An Investigation of Hypertension Risk Factors among Adults in Oshikoto Region in Namibia

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Abstract

Introduction: Hypertension complications are responsible for 9.4 million deaths worldwide and among these deaths, 51 % are due to stroke and 45% are due to heart disease like heart failure. This study aims to investigate the hypertension risk factors among adult in Oshikoto region, Namibia.

Methods: A community population-based, cross- sectional survey was conducted using WHO STEPwise approach among 375 adults in Oshikoto region. Bivariate and multivariate analysis was done to determine the association between risk factors and Hypertension, based on p-value <0.05.

Results: Overall prevalence for risk factors was: physical inactivity (25.3%), unhealthy diet (75.7%), tobacco use (9.1%), harmful use of alcohol (40.8%). 20.5% overweight with majority (85.7%) of them were females. Obesity was 9.1% in which 91.2% were females. Hypertension prevalence was 24.3%. Four percent of individuals were having two multiple risk factors for hypertension, 2.4% with four risk factors and 1.1% with more than four risk factors. Age group (OR=2.48, 95%CI=1.44-4.26, P=0.001), Obesity (OR=3.48, 95%CI=1.55-7.79, P=0.003), and overweight (OR=2.34, 95%CI=1.31-4.19, P =0.004) were significant risk factors for hypertension.

Conclusions: This study revealed a high prevalence and burden of hypertension risk factors such as obesity and overweight among adults in Oshikoto region, thus, these results highlight the need for interventions to reduce and prevent those risk factors of hypertension in Oshikoto region, Namibia.

Keywords: investigation, hypertension, non-communicable diseases, risk factors, Oshikoto region.

1. Introduction and Background

Namibia like other developing countries is experiencing an epidemiological health transition that is characterized by an increasing burden of non-communicable diseases (NCDs). This transition is linked to the high rate of urbanization and development strides that leads to general economic improvement in social and health indicators for the country. At the same time, urbanization has its own consequences including several personal lifestyle habits that ultimately would impact negatively on the health status of the individual. The effect of this is a shift in a spectrum of diseases that were not common in the population to even more dramatic resurgence of many non-communicable diseases (World Health Organization, 2017). NCDs results in more than 40 million deaths every year globally in which 15 million deaths were accounted for people between the ages of 30 and 70 years (Nelson, Nyarko, & Binka, 2015). Major NCDs such as cardiovascular diseases which include hypertension, cancer, diabetes and chronic respiratory diseases are responsible for 71 % of deaths worldwide (WHO, 2018).

In 2011 nine global targets of NCDs prevention and control were adapted in the United Nation (UN) General Assembly. The aim was to reduce premature mortality from the four major NCDs such as cardiovascular diseases (hypertension), chronic respiratory diseases, cancer and diabetes to 25% by 2025. The targets identified were salt intake, tobacco use, harmful alcohol use, obesity, raised blood pressure, raised blood glucose and physical inactivity. In 2015 World Health Organization (WHO) approach to Surveillance of NCDs Risk Factors (STEPS) was established as a global surveillance strategy in a response for trends of NCDs at country-level (WHO, 2017; WHO, 2018). Among targets of the 17 Sustainable Development Goals (SDGs), SDG 3 is to ensure a reduction by

one third in NCDs (including hypertension) premature mortality by 2030 (IDFA, 2018).

The burden of hypertension among low-income and middle-income countries is increasing disproportionately and almost half of premature deaths occur. However, these deaths are affected those furthest behind and the poorest, because the epidemic of NCDs is driven by poverty, globalization of marketing and trade of health-harming products, rapid urbanization, and population growth. Hypertensions' complications are responsible for 9.4 million deaths worldwide and among these deaths, 51 % are due to stroke and 45% are due to heart disease like heart failure. The common modifiable behavioral risk factors for hypertension are tobacco use, unhealthy diet, physical inactivity, and the harmful use of alcohol. Their clustering increases significantly the risk of cardiovascular disease morbidity and mortality, and, could lead to overweight and obesity, raised blood pressure, raised cholesterol, and ultimately disease (WHO, 2017; Nelson, Nyarko, & Binka, 2015; Namibia Statistics Agency (NSA), 2017). These risk factors are preventable and can be completely eliminated (WHO, 2017). According to DHIS2, the prevalence of Hypertension in Oshikoto region was recorded to be 56.8 - 59.1% in adults aged 18 years and above with 21.4% mortality for the region in year 2017 (MoHSS, 2018). Hypertension (Hpt) was indicated in the Health facility-based data as first causes of disability among adults in Namibia (MoHSS, 2018; WHO, 2016). This study was conducted to investigate the hypertension risk factors among adult in Oshikoto region, Namibia.

