the study was 32.5 (± 11.34 years) and their ages ranged between 17 and 60 years. The majority (60.9%, n=265) of the respondent were aged between 17 – 34 years. In addition, the majority of respondent (25%, n=108) of the respondent were from Sibinda constituency. Furthermore, the sample comprised of 93 (21.5%) respondents who were health care workers (HCWs). (The sociodemographic characteristics of the study participants are summarized in Table 1.

Table 1: Sociodemographic characteristics of study participants

Variable	Character	Frequency proportions	
		n	%
Gender	Male	177	48.9
	Female	257	59.1
Age	17-25 years	157	36
	26-34 years	108	24.9

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	35-43 years	87	20.1
	44-52 years	54	12.5
	53-60 years	28	6.5
Marital status	Single	234	54
	Married	130	30
	Separated	44	10
	Divorced	16	3.7
	Widowed	10	2.3
Education level	Primary	34	7.9
	Secondary	109	25.2
	Post-Secondary	131	30.3
	First stage tertiary	100	23.2
	Second stage tertiary	58	13.4
Area (Constituency)	Kabbe	43	9.93
	Kabbe North	44	10.16
	Linyanti	48	11.09
	Judea Lyambai	51	11.78
	Sibbinda	108	24.94
	Katima Mulilo Urban	63	14.55
	Rural Katima Mulilo	42	9.7
	Kongola	35	7.85

Prevalence and factors associated with smoking

Of the 434 respondents who participated in the study 129 (29.1%) were smokers of which, 14.2 % (n=18) of the smokers were HCWs while 85.8% (n=108) were non-HCWs. Our data further suggested that the prevalence of smoking was highest among those aged between 26 – 34 years (36%, 95% CI: 27.1 –45.7%) and least among those aged between 35 – 43 years (21.8%, 95% CI: 13.6 – 32%). The prevalence of smoking was significantly associated ($P < 0.05$) with: area of residency (constituency), gender, Age category, level of education, age of onset of smoking and the daily smoking frequency.

Table 2: Bivariate analysis of smoking status across selected risk factors

Variable	Character	Frequency proportions		Chi-square test
		Yes (n, %)	No (n, %)	P- value
Gender	Male	16.6% (n=72)	24.2% (n=105)	**0.001**
	Female	12.5% (n=54)	46.7% (n=202)	
Age	17-25 years	10.9% (n=47)	25% (n=109)	**0.042**

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	26-34 years	9% (n=39)	16% (n=69)	
	35-43 years	4% (n=19)	16% (n=68)	
	44-52 years	4% (n=18)	8% (n=36)	
	53-60 years	0.7% (n=3)	6% (n=25)	
Marital status	Single	17% (n=76)	36% (n=158)	0.335
	Married	7% (n=32)	22% (n=98)	
	Separated	2% (n=9)	10% (n=43)	
	Divorced	1% (n=5)	2% (n=11)	
	Widowed	0.9% (n=4)	1% (n=6)	
Education level	Primary	4.3 % (n=19)	3.4% (n=15)	**0.001**
	Secondary	6.7% (n=29)	18.5% (n=80)	
	Post Secondary	5.5% (n=24)	24.7% (n=107)	
	First stage tertiary	7.1% (n=31)	15.9% (n=69)	
	Second stage tertiary	5.3% (n=23)	8.1% (n=35)	
Area	Kabbe South	4.1% (n=18)	5.7% (n=25)	**0.02**
	Kabbe North	3.4% (n=15)	6.6% (n=29)	
	Linyanti	3.9% (n=17)	7.1% (n=31)	
	Judea Lyamboloma	3.6% (n=16)	8% (n=35)	
	Sibbinda	4.1% (n=18)	20.7% (n=90)	
	Katima Mulilo Urban	3.4% (n=15)	11% (n=48)	
	Rural Katima Mulilo	3.9% (n=17)	5.7% (n=25)	
	Kongola	2.3% (n=10)	5.5% (n=24)	
Parents smoked	None	28.6% (n=37)	0.7% (n=1)	**0.513**
	One	38.7% (n=50)	2.3% (n=3)	
	Both	21.7% (n=28)	0 (n=0)	
	I don't know	6.2% (n=8)	0 (n=0)	
Age for onset of smoking	17-25 years	93% (n=120)	2.3% (n=3)	**0.036**
	26-34 years	2.3% (n=3)	0.7% (n=1)	
	35-43 years	1.5% (n=2)	0 (n=0)	

