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Prevalence of Risk Factors of Non Communicable Diseases among the Healthcare Providers of Government Health Facilities in Jorhat, Assam

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ABSTRACT

INTRODUCTION: Healthcare providers constitute an important part of public health care. Non communicable Diseases (NCD) are not only restricted to the general population but even the healthcare providers are getting victimised. **OBJECTIVE**: To assess the prevalence of various risk factors of NCDs and to find out the association between demographic variables with behavioural NCD risk factors among health professionals. **MATERIALS AND METHODS**: This was a cross sectional study carried out among healthcare providers at all the three tiers of healthcare delivery system of Jorhat district, Assam. The study tool based on World Health Organisation (WHO) STEPS Questionnaire was used to determine the prevalence of NCD risk factors. The data were analysed using SPSS version 20. **RESULTS**: Out of 310 participants 35.2% were male and 64.8% were female. Prevalence of current tobacco use, alcohol consumption, low physical activity and inadequate dietary intake was 44.8%, 32.3%, 83.8% and 90%, respectively. According to WHO classification for Asians, 60.7 % were overweight and obese. Daily smoking was significantly associated with age ($p<0.05$) and gender ($p<0.05$). Similarly alcohol consumption was also significantly associated with gender ($p<0.05$) and occupation ($p<0.05$). Inadequate dietary consumption had significant association with age ($p<0.05$) and type of health facility ($p<0.05$) whereas low physical activity was significantly associated with gender ($p<0.05$) and type of health facility ($p<0.05$). **CONCLUSION**: The prevalence of NCD risk factors was high among the health professionals. Thus there is an alarming need to persuade the health care providers in Government set up to practice a healthy lifestyle.

Keywords: WHO STEPS, Risk factors, Healthcare providers, Non communicable diseases

INTRODUCTION

A non-communicable disease (NCD) is a medical condition that is non-infectious and non-communicable among people. WHO defines non communicable diseases as "diseases of long duration and are a result of a combination of genetic, physiological, environmental and behavioral factors" [1]. Non-communicable diseases like cardiovascular diseases, cancer, chronic respiratory diseases and diabetes, make the largest contribution to morbidity and mortality, globally [2]. Cardiovascular diseases account for most NCD deaths, around 17.5 million people annually, followed by cancers (8.2 million), respiratory diseases (4 million), diabetes (1.5 million) [2] and are collectively responsible for almost 70% of all deaths worldwide[1].

The rise of NCDs has been driven by primarily four major risk factors: tobacco use, physical inactivity, the harmful use of alcohol and unhealthy diets [3, 4]. The increase of risk factors resulting from socioeconomic and environmental changes following urbanization is the decisive factor in the rapid growth of NCD burden. NCDs are also, the outcome of the "nutrition transition" i.e. from traditional vegetable dietary pattern to unhealthy dietary intake, such as processed food, fast food, and fried food.

Health care providers like Doctors, Nurses and other auxiliary staff play a vital role in the health and welfare of the people of a country. They are the mentors to general populations for a healthy life as they have rich access to information on disease frequency and determinants. In spite of being the health guide to others, health professionals themselves are falling into unhealthy population group as they have a sedentary lifestyle with high levels of stress, excessive numbers of work hours resulting in lack of proper rest and irregular eating habits. NCDs are not just limited to the general population but even the health care providers are also affected.

Therefore, the present study was conducted to assess the prevalence of various modifiable and non-modifiable risk factors of NCDs, to find out the association between demographic variables with behavioural NCD risk factors among medical fraternity and to motivate them to lead a healthy life.

MATERIALS AND METHODS

The present cross sectional study was undertaken to determine the prevalence of risk factors of Non-Communicable Diseases (NCDs) among the Health Care Providers (HCP) working in the government health facilities of all three tiers of Indian public health care delivery system in Jorhat district of Assam and to find out the association between demographic variables with behavioural risk factors. The healthcare providers included doctors, nurses and paramedics (pharmacists and laboratory technicians) working in the Govt. Health Facilities of Jorhat District, Assam.

