Original Research Article

Prevalence of risk factors for non-communicable diseases, undiagnosed diabetes and dyslipidemia among doctors as compared with age and gender matched adults in Delhi NCR: a hospital based study

Varun S. Pichika[1], Abhishek O. Tibrewal[2]*, Narinder P. Singh[1], Pankaj N. Chowdhary[1], Rajat K. Agarwal[1]

[1]Department of Medicine, Max Super Speciality Hospital, Ghaziabad, Uttar Pradesh, India
[2]Department of Epidemiology and Biostatistics, Independent Consultant, New Delhi, India

*Correspondence:
Dr. Abhishek O. Tibrewal,
E-mail: dr.abhishek08@hotmail.com

ABSTRACT

Background: Doctors, due to their work-related stress, are prone to non-communicable diseases (NCDs) risk factors (smoking, alcohol use, unhealthy diet, physical inactivity) making them vulnerable to lifestyle disorders such as obesity, diabetes, dyslipidemia etc. To compare the prevalence of NCDs risk factors, obesity, diabetes and dyslipidemia among doctors and healthy adults visiting preventive health clinic of Delhi tertiary care hospital.

Methods: This was a cross-sectional study among 100 doctors and 100 healthy subjects aged 30-60 years, without coronary heart disease and pre-existing diabetes or hypertension. The variables included were socio-demographic; risk factors, and laboratory. Descriptive analysis, chi-square or fischer exact and independent t-test was used.

Results: The age (mean: 42.4 vs. 44.4; p=0.14) and gender (M: 80% vs. 76%, p=0.5) were comparable between doctors and the healthy adults. The prevalence of alcohol use (75% vs. 13%, p<0.001) and physically inactivity (42% vs. 27%, p<0.001) were higher, while the prevalence of smoking (15% vs. 31%, p<0.001) was lower among doctors versus the healthy adults. The prevalence of abnormal total cholesterol (40% vs. 25%, p=0.024) was higher, while the prevalence of undiagnosed diabetes (5% vs. 18%, p=0.006), abnormal HDL (21% vs. 37%, p=0.013) and abnormal triglyceride (32% vs. 48%, p=0.021) was lower among doctors versus the healthy adults.

Conclusions: The prevalence of NCDs risk factors was found to be higher among doctors versus healthy adults. Therefore, there is a need of regular health awareness and screening programs among doctors as well.

Keywords: NCDs risk factors, Doctors, Diabetes, Dyslipidemia, Delhi

INTRODUCTION

NCDs, also known as chronic diseases, are non-infectious and non-transmissible diseases which last for long periods of time and progress slowly.[1] NCDs include cardiovascular diseases (CVD), diabetes, respiratory diseases, most forms of cancers, etc.[2] According to World health organization (WHO), NCDs are by far the leading cause of death in the world, representing over 60% of all deaths, of which 47% are due to CVD, 22% due to respiratory diseases, 12% due to cancers, 4% due to diabetes, etc.[3] The manual of national programme for prevention and control of diabetes, CVD and stroke which has been collaboratively developed by the government of India and WHO stated that these NCDs are caused by a set of risk factors like unhealthy diet (low fruits and vegetables intake), physical inactivity, smoking, alcohol use, overweight/obesity, raised blood glucose, and dyslipidemia high levels of total cholesterol, low-density lipoprotein (LDL), and triglycerides and low

levels of high-density lipoprotein (HDL).[4] Therefore, simply by changing the lifestyle or making simple changes in the way people live their lives, these diseases can be prevented.

Doctors play a vital role in the health and welfare of the people of a nation. Health of the doctors is of paramount importance because they themselves must be healthy to perform their jobs optimally under challenging work environments. Additionally, evidence suggests that there is a strong and consistent relationship between doctor's health choices and the recommendations he or she makes to his or her patients[5]. Doctors are constantly confronting the stresses of increasing government regulations, malpractice suits, increased clinical demands, a rapidly expanding knowledge base, and balancing their personal and professional lives. Moreover, their altruistic tendencies result in putting their profession before their personal needs. Due to these circumstances, they are prone to develop unfavorable lifestyle habits such as smoking, alcohol use, unhealthy diet consumption, lack of exercise and eventually forming a sedentary lifestyle. All these, may ultimately make them vulnerable to lifestyle disorders such as obesity, diabetes, dyslipidemia etc.