When controlled for being a HCW or non-HCW, area of residency (constituency) was associated with smoking among non-HCW (X^2=16.3, p=0.022) and not among HCWs (X^2=3.4, p=0.841).

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Furthermore, gender and age category were also associated with smoking among non-health care worker. On the other hand, marital status (X^2=12.6 p=0.013) and daily smoking frequency (X^2=13.6, p=0.001) were associated with smoking among HCWs (Table3).

Table 3: Bivariate analysis of smoking status across selected risk factors control for being a HCW and None-HCW

Variable	Character	Health workers			Non-health workers		
		Yes	No	P-value	Yes	No	P-value
	Male	10.7% (n=10)	26.8% (n=25)	0.081	17.7% (n=62)	22.8% (n=80)	
	Female	8.6% (n=8)	8.6% (n=50)		13% (n=46)	46.2% (n=162)	
Age	17-25 years	4.3% (n=4)	18.2% (n=17)	0.62	12.6% (n=43)	27.% (n=92)	**0.002**
	26-34 years	5.3% (n=5)	23.6% (n=22)		10% (n=34)	13.8% (n=47)	
	35-43 years	5.3% (n=5)	21.5% (n=20)		4.1% (n=14)	14.1% (n=48)	
	44-52 years	1% (n=1)	11% (n=11)		5% (n=17)	7.3% (n=25)	
	53-60 years	3.25 (n=3)	5.3% (n=5)		0% (n=0)	5.8% (n=20)	
Marital status	Single	10.7% (n=10)	36.5% (n=34)	**0.013**	19.4% (n=66)	36.4% (n=124)	0.687
	Married	3.2% (n=3)	32.2% (n=30)		8.5% (n=29)	20% (n=68)	
	Separated	1% (n=1)	8.6% (n=8)		2.3% (n=8)	7.6% (n=26)	
	Divorced	2.1% (n=2)	2.1% (n=3)		0.8% (n=3)	2.3% (n=8)	

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	Widowed	2.1% (n=2)	0% (n=0)		0.5% (n=2)	1.7% (n=6)	
Education level	Primary	1% (n=1)	7.5% (n=7)	0.343	5.3% (n=18)	2.3% (n=8)	**0.001**
	Secondary	5.3% (n=5)	7.5% (n=7)		7.0% (n=24)	21.5% (n=73)	
	Post Secondary	4.3% (n=4)	23.6% (n=22)		5.8% (n=20)	25% (n=85)	
	First stage tertiary	5.3% (n=5)	25.8% (n=24)		7.6% (n=26)	13.2% (n=45)	
	Second stage tertiary	3.2% (n=3)	16.1% (n=15)		5.8% (n=20)	5.8% (n=20)	
Area	Kabbe	3.2% (n=3)	5.3% (n=5)	0.841	4.4% (n=15)	5.8% (n=20)	**0.022**
	Kabbe North	3.2% (n=3)	8.6% (n=8)		3.5% (n=12)	6.1% (n=21)	
	Linyanti	3.2% (n=3)	11.8% (n=11)		4.11% (n=14)	5.8% (n=20)	
	Judea Lyamb	3.2% (n=3)	12.9% (n=12)		3.8% (n=13)	6.7% (n=23)	
	Sibbinda	2.1% (n=2)	15% (n=14)		4.7% (n=16)	22.3% (n=76)	
	Katima Mulilo Urban	1% (n=1)	9.6% (n=9)		4.11% (n=14)	11.4% (n=39)	
	Rural Katima Mulilo	1% (n=1)	4.3% (n=4)		4.7% (n=16)	6.1% (n=21)	
	Kongola	2.1% (n=2)	12.9% (n=12)		2.3% (n=8)	3.5% (n=12)	
Age for onset of smoking	17-25 years	76.1% (n=16)	9.5% (n=2)	0.301	96.2% (n=104)	0.9% (n=1)	0.986
	26-34 years	4.7% (n=1)	4.7% (n=1)		1.8% (n=2)	0% (n=0)	
	35-43 years	4.7% (n=1)	0% (n=0)		0.9% (n=1)	0% (n=0)	