Jorhat is an administrative district of Assam, located in the central part of Brahmaputra Valley covering an area of 2,852 sq. km [5]. It is one of the five districts of the state selected for the implementation of National Programme for Prevention and Control of Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS). Jorhat district has one tertiary health care facility, Jorhat Medical College and Hospital, ten secondary and twenty six primary health care facilities. The study was carried out from September 2017 to August 2018. Flowchart showing sample selection process is depicted below (Figure 1).

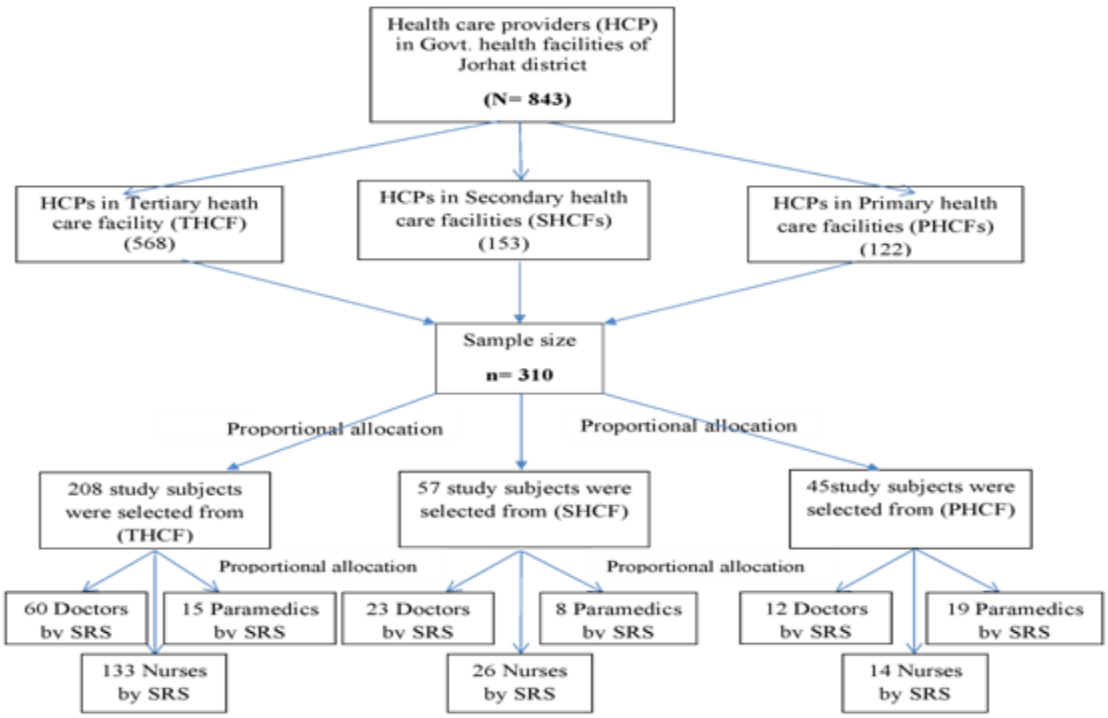

FIGURE 1: FLOWCHART SHOWING SAMPLE SELECTION PROCESS

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THCF= Jorhat Medical College and Hospital, SHCF= Block Primary Health Center (BPHC), Community Health Center (CHC) and First Referral Unit (FRU), PHCF= Primary Health Center (PHC), Mini Primary Health Center (MPHC), State Dispensary (SD) and Subsidiary Health Center (SHC).

Considering the prevalence rate (p) of hypertension among doctors in India [6] as 35.6% with a relative error 15%, the sample size was calculated to be 308. A "stratified random sampling" with "proportional allocation" was applied in the present study to select the required number of samples from the study universe to make the samples representative.

Health care providers who have been working for at least one year or more and those who gave their consent were included in the study. Pregnant women and Health care providers other than doctors, nurses, laboratory technician and pharmacists were excluded.