2. Methodology

2.1 Study Design and Setting

A quantitative, descriptive, community population-based, cross- sectional survey to investigate the hypertension risk factors among adult population in Oshikoto region, Namibia. The study also determines the association between specific risk factors and a health outcome (hypertension) exists among adult population within Oshikoto region in Namibia. It was conducted between November 2018 and January 2019.

2.2 Study Population

This study included adults population, 18 years and older with in Oshikoto region in Namibia. Oshikoto region's 2018 population distribution (for 18 years and older) is 109 478. Individuals less than 18 years and vulnerable people example mental restarted were excluded in the study.

2.3 Sampling Method

Stratified cluster random sampling method was employed to select households randomly from each Primary Sampling Units (PSU) and in selected household, all adults (18 years and above) are to be sampled.

2.4 Sample Size and Criteria

Sample size was calculated using software Epi Info 7.2 version. The precision level on which the true value of the population estimated was 95% Confidence interval. The number of subjects in this study was estimated to be 370 individuals. One (1) cluster was used in order to balance considerations of cost, resources and time without compromising the representatives of the sample. In order to achieve the study objectives within limited resources and time, the design effect (DE) of 1 was considered, so, the final sample size (n) was still 370 (1 x 370). The average household size for 18 years and above was 2.55 persons, therefore 178 households was approached.

2.5 Validity and Reliability

Pilot study was conducted in Oshana region among similar target population prior to actual data collection to assess the feasibility of the study. The interviewer-administered questionnaire was tested and retested to the same individuals from pilot area on different occasions, and then, their responses reviewed for similarities.

2.6 Data Collection Instruments and Procedure

A structured questionnaire was used to capture data on demographic and behavioral risk factors; as well as anthropometric (blood pressure, height, weight) and biochemical (blood glucose) measurements. The collection tool was developed and modified based on the WHO STEPwise Approach.

2.7 Data Analysis Method

The collected data was entered in computer, cleaned, coded, edited for inconsistencies and then analyzed using Epi Info 7.2 version to: generate frequencies and proportions. WHO guideline for blood pressure was used to classy the blood pressure (BP) results as normal or abnormal. Data was summarized using descriptive statistics and presented as tables, charts and graphs. Chi-square was used to test association and statistical significance has accepted at p-value <0.05. Multivariate logistic regression analysis test has performed.

2.8 Ethical Considerations

Ethical approval was obtained from the University of Namibia, the Ministry of Health and Social Services (MoHSS) National Health Research Unit (NHRU) as well as from the Oshikoto regional health Director. The research ethical principles of respect for person, beneficence, justice, and confidentiality were maintained before, during and after the study. Consent was obtained from participants and the nature of the procedure was explained before data collection.

3. Results

3.1 Socio-Demographic Characteristics of the Study Population

A total number of 375 individuals participated in a study, the majority of participants 279 (74.4%) were female while males were only 96 (25.6%). The mean age of study population was 42.9 ± 15.0 years (male respondents: 45.5 ± 16.2 years; female respondents: 42.0 ± 14.5 years) with representation of participants from all the age groups. Among participants 268 (81.6%) were from age group of 18 - 55 years in which majority were age group of 26 – 35 years with 27.2%, while 69 (18.4%) were 56 and above years of age in which 6.9% were over 66 years. Most participants 244 (65.1%) were residing in rural area and 100 (26.7%) in urban area and this finding was higher in both males and female. This is presented in Table 1.