At present, the majority of research in the area of doctors' health has been focused on three domains namely work-related stress and burnout, mental health disorders such as depression and suicide, and substance abuse. In contrast, there has been limited research to-date on lifestyle behaviours and preventive health care among doctors. Some studies have been conducted on the risk factors for NCDs in the world and perhaps in India, however, there is limited literature on the prevalence of NCD risk factors among private practicing doctors as compared with the healthy adults, particularly in the northern India. The objectives of the study were to compare 1) the prevalence of NCDs risk factors among doctors as compared with the healthy adults and 2) the prevalence of overweight or obesity, undiagnosed type 2 diabetes mellitus and dyslipidemia among doctors as compared with the healthy adults.

METHODS

This was a cross-sectional hospital-based study conducted in a tertiary care hospital, Delhi national capital region (NCR) from 1st January 2015 to November 30th 2016. The ethical clearance for this study was obtained from the Institutional Ethics Committee of the hospital. The inclusion criteria for the study were doctors (part- or full-time) working in the hospital, irrespective of their speciality and healthy adults visiting the hospital's health and wellness clinic for preventive health check-up aged 30-60 years. The exclusion criteria were pregnancy and pre-existing diabetes, coronary heart disease or hypertension. Informed consent was obtained from the participants before enrolment.

Multiple variables were recorded using a questionnaire based on WHO steps (stepwise approach to surveillance) core questionnaire for each of the included study subjects.[6] These variables included age (self-reported in years); gender (male/female); height (measured by stadiometer in meters); weight (measured by weighing machine in kilogram); smoking status (smokers were defined as those who had smoked at least 100 cigarettes in their entire life and were currently smoking at least 1 cigarette daily or some day in a week); alcohol use was defined as consumption of any alcohol containing drink (such as beer, wine, whiskey, rum, spirits etc.,), irrespective of the amount, within the past 30 days]; physical activity [physically active were those who did at least 150 minutes of moderate-intensity physical activity (brisk walking, slow cycling, light weight lifting etc.) or at least 75 minutes of vigorous-intensity physical activity (jogging, fast cycling, heavy weight lifting etc.) or an equivalent combination of moderate and vigorous-intensity activity per week; adequate fruits and vegetables consumption [adequate fruits and vegetables consumption was defined as taking at least 400 gm (i.e., five portions) of fruits and vegetables per day, excluding potatoes and other starchy tubers]; BMI [self-reported, calculated using weight/height^2 in kg/m^2]; laboratory blood glucose profile [fasting and post-prandial (2 hours after meal); cut-offs based on American diabetes association]; and laboratory lipid profile [total cholesterol, HDL, LDL, triglyceride, very low density lipoprotein (VLDL) (cut-offs based on American heart association)].[7,6,8-11]

Statistical analysis

The collected data were entered and analyzed using SPSS version 22 software. Descriptive analysis, chi-square or fischer exact test and independent t test were done to see the statistical significance between various variables among doctors and the healthy subjects. For the sample size calculation, a relevant difference of 20% in the prevalence of NCDs risk factors was considered among doctors as compared with the healthy subjects (whose prevalence was identified to be 40% from the secondary sources). Using a two-tailed α value of 0.05 and a β value of 0.2, it was observed that a minimum of 97 subjects per group would be sufficient. For this study, every 5th healthy adult visiting the preventive health check-up clinic, and all the doctors were considered.

RESULTS

Socio-demographic characteristics

The study was carried out among 100 doctors and 100 healthy subjects. The mean (SD) age [42.4 (9.0) vs. 44.4 (9.0) years, respectively, p=0.135] was comparable between doctors and healthy subjects with almost equal proportion of them distributed across different age groups (p=0.53). The gender (M: 80% vs. 76%, respectively, p=0.495) was also similar between doctors and healthy

subjects. Moreover, the mean (SD) height 162.4 (9.6) vs. 162.2 (8.5) cm and weight 75.2 (10.6) vs. 73.7 (11.7) kg were also comparable between doctors and healthy subjects, respectively (Table 1).

Table 1: Comparison of socio-demographic variables among doctors and healthy subjects.