A predesigned and pretested interview schedule was constructed using WHO STEPS questionnaire for non communicable disease risk factors surveillance. Step-1 included demographic variables such as age, sex, religion, marital status, education, occupation, per capita income, socio-economic status and family history of chronic non-communicable diseases; and behavioural risk factors such as tobacco consumption, alcohol consumption, diet (consumption of fruits and vegetables), extra salt intake in diet, physical activity. Also, history of raised Blood Pressure, history of diabetes mellitus was taken. In Step-2 physical measurements such as blood pressure, height, weight, waist circumference, hip circumference and heart rate were measured. All the measurements were taken according to the WHO STEPs protocol [7]. Due to time and resource constraints, biochemical analysis (STEP 3) could not be performed. Ethical clearance was obtained from institutional Ethics Committee (Human) of Jorhat Medical College and Hospital. There was no conflict of interest in the study

Data were analysed as per WHO guidelines [7]. Current tobacco users were defined as individuals who used any form of tobacco during the last one month. Alcohol users were those who ever consumed an alcoholic drink. Unhealthy diet was defined as consumption of less than five servings of fruits and/or vegetables per day. Hours of physical activity of low, moderate and vigorous intensities were calculated by Metabolic Equivalent (MET) values using WHO guidelines. Physical activity was classified according to MET minutes per week into low (<600), moderate (600-2999) and vigorous (≥3000). Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared. Participants were grouped as overweight or obese if they had a BMI of ≥25 kg/m^2. Abdominal obesity based on waist circumference was defined as waist circumference of ≥ 90 cm for men and ≥ 80 cm for women. Also, Abdominal obesity based on waist-hip ratio was defined as waist-hip ratio >.90 for men and >.85 for women. Hypertension was defined as systolic blood pressure of ≥140 mm of Hg and/or diastolic blood pressure of ≥ 90 mm of Hg or on medication for hypertension. Prevalence of diabetes mellitus was considered based on the history of diabetes mellitus as diagnosed by physician or taking medication for diabetes mellitus.

Statistical analysis was done using SPSS for Windows, version 20 comprising of calculating proportion, mean and standard deviation. Association was determined using chi-square test and p- value <0.05 was considered significant for all tests. Risk factor analysis was done using odds ratios (OR) along with their respective 95% confidence intervals (CI).

RESULTS

The demographic profile of the study in Table 1 shows that most of the respondents in our study belonged to the age group of 31-40 years (45.5%) and mean age of the respondents was 39.58±8.57 years. Females constituted majority of the study subjects (64.8%). Majority of the respondents belonged to Socio-Economic class I (89.7%) followed by 10.3% in Socio-economic class II according to modified BG Prasad Socio-economic classification (revised for the year 2018). Family history of one or more Non-Communicable Diseases (Hypertension, Diabetes Mellitus, Stroke, Cardiovascular Diseases, COPD and Cancer) was present among 67.1 % of the respondents.

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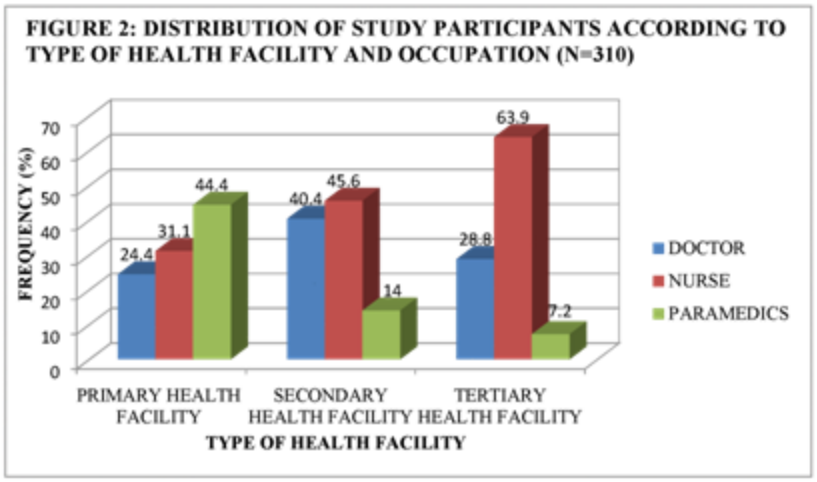

In the present study, 67.1% of the study participants were from tertiary health care facility followed by secondary and primary health care facilities (18.4% and 14.5%) respectively. Among the participants majority were nurses (55.8%) followed by doctors (30.3%) and paramedics (13.9%). (Figure 2)

Behavioural and anthropometric risk factors (STEP 1 and 2)

Prevalence of various NCD risk factors revealed mean age of initiation of smoking was 22.25±3.20 years and mean age of initiation of smokeless tobacco use was 25.19± 4.97 years (Table 2).