Table 1. Socio-demographic characteristics of the study population by sex, Oshikoto region

Characteristics	Categories	Male (%)	Female (%)	Total (%)
Age in years				
	18 – 25	7 (18.4)	31 (81.6)	38 (10.2)
	26 – 35	22 (21.6)	80 (78.4)	102 (27.2)
	36 – 45	26 (29.2)	63 (70.8)	89 (23.7)
	46 – 55	18 (23.4)	59 (76.6)	77 (20.5)
	56 – 65	12 (27.9)	31 (72.1)	43 (11.5)
	66 +	11 (42.3)0	15 (57.7)	26 (6.9)
Residential area				
	Rural	53 (21.7)	191 (78.3)	244 (65.1)
	Semi - urban	13 (41.9)	18 (58.1)	31 (8.3)
	Urban	30 (30.0)	70 (70.0)	100 (26.7)
Level of Education				
	Illiterate	14 (45.2)	17 (54.8)	31 (8.3)
	Primary education	26 (25.7)	75 (74.3)	101 (26.9)
	Secondary education	48 (22.2)	168 (77.8)	216 (57.6)
	Tertiary education	8 (29.6)	19 (70.4)	27 (7.2)
Marital status				
	Cohabiting	13 (52.0)	12 (48)	25 (6.7)
	Divorced	0 (0)	4 (100)	4 (1.1)
	Married	44 (37.0)	75 (63.0)	119 (31.7)
	Separated	0 (0)	1 (100)	1 (0.3)
	Single	39 (18.7)	170 (81.3)	209 (55.7)
	Widowed	0 (0)	17 (100)	17 (4.5)
Ethnic group				
	Caprivian	8 (61.5)	5 (38.5)	13 (3.5)
	Herero/Himba	5 (33.3)	10 (66.7)	15 (4.0)
	Kavango	2 (50.0)	2 (50.0)	4 (1.10
	Nama/Damara	4 (44.4)	5 (55.6)	9 (2.4)

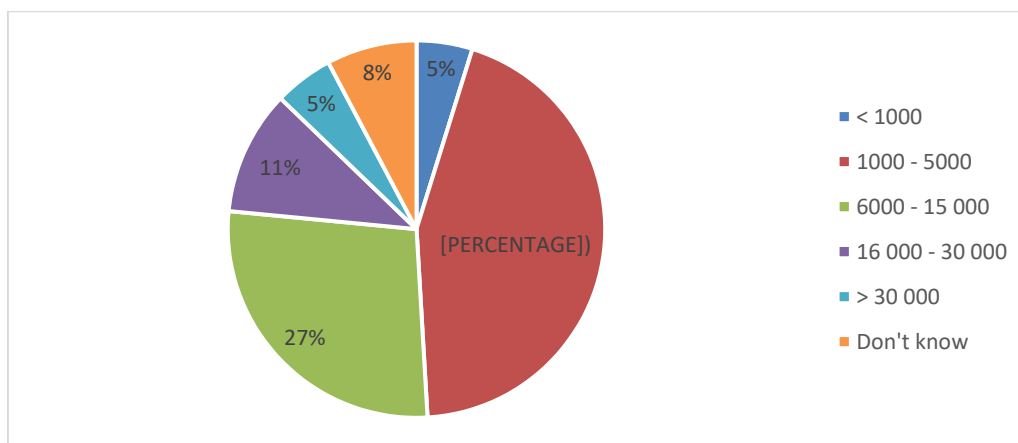|			
San community	6 (30.0)	14 (70.0)	20 (5.3)
Wambo	73 (23.2)	241 (76.8)	314 (83.7)
Employment status			
Government employed	16 (42.1)	22 (57.9)	38 (10.1)
Non-government employed	20 (35.1)	37 (64.9)	57 (15.2)
Pensioner	19 (36.5)	33 (63.5)	52 (13.9)
Self employed	15 (26.3)	42 (73.7)	57 (15.2)
Student	2 (50.)	2 (50.0)	4 (1.1)
Unemployed	24 (14.4)	143 (85.6)	167 (44.5)

Figure 1. Proportion of participants by monthly average household earning in Namibia dollar (N$), Oshikoto region

Forty-nine percent of the participants had a monthly average household earning of less than N$ 6000 and only 19 (5.1%) had more than 30 000. Therefore, majority of the participants belongs to lower socio-economic status (Figure 1 above).