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In the univariate logistic analysis, gender (OR: 0.389, 95% CI: 0.255 – 0.595) and daily smoking frequency (OR: 0.037, 95% CI: 0.003 – 0.439) were significantly associated with smoking. On the other hand, factors such as area, age category, and level of education were not associated with smoking despite having been included in the final model. In the final multivariate model and after controlling for the covariate (HCWs and Non-HCWs), the odd of smoking among females who were non-HCW were lower (OR: 0.387, 95% CI: 0.228 – 0.655) than males who were in the same category. On the other hand, there were no significance difference in the odd of smoking among males and females who were HCWs (Table 3). The study further showed that the odds of smoking among non-health care workers who had only attained primary school education were higher than those who had Secondary education (OR: 0.17, 95% CI: 0.065 – 0.483), post-secondary education (OR: 0.116, 95% CI: 0.041 – 0.330) and first level tertiary education (OR: 0.306, 95% CI: 0.101 – 0.881). Furthermore, the odds of smoking among those who had obtained and first level tertiary education (OR: 0.306, 95% CI: 0.101 – 0.881) were also higher than those who had obtained Secondary education (OR: 0.17, 95% CI: 0.065 – 0.483) and post-secondary education (OR: 0.116, 95% CI: 0.041 – 0.330). No significance difference in the odds of smoking were observed among non-health workers who had primary education and those with second stage tertiary education. On the other hand, no statistical differences were observed in the odds of smoking among the various education levels for HCWs. However, the odds of smoking for HCWs aged between 53-60 years were higher (OR: 20.16, 95% CI: 1.047 – 33.18) than the other age groups (Table 3).

Table 4: Multivariate analysis of smoking across selected risk factors

	Non-Health Care workers			Health Care workers		
Variable	OR	P-value	95% CI	OR	p-value	95% CI
Gender						
Male	Ref					
Female	**0.386**	**0.001**	**0.228 – 0.655**	0.302	0.084	0.078 – 1.172
Age category						
17-25 years	Ref					
26-34 years	1.691	0.123	0.867 – 3.298	2.233	0.365	0.393 – 12.686
35-43 years	0.555	0.168	0.240 – 1.280	4.303	0.142	0.614 – 30.137
44-52 years	1.520	0.392	0.583 – 3.959	1		
53-60 years	1.000			**20.16**	**0.046**	**1.047 – 33.18**
Marital status						

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Single	Ref						
Married		1.084	0.819	0.545 – 2.154	0.163	0.07	0.023 – 1.157
Widowed		1.308	0.649	0.412 – 4.415	0.089	0.108	0.005 – 1.699
Divorced		0.534	0.435	0.110 – 2.582	3.182	0.319	0.327 – 30.94
Separated		0.492	0.43	0.084 – 2.859	1		
Education							
Primary	Ref						
Secondary		**0.178**	**0.001**	**0.0659 – 0.483**	2.823	1.04	0.401 – 19.85
Post-Secondary		**0.117**	**0.001**	**0.0412 – 0.330**	0.727	-0.32	0.102 – 5.156
First stage tertiary		**0.306**	**0.028**	**0.106 – 0.881**	1.216	0.21	0.190 – 7.771
Second stage tertiary		0.567	0.327	0.812 – 1.763	1		

Discussion

In recent years, various surveys have been conducted regarding smoking in Namibia (11,12,18,19) however, there has been paucity of information the prevalence of smoking and associated factors in Zambezi region. Knowledge of the prevalence and associated factors of smoking would be essential in designing and implementation of smoking cessation strategies. The currently study contributes to knowledge gaps on the in the prevalence and risk factors in Namibia by focusing rural region of Zambezi.