In the present study, 44.8% of the respondents were current tobacco users and 20.3% were current smokers. Among the current smokers, 81% were daily smokers. An increasing trend in daily smoking was observed with an increase in age and this finding was found to be statistically significant (p=0.014). Daily smoking was significantly higher among males as compared to females. (p=0.038). Daily smoking was prevalent among doctors (80.9%) and paramedics (86.7%) only. Majority of the current smokers were daily smokers in all the three types of health care facilities i.e. 83.3%, 89.5% and 75% in primary, secondary and tertiary health care facilities, respectively. Prevalence of smokeless tobacco use was 33.9%.

History of alcohol consumption was prevalent among 32.3% of study participants. Consumption of alcohol was significantly higher among males as compared to females (p=0.0001).The prevalence of alcohol consumption was also found to be significantly higher among the doctors (59.6%) as compared to nurses (15%) (p=0.0001).

It was observed that majority (90%) of the respondents in our study consumed <5 servings of fruits and/or vegetables in a day. Poor Fruits and/or Vegetables consumption i.e. less than 5 servings per day was more prevalent in the age group 31-40 years (94.3%) while 93.2% in 41-50 years and 82% in 51-60 years age group. This difference was found to be statistically significant (p=0.006).

Inadequate consumption of fruits and vegetables was observed to be more prevalent among females and in nursing profession. Among the health care providers, 73.3% working in the Primary health care facilities consumed <5 servings of fruits and/or vegetables in a day compared to 87.7% and 94.2% of the respondents working in the Secondary and Tertiary health care facilities, respectively. This difference was found to be statistically significant (p=0.000). Mean number of servings of fruits and/or vegetables in a day was 3.75±0.75.

Majority (83.8%) of the health care providers had reported to have low level of physical activities followed by 12.3% with moderate physical activity and only 3.9%were engaged in vigorous physical activity. Our study revealed that 71.1% of the respondents in the age group 21-30 years, 83.7% in 31-40 years, 90.5% in 41-50 years and 86% in 51-60 years have low level of physical activities. We found that 68.8% of males have low level of physical activities as compared to 92% in females. Our observation was statistically significant (p=0.000). We also recorded significant differences among the Doctors, Nurses and Paramedics regarding their level

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of physical activities (p=0.000). It was observed that 92.5% of nurses had a low level of physical activity compared to 75.5% of doctors and 67.4% of paramedics. A significant difference was also observed in the level of physical activity among the respondents working at different levels of Health Care facilities. Majority (88.5%) of respondents working in tertiary health care facility were found to have low level of physical activities compared to 75.6% of the respondents in the primary health care facilities and 73.3% working in secondary health care facilities.

Prevalence of overweight and obesity among the study participants was 60.7%. The prevalence of central obesity (based on waist circumference) was 64.52% and central obesity (based on waist hip ratio) was found to be 66.1%. In the current analysis the study subjects were considered as hypertensive if they had the history of hypertension and or measurement of blood pressure is high i.e. systolic blood pressure ≥140 mmHg and diastolic pressure ≥90 mmHg. Based on the history and/or measurement of blood pressure, it was found that 33.9% of the participants were having hypertension. Prevalence of diabetes mellitus was considered based on the history of diabetes mellitus as diagnosed by physician and it was found that 11.6% of the respondents had a history of Diabetes Mellitus.

DISCUSSION

Current study unfolds the prevalence NCD risk factors among health care providers of Jorhat district, Assam. We found that 44.8% of the respondents are current tobacco users, which is much higher as compared to others similar studies [8, 9]. Higher prevalence of tobacco use among healthcare workers may be due to occupational stress due to high work load in resource constraint settings. The findings from the current study indicates that despite many initiatives like awareness campaign and strict legislatures the tobacco use among the health care providers have not changed much. High prevalence of tobacco use among health care workers is a cause of concern because it may cause hindrance to anti-tobacco counseling by healthcare providers who himself is a tobacco user.