Variables	Doctors (n=100)	Healthy subjects (n=100)	P value
Average age (years)	42.4 (9.0)	44.4 (9.0)	0.135
Age (years)	N (%)	N (%)	
30–40	48 (48)	46 (46)	
41–50	37 (37)	33 (33)	0.530
51–60	15 (15)	21 (21)	
Gender	N (%)	N (%)	
Male	80 (80)	76 (76)	
Female	20 (20)	24 (24)	0.495
Height (cm)	162.4 (9.6)	162.2 (8.5)	0.844
Weight (kg)	75.2 (10.6)	73.7 (11.7)	0.322

SD: Standard deviation, cm: centimeter, kg: kilogram, N (%) except for those with mean (SD).

Table 2: Comparison of different risk factors among doctors and healthy subjects.

Risk factors	Doctors (n=100)	Healthy subjects (n=100)	P value
	N (%)	N (%)	
Smokers	15 (15)	31 (31)	<0.001*
Alcohol use	75 (75)	13 (13)	<0.001*
Physically inactive	42 (42)	27 (27)	<0.001*
Inadequate fruits and vegetables use	71 (71)	88 (88)	0.003*
BMI (kg/m^2)	28.7 (4.3)	28.1 (4.6)	0.363
18.5-24.9 (normal weight)	22 (22)	23 (23)	
25-29.9 (overweight)	41 (41)	49 (49)	
30-34.9 (grade 1 obese)	28 (28)	23 (23)	0.500
≥35 (grade 2 obese)	9 (9)	5 (5)	

SD: Standard deviation; m: meter; kg: kilogram, N (%) except for those with mean (SD), *statistically significant (p<0.05).

Table 3: Fasting and post-prandial blood glucose among doctors and healthy subjects.

Blood glucose parameter	Level (mg/dl)	Doctors (n=100)	Healthy subjects (n=100)	P value
		N (%)	N (%)	
FBS	<100 (normal)	59 (59)	51 (51)	
	100-125 (impaired)	38 (38)	34 (34)	0.012*
	>125 (diabetic)	3 (3)	15 (15)	
PPBS	<140 (normal)	76 (76)	58 (58)	
	140-200 (impaired)	19 (19)	24 (24)	0.006*
	>200 (diabetic)	5 (5)	18 (18)	

FBS: fasting blood sugar; PPBS: post-prandial blood sugar; mg: milligram; dL: decilitre, *statistically significant (p<0.05).

Table 4: Lipid profile among doctors and healthy subjects.

Lipid parameter	Level (mg/dl)	Doctors (n=100)	Healthy subjects (n=100)	P value
		N (%)	N (%)	
Total cholesterol	<200 (normal)	60 (60)	75 (75)	0.024*
	≥200	40 (40)	25 (25)	
HDL	≥40 (normal)	79 (79)	63 (63)	0.013*
	<40	21 (21)	37 (37)	
LDL	<100 (normal)	42 (42)	33 (33)	0.189
	≥100	58 (58)	67 (67)	
TG	<150 (normal)	68 (68)	52 (52)	0.021*
	≥150	32 (32)	48 (48)	
VLDL	2-30 (normal)	58 (58)	53 (53)	0.477
	>30	42 (42)	47 (47)	

HDL: High density lipoprotein; LDL: Low density lipoprotein; VLDL: Very low-density lipoprotein; TG: Triglyceride; mg: milligram; dL: deciliter, *statistically significant (p<0.05).

Risk factors

The risk factors differed significantly among doctors and healthy subjects such that a lower proportion of doctors were smokers (15% vs. 31%, p<0.001) and had inadequate fruits and vegetables consumption (71% vs. 88%, p=0.003) as compared with the healthy subjects. In contrast, a higher proportion of doctors were alcohol users (75% vs. 13%, p<0.001) and physically inactive

(42% vs. 27%, p<0.001) as compared with the healthy subjects. A total of 37% of doctors and 28% of healthy subjects were obese (grade 1 and grade 2), however, the proportion of subjects across different BMI categories (p=0.5) and mean (SD) BMI (p=0.363) did not differ significantly between the two groups (Table 2).

Laboratory parameters

The fasting and post-prandial blood glucose differed significantly across the two groups. The prevalence of undiagnosed diabetes was 3% in doctors versus 15% in healthy subjects based on fasting blood glucose (p=0.012) and 5% in doctors versus 18% in healthy subjects based on post-prandial blood glucose (p=0.006). Also, the prevalence of impaired blood glucose was ~35% based on fasting and ~20% based on post-prandial blood glucose in the two groups (Table 3).