In this study, the overall prevalence of smoking was29.1%. The study further showed that the majority of smokers (85.8%, n=108) were non-health workers. The prevalence of smoking observed in the current study is comparable to the findings that were reported in 2016 among adult population (ages 15+) in Namibia (10,20). On the contrary, the prevalence of smoking observed in the current study is higher than what has been reported in Botswana (21), Zambia (22) and Ghana (23) and South Africa (24). Our results suggest that despite having implemented the anti-tobacco measures, the prevalence of smoking in Namibia remains high. While other countries have designed strategies to adopt and implement the WHO's Framework Convention on Tobacco Control, Namibia has a shorter history of implementing tobacco control measures due to battles with the tobacco industry (25,26). Our results also showed that areas of residence (rural or urban areas) had varied prevalence of smoking. Notably, our study finding contrast the findings made by Völzke in a study that was conducted in Germany (27). Our study showed that the prevalence of smoking was lower in Katima urban. This maybe die to exposure of the urban population to electronic media better and tobacco advertisements (28–30).

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Our study showed that most smokers started smoking when aged between 17-25 years. . This is concordant with previous observations by (11) and (31). These authors concluded that there were more smokers of younger age ranges 15-25 years compared to any other age group. . Our study also suggested that the odds of smoking were higher for older age groups than younger age groups. The reduction in the odds of smoking in the younger generation compared to elderly people may be due to higher academic achievements, religious/traditional groups and racial/ethnic pride (32). On the other hand, social and physical environments factors (32–34), mental health factors (32), lower socioeconomic status (32,35), and individual personal views (36) have been found to enhance the odds of smoking and usually associated with elderly people (36). This is further corroborated by the outcome of the National Drug Strategy Household of 2019 in Australia which showed that the rates of smoking were decreasing among the younger generation (37).

Although our study showed that gender had no influence on the risks of smoking, our study observed that there were more male smokers than female smokers. These findings corroborates finding of Amakali (11), Sieminska (38), Higgins (39), Chinwong (40) and Allen (41). Earlier studies focusing on gender and smoking concluded that the difference observed in our studies as well as others in the prevalence of smoking between males and females maybe be due to culture, religious, psychological, behavioral, and physiological factors (38,42,43). Research has shown that smoking behavior varies between males and females for example, females usually smoke for a shorter period of time and normally take smaller puffs when compared to males (44). Similarly, the perception of smoking function between males and females varies, males are more likely to enjoy smoking and use this as a motive to continue smoking while the motives for females are weight control and stress relief (45,46). The current study also observed that levels of education may have an influence of the odds of smoking. Studies (44,47–49) have suggested that education maybe an indicator of socioeconomic status as it may precede employment and income, and knowledge that plays a major role in making health behaviour choices. The finding observed in the current study corroborates the findings observed by Cao and Chen. These authors concluded that the odds of smoking were higher for people living below the poverty level and those having lower levels of educational achievement. (50,51). Our study further observed that the odds of smoking were also high for those who had attained first level tertiary of education. This outcome may be due to peer pressure. A study conducted in Kenya (52) and Iran (53) concluded that peer

pressure among university students increased the odd of smoking. Others studies also found that having smokers as friends also increased the odds of smoking (52,54).

Conclusion

This study is unique in that it delivers the first quantitative report of prevalence and risk factors of HCW and none HCWs in the Zambezi region. According to the results of this study, smoking prevalence among none HCWs and HCWs working in Zambezi was similar to that of the general Namibian population. However, the prevalence of smoking observed in the current study is higher than what has been reported in neighboring African countries. The is a need to develop tobacco use preventative interventions and strategies that target HCWs and none HCWs which are tailored to the local context and sensitive to the culture and community norms in Zambezi region, Namibia. Lastly, comprehensive tobacco control policies aimed at reducing smoking among HCWs are needed

Conflicts of Interest

The authors declare no conflict of interest.

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