3.2 Behavioral Risk Factors of the Study Population

Table 2 presents behavioral risk factors for males and females in the study. Among 375 study participants 278 (74.1%) reported performing physical activity of more than 30 minutes daily, in which 78.4% were females and 60 (21.6%) were males. Most 95 (25.3%) participants were not performing physical activity. Few 56 (14.9%) were being sedentary as estimated by the duration of time spend reclining or sitting on a typical week and it was found higher among males 26 (27.1%) (n=96) than females 30 (10.5%) (n=279). Walking as a measure for physical activity was a better habit among participants, with majority 319 (85.1%) walking at least 10 hours/ more per week (Table 2). However, 68 (18.1%) of participants (60.3% females and 39.7% males) were not even walking daily for 10 minutes as recommended by WHO, this was found higher (55.5%) among age groups between 18 and 45 years and majority 48 (70.6%) were living in urban areas.

Among study participants, none of the 183 (48.8%) consumes any fruit per week (females 75.4%% and males 24.6%). However, 186 (49.6%) participants consume vegetables at least once a week (females 138(74.2%) and males 48(25.8%)). All participants 375 had salt intake. Most of participants 332 (88.5%) responded that they only ate processed food with high salt and 165 (44.0%) were eating food that not prepared at home in past 14 days. On other hand, vegetable oil was used by majority 362 (96.5%) as type of kitchen oil. This data is presented in Table 2.

About 30 (8%) of participants reported being current smokers, and this was found higher in men than in women 16 (53.3%) and 14 (46.7%) respectively, and it was distributed equally among rural and urban males. Alcohol consumption rate when relates to current use was 132 (35.2%) more among females 80 (60.6%) compared to males 52 (39.4%) and among all 132 participants 90.1% were accustomed to home brews (Tombo and Katokele) as well as beer (Table 2).

Table 2. Frequency distribution of the behavioral risk factors for hypertension of study participants by sex, Oshikoto region

Variables	Categories	Male (%)	Female (%)	Total (%)
Frequency of physical activity per day in minutes				
	0 minutes	35 (36.8)	60 (63.2)	95 (25.3)
	10 - 30 minutes	1 (50.0)	1 (50.0)	2 (0.5)
	> 30 minutes	60 (21.6)	218 (78.4)	278 (74.1)
Frequency of sedentary lifestyle per week in hours				
	0 hours/week	70 (21.9)	249 (78.1)	319 (85.1)
	> 10 hours/week	26 (46.4)	30 (53.6)	56 (14.9)
Frequency of walking per day/ week in hours				
	0 hours/week	20 (43.5)	26 (56.5)	46 (12.3)
	> 10 hours/week	76 (23.1)	253 (76.9)	329 (87.7)
Frequency of taking fruits per week				
	Zero a week	45 (24.6)	138 (75.4)	183 (48.8)
	Once a week	23 (26.7)	63 (73.3)	86 (22.9)
	Twice a week	18 (27.7)	47 (72.3)	65 (17.9)
	Thrice a week	6 (20.7)	23 (79.3)	29 (7.8)
	> three times a week	4 (33.3)	8 (66.7)	12 (3.2)
Frequency of taking vegetables per week				
	Zero a week	44 (25.4)	129 (74.6)	173 (46.1)
	Once a week	48 (25.8)	138 (74.2)	186 (49.6)
	Twice a week	4 (25.0)	12 (75.0)	16 (4.3)
Frequency of salt consumption				
	Always	96 (25.6)	279 (74.4)	375 (100)
Frequency of eating processed food high in salt				
	Always	0 (0.0)	1 (100)	1 (0.3)
	Often	4 (44.4)	5 (55.6)	9 (2.4)
	Sometimes	81 (24.4)	251 (75.6)	332 (88.5)
	Never	11 (33.3)	22 (66.7)	33 (8.8)
Frequency of eating food that not prepared at home past 14 days				
	Yes	60 (36.4)	105 (63.6)	165 (44.0)
	No	36 (17.1)	174 (82.9)	210 (56.0)
Type of kitchen oil				
	Animal fat	2 (22.2)	7 (77.8)	9 (2.4)
	Butter/margarine	1 (33.3)	2 (66.7)	3 (0.8)
	Traditional marura oil	1 (100)	0 (0.0)	1 (0.3)
	Vegetable oil	92 (25.4)	270 (74.6)	362 (96.5)
Tobacco use				
	Current smoker	16 (53.3)	14 (46.7)	30 (8.0)
	Never smoker	77 (22.6)	264 (70.4)	341 (90.9)
	Previous smoker	3 (75.0)	1 (25.0)	4 (1.1)
Alcohol consumption				
	Current use	52 (39.4)	80 (60.6)	132 (35.2)
	Never use	35 (15.8)	187 (84.2)	222 (59.2)
	Previous use	9 (42.9)	12 (57.1)	21 (5.6)