The lipid profiles differed significantly between the two groups such that a higher proportion of doctors had an abnormal total cholesterol levels (i.e., ≥200 mg/dl) [40% vs. 25%, p=0.024] as compared with the healthy subjects. In contrast, a lower proportion of doctors had abnormal HDL level (i.e., <40 mg/dl) [21% vs. 37%, p=0.013] and abnormal TG level (i.e., ≥150 mg/dl) [32% vs. 48%, p=0.021] as compared with the healthy subjects (Table 4).

DISCUSSION

As per WHO, NCDs are the result of risky behaviours such as smoking, alcohol use, physical inactivity, and unhealthy diet that lead to key metabolic or physiological changes which are overweight or obesity, raised blood glucose and raised cholesterol.[12] This hospital-based cross-sectional study was conducted to identify the prevalence of these risk factors among doctors as compared with the age and gender matched healthy subjects. The prevalence of smoking among doctors in our study was 15%, a finding similar to 13% prevalence of smoking among physicians in a study conducted in Kerala in 2006.[13] Better knowledge about the harmful effects of smoking among doctors might have accounted for almost half prevalence of smoking among them versus the healthy subjects. However, almost three-fourth of doctors was alcohol users as compared with one-eighth of the healthy subjects. This high prevalence among doctors might be due to a broad definition of alcohol users (i.e. consumption of at least one alcohol containing drink in the past 30 days) and doctors attending conferences or meetings on a regular basis, where social drinking is a norm. That said, it is vital to address doctors' smoking and alcohol use habits for two reasons. Firstly, these habits are known to have a direct effect on their health and wellbeing. Secondly, it has been shown that doctors who smoke or drink are less likely to advise their patients regarding the health hazards of smoking and drinking.[14]

Approximately two-fifth of doctors was observed to be physically inactive as compared with one-fourth of the healthy subjects. A probable reason for this could be higher workloads and longer hospital shifts. On the other hand, the proportion of doctors having adequate fruits and vegetables consumption on a daily basis was higher than that observed in the healthy subjects, which might be due to greater awareness about fruits and vegetables health benefits among doctors. But still, almost three-fourth of doctors having an inadequate fruits and vegetables consumption is alarming with a considerable scope for improvement.

In our study, approximately two-fifth of doctors was observed to be obese as compared with one-fourth of the healthy subjects. This higher prevalence of obesity among doctors can be explained by higher stress levels, which leads to increased activity of hypothalamic-pituitary-adrenal axis resulting in cortisol secretion and fat deposition and more time spent in sitting during working and leisure hours, which is known to have a significant adverse metabolic and health effects even if people meeting the current recommendation of 30 minutes of physical activity on most days each week.[15,16]

The prevalence of undiagnosed diabetes based on fasting and post-prandial blood glucose was observed to be significantly lower among doctors as compared with the healthy subjects. In our study, the limited sample size might have resulted in the higher prevalence of undiagnosed diabetes among healthy subjects than that reported in the literature: 10.3% among adults attending medical camps in Chennai and 7.2% among adults visiting health centres across eight Indian states.[17,18] Two-fourth of doctors was observed to have abnormal cholesterol level, similar to that reported among Indian physicians.[19] Moreover, this prevalence was significantly higher than that observed in the healthy subjects. However, the prevalence of abnormal HDL was half and abnormal triglyceride was two-third among doctors as compared with the healthy subjects. It is possible that the risk factors might be contributing to abnormal lipid profiles in the included study subjects.

Our study had some limitations: lack of data related to educational qualification of healthy subjects, type of specialization of doctors, and socio-economic status of the study population: most of the risk factors were self-reported; non-quantification of risk factors (i.e., no of cigarettes or drinks, duration of smoking or alcohol, type and duration of physical activity, quantity of fruits and vegetables use etc.); non-reporting of blood pressure, as one of the risk factor and non-analysis of correlation association between different socio-demographic variables, risk factors and laboratory parameters.

CONCLUSION

The prevalence of alcohol use and physically inactivity was higher, while the prevalence of smoking was lower among doctors versus the healthy adults. Moreover, the prevalence of abnormal total cholesterol was higher,

while the prevalence of undiagnosed diabetes, abnormal HDL and abnormal triglyceride was lower among doctors versus the healthy adults. These findings suggest that the doctors are also at an increased risk of developing NCDs, therefore, there is a need of regular health awareness and screening programs among doctors as well.

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