In the our study, 20.3% of all the respondents were current smokers which is similar to the findings of Muneer A Bhat, *et al* [10] (20%) and KK Aryal *et al* [9] (19%). Among the current smokers, majority of the participants (81%) were daily smokers. Similar results were obtained by Eric Maimela *et al* [11] (81.3%) and Muneer A Bhat, *et al* [10] (76%). Daily smoking was significantly higher among males as compared to females in our study (p=0.038). Smith DR *et al* [12] and K K Aryal *et al* [9] had observed similar findings in their study. This might be due to the low value given by our society to smoking by females and society does not accept female smoking habit. A statistically significant relationship was observed between tobacco use and age (p=0.014) where the prevalence of smoking increased with an increase in age of the participants. This finding was similar to the results of Zafar *et al* [13] and Ernster VL *et al* [14]. This may be due to dependency to smoking and people find difficulty to quit smoking in later age. Health care providers feel urges to smoking when there is increase load of activity related stress. This is always more as the age advances.

Prevalence of smokeless tobacco use was high (33.9%) in our study. On the contrary, earlier studies [9, 15] revealed that the overall prevalence of smokeless tobacco use was much lower between 17.8% and 5.7%. A high prevalence of smokeless tobacco use in our study might be attributed to a higher socially accepted habit of taking betel nut (areca) with tobacco in different forms like gutka, panmasala, khaini etc. in this part of the country. Recently though Government has banned the selling of tobacco related products in Assam however it is not yet materialized.

In the present study, 32.3% of the Health Care Providers consumed alcohol. Our findings are consistent with the findings of Garg A, *et al* [16], Obadeji A *et al* [17] and Verenkar YJ *et al* [18]. High alcohol consumption among health professionals may be attributed to high workload. Also alcohol is a socially accepted drink in many communities in Assam. Global Status report on alcohol and health 2014, released by the World Health Organization states that around 30% of the total population of India consumes alcohol a year.

Alcohol consumption was significantly higher among the male Health Care Providers (63.3%) as compared to females (15.4%). Similar trend was observed by Ganesh K.S *et al* [19]. This may be because cultural

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acceptability of alcohol consumption among males is more as compared to females.

Prevalence of alcohol consumption was significantly higher among the doctors (59.6%). A study conducted by Juntunen J *et al* [20] found that alcohol consumption among doctors was higher than that of the general population in Finland. High consumption of alcohol among doctors may be due to high purchasing power and frequently attending academic conferences/CME and social functions etc. where alcohol is served as a mark of refreshment.

Majority of the respondents (90%) in the present study had consumed <5servings of combined fruits and/or vegetables in a day which is consistent with the findings of Eric Maimela *et al* [11] (88.6%), Gandhi H *et al* [21] (92%) and Sharma D, *et al* [15] (85.4%). Among the health care providers, 73.3% working in the Primary health care facilities consumed <5 servings of fruits and/or vegetables in a day compared to 87.7% and 94.2% of the respondents working in the Secondary and Tertiary health care facilities, respectively. This difference was found to be statistically significant (p=0.000). This may be due to the fact that tertiary health care facilities are situated in urban setting and they solely dependent on fruits and vegetables available in the markets where as primary and secondary health care facility workers get fruits and vegetables from the local agriculture production and it is convenient for them to have more on daily basis. Further health care providers working in the tertiary health care facilities have more predilection towards junk food as it is ready to serve and eat in urban area.