3.3 Hypertension Biological Risk Factors of the Study Population: Anthropometric and Biochemical Measurements

These measurements including height, weight, body mass index (BMI can be calculated as ratio of weight (kg) and height square (m), blood pressure, heart rate (Anthropometric) and blood glucose (levels). Mean height for males was 168 ± 9.3 SD and range between $130 – 185$ cm, while mean height for females was 16 ± 8.7 SD and range on average males were 168 cm tall while females were 161cm tall. Considering their weight, on average females had 62 kg as compared to 61 kg for males. Among all study participants 111 (29.6%) had higher BMI (females 87.4%, male 12.6%) with mean (BMI) of 23.3 ± 4.5 SD and range between 14.0 and 46.0. Females had relatively higher BMI than males (Females = 46, Males = 36).

Among participants with high blood pressure, proportion of 39 (44.8%) were currently on hypertension treatment. All participants had their heart rate checked and recorded in which 4 (10.9%) were having abnormal heart rate (bradycardia = 3 (7.3%), tachycardia = 38 (92.7%)) and it was found higher among female than male with 71.7% and 29.3% respectively. Among all study participants 375, 77 (20.5%) were overweight and 34 (9.1%) were obese. The most affected population per sex was females with 193 (78.8%).
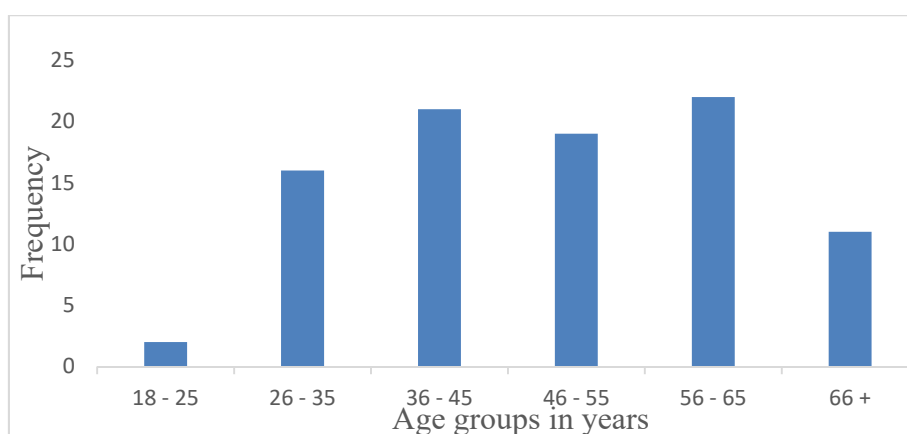

Figure 2. Prevalence of Hypertension by aged group in years, Oshikoto region, 2018

Among all study population 91 (24.3%) were hypertensive predominantly among age-group $56 – 65$ years (22 (24.2%)), followed by $36 – 45$ and $46 – 55$ years with 21 (23.1%) and 19 (20.9%) respectively while $18 – 25$ years was least with less than three percent (Figure 2). More females 64 (70.3%) were affected compare to males 27 (29.7%). Note with 43 (47.3%) were already on treatment. According to high blood pressure classifications, hypertension was the highest at 57 (62.6%) while almost ten percent (9.9%) were found with stage 11 hypertension. In addition, 16 (4.3%) of study participants had two combination risk factor of hypertension such as physical inactivity and unhealthy diet. However, 9 (2.4%) participants were having both four behavioral risk factors, while 4 (1.1%) were having combination of both behavioral risk factors plus one biological risk factor.

3.4 Association between Risk Factors and Hypertension

Two by two analysis results to determine the association between major socio-demographic and risk factors and hypertension are presented in Tables 3. Logistic regression was used to estimate the strength of association for all exposure variables that were statistically significant in bivariate analysis. Results for multivariate logistic regression analysis are presented in Table 4.

Table 3. Bivariate analysis of hypertension exposure variables among adults in Oshikoto region

Exposure variables	Hypertension		OR	95%CI	P-value
	Yes	No			
Sex	27	69			
Male	64	215			
Female			1.31	0.78 - 2.22	0.33
Age Group (years)					
18 - 45	39	190			
46+	52	94	0.37	0.23 - 0.60	0.000*
Residential area					
Rural	55	189			
Urban	36	95	0.77	0.47 - 1.25	0.31
Level of Education					
Illiterate	10	21			
Literate	81	263	1.55	0.69 - 3.42	0.28
Marital status					
Married	46	98			
Single	45	186	1.94	1.20 – 3.13	0.009*
Ethnic group					
Wambo	73	242			
Others	18	42	0.7	0.38 -1.297	0.25
Employment status					
Employed	39	113			
Unemployed	52	171	1.14	0.70 - 1.83	0.62
Physical Inactivity	24	53			
Yes	67	231			
No			1.56	0.89 – 2.72	0.14
Unhealthy Diet					
Yes	36	129			
No	55	155	0.79	0.46 – 0.27	0.34
Tobacco use					
Yes	9	21			
No	82	263	1.37	0.61 – 3.12	0.51
Alcohol use					
Yes	37	116			
No	54	168	0.99	0.13 – 1.60	1
Overweight					
Yes	29	52			
No	62	232	2.09	1.22 – 3.56	0.008*
Obesity					
Yes	15	19			
No	76	265	2.75	1.34 – 5.67	0.01*
High blood glucose					
Yes	4	2			
No	87	282	6.48	1.17 – 35.9	0.03*

Values in bold and * are statistically significant at P-value < 0.05 95 % Confidence Interval, OR=Odds Ratio.

There was no significant association between sex and hypertension (OR=1.31, 95%CI=0.78 - 2.22, P-value=0.33). The odds of developing hypertension were 0.37 times more in participants of age group 46 + than those in 18-45 age group (OR=0.37, 95%CI=0.23 - 0.60, P-value=0.000*). Furthermore, hypertension was associated with marital status (OR=1.94, 95%CI=1.20-3.13, P-value=0.009); Overweight (OR=2.09, 95%CI=1.22-3.56, P-value=0.008); obesity (OR=2.75, 95%CI=1.34-5.67, P-value=0.01); and, high blood glucose (OR=6.48, 95%CI=1.17 – 35.9, P-value=0.03). The other exposure variables were not found to be statistically significant (Table 3).

3.5 Multivariate Logistic Regression Analysis of Risk Factors Associated with Hypertension

In order to find independent associations and confounder, multivariate logistic regression analysis was performed for common risk factors that were statistical significant in bivariate analysis versus outcome variables such as hypertension as reflected in Table 4.

Table 4. Multivariate analysis risk factors associated hypertension among adult, Oshikoto region

Variables	AOR	0.95 - C.I.	P-Value
Age Group (46 +/18 - 45)	2.48	1.44 - 4.26	0.001*
Marital status (Yes/No)	1.26	0.73 - 2.17	0.39
Overweight (Yes/No)	2.34	1.31 - 4.19	0.004*
Obesity (Yes/No)	3.48	1.55 - 7.79	0.003*
Presence of Elevated blood Glucose (Yes/No)	4.44	0.67 - 29.26	0.12

Values in bold and * are statistically significant at P-value < 0.05 95 % Confidence Interval, AOR=Adjusted Odds Ratio. Age group (AOR=2.48, 95%CI=1.44- 4.26, P-value=0.001*), obesity (AOR=3.48, 95%CI=1.55-7.79, P-value=0.003*) and overweight (AOR=2.34, 95%CI=1.31-4.19, P-value=0.004*) were found to be significantly association with hypertension, therefore, older age, overweight and obesity were factors that strongly associated with hypertension.