In our study, 83.8 % of the respondents were found to be involved in low level of physical activity. This is comparable to the findings of Singh and Purohit *et al* [22] (68%), Sanabria Rojas *et al* [23] (87.8%) and JS *Jerônimo et al* [24] (82.4%). A significantly higher proportion of females (92%) were having low levels of physical activity compared to 68.8% of males who had a low level of physical activity which is comparable to the findings of F Nelson *et al* [25] and contrary to the finding of Bhagyalaxmi *et al* [26]. It was observed that low level of physical activity was significantly higher among nurses (92.5%) compared to doctors (75.5%) and paramedics (67.4%). It was also observed that a significantly higher number of Health Care Providers working in Tertiary Health Care Facilities (88.5%) had low level of physical activity compared to 75.6% of the respondents working in the primary health care facilities and 73.3% working in secondary health care facilities. This could be due to hectic schedule and long duration of work hours of the health care providers at tertiary health care facility and their works are mostly sedentary in nature. Moreover patient load is expected to be high at a tertiary heath care facility leading to less time for physical exercise.

Majority (60.7%) of the respondents were found to be overweight and obese. The finding is somewhat similar to the findings of Mehen MB *et al* [27] (65.5%) and Reddy KS *et al* [28] (51.4%). In our study 64.52% of the respondents had central obesity which is in line with the results obtained by Ankur Garg, *et al* [16] (77.5%) and Shailendra Kumar *et al* [29] (94.4%). This may be due to transition of food habits from low fat (traditional) diet to high fat (western) diet. Since most of the participants belonged to higher socio-economic class they are able to purchase costly food items having high calories. In our study 66.13% of the Health care providers were found to be obese (high Waist-hip Ratio). The findings of Mehan MB *et al* [27] and Gandhi H *et al* [21] corroborated with the present finding.

It was seen in the present study that 33.9% of the health care providers had hypertension based on history and or measurement of blood pressure. The findings of the present study corroborated with the findings of Eric Maimela *et al* [11] (38.2%), JS Thakur *et al* [30] (40.1%), Sumita Sandhu *et al* [31] (32.6%) and A Bhagyalaxmi *et al* [26] (29%). This may be attributed to the fact that majority of the participants in the present study were overweight and obese which are the risk factors for hypertension. Most of the respondents consumed extra salt in their diet and have low physical activity which may lead to hypertension.

In the present study we observed that 11.6% of the respondents were known Diabetic. The findings of our study were similar to the findings of Shailendra Kumar B. Hegde *et al* [29] (15.6%), Ramachandran A *et al* [6] (12.1%) and JS Thakur *et al* [30] (14.3%). This may be attributed to high prevalence of overweight and obesity among the doctors. It may also be contributed by their low level of physical

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activity and low consumption of fruits and vegetables.

One of the major strength of our study is that, interviews and measurements were taken by a single investigator thereby minimizing bias. Limitations include small sample size and step-3 could not be done. Further studies among health professionals with larger sample size in multicenter and more detailed risk factor profile including biochemical measurements are recommended.

In conclusion, prevalence of unhealthy diet and low physical activity were very high among this population group which may be a contributory factor for a high prevalence of overweight and obesity too. Smoking and alcohol consumption was more common among men whereas low physical activity was more common among women. Alcohol consumption was significantly higher among doctors as compared to nurses and paramedics. Unhealthy diet and low physical activity were more prevalent among health care professionals working in tertiary health care facilities compared to their counterparts working in primary and secondary health care facilities.

TABLE 1: DISTRIBUTION OF THE RESPONDENTS ACCORDING TO DEMOGRAPHIC CHARACTERISTICS

Characteristics		Number (n= 310)	Percentage (%)
Age group in years	21 – 30	45	14.5
	31 – 40	141	45.5
	41 – 50	74	23.9
	51 – 60	50	16.1
Sex	Male	109	35.2
	Female	201	64.8
Religion	Hindu	291	93.9
	Muslim	19	6.1
	Others	0	0
Marital status	Married	287	92.6
	Unmarried	23	7.4
	Divorced	0	0
Education	Completed high school	176	56.7
	Completed graduation	69	22.3
	Completed post-graduation	65	21
Occupation	Doctors	94	30.3

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	Nurse	173	55.8
	Paramedics	43	13.9
Income per capita (in Rupees/month)	6574 and above	278	89.7
	3287-6573	32	10.3
	1972-3286	0	0
	986-1971	0	0
	985 and below	0	0
Socio-economic status (modified BG Prasad 2018)	I	278	89.7
	II	32	10.3
	III	0	0
	IV	0	0
	V	0	0
Family history of NCDs	Present	208	67
	Absent	102	33
	Total	310	100