4. Discussion

The risk factors of today are the diseases of tomorrow and, the public health interventions/ strategies addressing hypertension risk factors in population should be informed by accurate and reliable data from different settings. This WHO STEPS survey has great importance on providing valuable baseline information needed to develop policies, strategies and plan of action against those risk factors. This study addressed common NCDs risk factors such as physical inactive, unhealthy diet, tobacco use, alcohol consumption (behavioral risk factors); obesity, overweight, blood pressure and random blood glucose (biological risk factors). Majority (74.4%) of our study participants were females. This is probably because females are mostly confined at home as housewives. This finding is almost the same with the studies conducted in Afghanistan (66.5%), Zimbabwe (75%) and Malawi (67.5%) (IDFA, 2018; Ministry of Health & WHO, 2010). According to our findings, more participants are from middle age group (26 – 35 years). This finding is similar to study that was conducted in Uganda (Mondo, Otim, Akol, Musoke & Orem, 2013). By rural – urban stratification, most of the participants were residing in rural areas than in urban areas, 84% of Oshikoto region is rural and only 16% urban (Wu et al., 2015). Studies that were conducted in some of Sub-Saharan African countries, Afghanistan, and India also shared same findings as our study. This study findings could be also due to the fact that most of urban residents are at work during the day than those are residing in rural areas (Saeed, 2013). There was high unemployment rate among participants (aged 26 – 45 years). Namibia is ranked at second position in Africa with 33.4% (19.5 – 37.6%) by December 2018, (MoHSS & NSA, 2014). Therefore, this high unemployment rate could be associated with the current high unemployment rate in the country at the time of the study.

The main behavioral risk factors for hypertension are physical inactivity, unhealthy diet, obesity, tobacco use and harmful use of alcohol. Individuals are predisposed to NCDs by poverty, unhealthy dietary practice (including low fruits and vegetables intake) and harmful use of alcohol. But on the other hand, as individuals (at household level) become financially stable, their lifestyle changes and then their exposure to NCDs increases and this is because higher incomes promote risky behaviors like higher level of physical inactivity, smoking and consumption of processed foods with high salt/ fat content including Westernization of dietary habits (Omoleke, 2013; Adebamowo, 2011). And this was proven by a study that was conducted in Kenya which found out a 5.42% association between living in urban setting and NCDs (Adebamowo, 2011).

Physical inactivity is the fourth leading risk factor for mortality, causing more than 3.2 million deaths global (Mondo, Otim, Akol, Musoke & Orem, 2013), Physical inactivity among study participants was 25.3% and this was highest among those residing in urban areas than rural areas and majority were females. These results are almost similar to the overall WHO African regions figures (22%) and less than global data (28%) for year 2016 (WHO, 2017; MoHSS & NSA, 2014). The physical and social environment such as industrialization, urbanization and economic development, social norms and motorized transport are the factors that contribute to physical inactivity (WHO, 2017).

This study found out that majority of the study participants consumed inadequate amount of fruit and vegetables, (almost half do not consume any fruit per week) and about half participants consume vegetables at least once a week with high female respondents. Globally, 2.7 million deaths are attributable to diets low in fruits and vegetables (WHO, 2018). All the study participants were always adding salt in their meals. This finding was almost similar to study conducted in Bangladesh with 80% of study participants were added salt in their meals (Khalequzzaman et al., 2017). Most participants responded that they ate processed food high in salt sometimes and less than half ate food not prepared at home within past 14 days. Any food that rich in salt (sodium), calories and saturated fats is unhealthy (WHO, 2017). Study conducted in Ethiopia found that 60 402 deaths of NCDs were associated with dietary risks (Melaku et al., 2016).

About 8% of participants reported being current smokers and higher in males than females, and was equally distributed equally among rural and urban males. Unsimilar findings with study conducted in India in 2013 found high prevalence of tobacco use among rural men than urban men (Sajeev & Soman, 2018). Various study indicated that tobacco smokers have relative risk of 2-3 times higher for coronary heart disease (CHD), 12 time risks for lung cancer, 1.5 times for stroke and 1.4 times for chronic obstructive pulmonary disease (COPD) (WHO, 2017). According to study results, current alcohol consumption rate was less than 50% and more among females than males. These results might be due to females predominantly in study. However, Studies in other countries found high proportion of alcohol consumption among males (WHO, 2018; Sajeev & Soman, 2018).