TABLE 2: STATUS OF RISK FACTORS OF NON-COMMUNICABLE DISEASES (N=310)

Risk factors	Frequency	Percentage
Current tobacco use (A+B+C)	139	44.8%
Exclusive Smoking tobacco (A)	34	11%
Exclusive Smokeless tobacco (B)	76	24.4%
Both smoking and smokeless tobacco (C)	29	9.4%
Current smoker (A+C)	63	20.3%
Current smokeless tobacco user (B+C)	105	33.9%
Daily smoking	51	16.5%
Alcohol consumption	100	32.3%

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<5 Servings of Fruits and/or vegetables in a day	279	90%
Low physical activity	260	83.8%
Overweight and obesity	188	60.7%
Abdominal obesity (based on waist circumference)	200	64.5%
Abdominal obesity (based on waist-hip ratio)	205	66.1%
Hypertension	105	33.9%
Diabetes mellitus	36	11.6%

TABLE 3: ASSOCIATION OF DEMOGRAPHIC VARIABLES WITH BEHAVIOURAL NCD RISK FACTORS

Demographic variables		Behavioral risk factors							
		Daily smoker among Current smoker N=63 n (%)	χ^2 df	Alcohol consumption N=310 n (%)	OR	<5 Servings of fruits and/or vegetables consumed in a day N=310 n (%)	χ^2 df	Low Physical activity N=310 n (%)	χ^2 df
Age group (in years)	21-30	4(44.4)	10.6* 3	11(24.4)	1	36(80)	12.4* 3	32(71.1)	11.3 6
	31-40	22(81.2)		50(35.5)	0.59	133(94.3)		118(83.7)	
	41-50	17(89.5)		23(31.1)	0.72	69(93.2)		67(90.5)	
	51-60	8(100)		16(32)	0.69	41(82)		43(86)	
Sex	Male	51(82.3)	4.3* 1	69(63.3)	1	95(87.2)	1.51 1	75(68.8)	32.1* 2
	Female	0(0)		31(15.4)	9.46*	184(91.5)		185(92)	
Occupation	Doctor	38(80.9)	4.57 2	56(59.6)	1	80(85.1)	5.80 2	71(75.5)	26.1 4
	Nurse	0 (0)		26(15)	8.33*	162(93.6)		160(92.5)	
	Paramedic	13 (86.7)		18(41.9)	2.045	37(86)		29(67.4)	
Type of healthcare	Primary	10 (83.3)	1.67 2	13(28.9)	1	33(73.3)	18.4* 2	34(75.6)	11.7* 4
	Secondary	17(89.5)		20(35.1)	0.775	50(87.7)		42(73.7)	

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facility	Tertiary	24(75)		67(32.2)	0.854	196(94.2)		184(88.5)	
Total		51(81)		100(32.3)		279(90)		260(83.8)	

*p<0.05(statistically significant); OR, odds ratio; x^2, chi square; df, degree of freedom

REFERENCES

1. Park K. Park's textbook of preventive and social medicine.24th ed. Jabalpur: M/S Banarsidas Bhanot; 2015: 380-381
2. Non-communicable diseases. Available from: http://www.who.int/mediacentre/factsheets/fs355/en/
3. Global Health Observatory (GHO) data.Available from: http://www.who.int/gho/ncd/risk_factors/en/
4. "District Census 2011". Census2011.co.in. 2011. Retrieved 2011-09-30
5. Ramachandran A, Snehalata C, Yamuna A, Murugesan N. High prevalence of Cardiometabolic Risk Factors among young physicians in India. J Assoc Physicians India. Jan 2008;56:17-20. [accessed 2017 May 11] Available from: http://www.japi.org/january2008/O-17.pdf
6. Geneva: World Health Organization; 2003. [accessed on March 4, 2013]. Surveillance of riskfactors for non communicable diseases. The WHO STEP wise approach. Non communicable diseasesand mental health. Available from: http://www.who.int/ncd_surveillance/steps/riskfactor/en/index.html
7. Ahmed A. Mahfouz et al. Tobacco Use among Health Care Workers in Southwestern Saudi Arabia. BioMed Research International.2013, Article ID 960292, 5 pages. Available from http://dx.doi.org/10.1155/2013/960292
8. Non Communicable Disease Risk Factor Survey Nepal 2013. Available from : http://www.searo.who.int/nepal/mediacentre/non_communicable_diseases_risk_factors_steps_survey_nepal_2013..pdf.
9. Bhat M.A et al. Smoking behaviour among young doctors of a tertiary care hospital in North India. Int J Res Med Sci. 2014 :2(3);1026-1030
10. Smith DR, Zhao I, Wang L. Tobacco smoking among doctors in mainland China: a study from Shandong province and review of the literature. *Tobacco Induced Diseases*. 2012;10(1):14
11. Zafar M. Prevalence of Smoking and Associated Risk Factors among Medical Professionals in Hospitals of Karachi, Pakistan. International journal of preventive medicine.2014;5(4):457-462
12. Ernster VL et al. Facial wrinkling in men and women, by smoking status. American journal of public health.1995;85(1):78-82.
13. Divya Sharma et al. Study of cardiovascular risk factors among tertiary hospital employees and their families Indian heart journal 64 (2012) 356-363ces
14. Garg A. et al. Prevalence of Risk Factors for Chronic Non-communicable Diseases Using WHO Steps Approach in an Adult Population in Delhi. J Family Med Prim Care. 2014:Vol 3(2); 112–118.
15. Adetunji Obadeji et al. Hazardous alcohol use among doctors in a Tertiary Health Center. Ind Psychiatry J. 2015; 24(1): 59–63.
16. Yash Jairam Verenkar et al. Prevalence and pattern of alcohol consumption using alcohol use disorder identification test among students at a medical college in Goa, India. Int J Community Med Public Health. 2018;5(7):2935-2938
17. Ganesh Kumar S et al. Prevalence and pattern of alcohol consumption using AUDIT in Rural Tamil Nadu, India.JCDR.2013;7(8:1637-1639.)
18. Juntunen J et al. Doctors' drinking habits and consumption of alcohol.BMJ.1988;297(6654):951-4.
19. Gandhi H et al. A survey on physical activity and noncommunicable disease risk factors among physicians in tertiary care hospitals, mangalore . National Journal of Community Medicine.2012;Vol 3 (1):7-13

Volume 2, Issue 3; May-June 2019; Page No. 173-183

20. Singh A. et al. Physical activity, sedentary lifestyle, and obesity among Indian dental professionals. J Phys Act Health. 2012;9(4):563-70.

21. Sanabria-Rojas H et al. The physical activity level of people working at a regional health office in Lima, Peru. Rev Salud Publica (Bogota). 2014;16(1):53-62.

22. JS Jerônimo et al.physical activity in staff workers at centers for psychosocial care in Southern Brazil:temporal trends.Cad. Saude Publica.2014;vol30(12)

23. F. Nelson et al. prevalence of risk factors for non-communicable diseases for new patients reporting to korle-bu teaching hospital. Ghana medical journal.2015;vol 49 (1):12-18

24. Bhagyalaxmi A. et al. Prevalence of Risk Factors of Non-communicable Diseases in a District of Gujarat, India. J HEALTH POPUL NUTR.2013 :Vol31(1);78-85

25. Mehan MB et al. Profile of non communicable disease risk factors in industrial setting.JPGM.2006;53(3):167-171

26. Reddy KS, Prabhakaran D, Chaturvedi V, Jeemon P, Lakshmi R, Singhi M, et al . Cardiovascular risk profile across India Results from the CVD Surveillance in Industrial Populations Study. Indian Heart J 2005;57:543-57

27. Shailendra Kumar B. Hegde et al. Prevalence of Diabetes, Hypertension and Obesity among Doctors and Nurses in a Medical College Hospital in Tamil Nadu, India. National Journal of Research in Community Medicine.2015; Vol.4(3):235-239

28. Sandhu S et al. Prevalence of Risk Factors for Noncommunicable Diseases in Working Population. .MAMC J Med Sci 2015;1:101-104

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