The results from this regional population-based study found gender differences in the prevalence of the measurements. On the average height of study population, males were taller than females. Findings also shows high body mass index (BMI) in females than males. However, study conducted in Lebanon does not support this (Khalequzzaman et al., 2017). The substantial proportion of population was overweight, found higher among females compared to males. Study finding is congruous with previously published studies and this established a warning sign that need urgently consideration before reaching drastic levels (Saeed, 2013; Kavishe et al., 2015). In addition, the prevalence of obesity based on BMI of ≥30 was higher in females than males. This was attributed by the physical inactivity, unhealthy diet (caloric intake) and sedentary lifestyle especially among urban residents. These result was similar to findings of a study conducted in sub-Saharan Africa countries reported that increasing rise of overweight and obesity was associated with genetic, physical inactivity and caloric intake and other underlying causes such as globalization, urbanization, occupation and perceptions of weight in some cultures (WHO, 2017 & Adebamowo, 2011). Previous published studies have demonstrated that changing lifestyle could prevent overweight and obesity, which in long run prevent NCDs such as hypertension in selected adult groups at high risk (MoHSS & NSA, 2014; Saeed, 2013; Adebamowo, 2011; Khalequzzaman et al., 2017).

This study found higher prevalence of high blood pressure among females and many were undiagnosed. Approximately quota of adult population (18 and above) in Oshikoto region has hypertension with almost half currently on treatment and majority were females. Most participants on hypertension treatment BP was not controlled. Results of an Afghanistan and Iranian study support these findings, in which the overall prevalence rate of hypertension was 27.1%, however, this study reported higher prevalence of hypertension in males than females (Saeed, 2013). Hypertension is more among older age groups even though less proportion of participants under 25 years of age has hypertension. This finding was similar to studies done in Tanzania and Uganda (WHO, 2017; Kavishe et al., 2015). This study found about ten percent of study population has abnormal heart rate, with higher proportion of tachycardia. Study conducted in Tanzania had support this findings (Kavishe et al., 2015).

Our study found some study participants with two or more combination risk factor of hypertension in which majority were urban residents. This finding was similar to study conducted in Afghanistan which reported that participants residing in urban areas were more likely to have two or more risk factors than those in rural areas. This also concur with other study cited in Saeed, 2013 found urban residence as primary risk factor for NCDs impacting the health of population. Therefore, these findings suggested that the interventions are needed to target a group of risk factors and the control strategy to address urbanization and warrants gender-sensitive strategies specifically aiming women. The bivariate analysis among socio-demographic variables of our study revealed that the age,

marital status, overweight, obesity and raised blood glucose were independently associated with hypertension.

The prevalence of hypertension significantly increased with age when comparing those ≥46 years old with those ≤45 years old. With being married compared with those single, hypertension prevalence was significantly high among married participants. Furthermore, this study reveals the odds of being hypertensive increased by existence of overweight and obesity. Other published studies conducted in Afghanistan, Angola, China, Tanzania and Uganda were in agreements with these findings that older age and higher BMI were significantly associated with hypertension (Saeed, 2013; Mondo et al., 2013; Khalequzzaman et al., 2017; Kavishe et al., 2015). This study results shows that in order to managing hypertension, it needs comorbidity consideration, therefore, this study suggests the screening program to be established to prevent the development of hypertension. The multivariate logistic regression analysis of these study findings clearly listed out older age, overweight and obesity as leading risk factors for hypertension. This finding was narrated to other studies especially association between older age and obesity, however, those studies have other risk factor which were found with strongly significant like education and alcohol consumption (Saeed, 2013; Sajeev, 2018). Therefore, the intervention at population level should target a group of risk factors in order to reduce the growing burden of hypertension.

5. Conclusion

This study revealed a high prevalence and burden of hypertension risk factors among adult in Oshikoto region, directing to changing disease epidemiology of hypertension. The researcher concluded that this increased in the burden of these risk factors could be due to rapid growth of urbanization in Oshikoto region that responsible for lifestyle changes and this was likely to inflict a major public health in future. Finally, researcher's conclusion absolutely assumed that the risk factors measured influence hypertension risk in Namibian population as they do in other SSA, Asia and European population where most studies have been conducted. Therefore, our findings can serve as baseline epidemiological data which aid policymakers to develop suitable hypertension control strategies.

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