A Pilot Study Prevalence of Non-Communicable Disease Urban Population in Udaipur (Rajasthan)

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Abstract

Non-communicable diseases continue to be important public health problems in India, being responsible for sizeable mortality and morbidity. Demographic changes and changes caused in the environment and the economy are the major reasons for shift against a predominantly communicable diseases scenario A pilot study, consisting of a total sample of five hundred and sixty-eight comprising both male (40.49%) and female (59.51%) subjects of age ≥ 18 years, was conducted. All subjects lived in Udaipur district of Rajasthan. Blood glucose levels, blood pressure, height, weight, waist girth, and hip circumference were measured. The prevalence of type 2 diabetes was 7.8% among male and 7.1% in female individuals. Prevalence of pre-hypertension and hypertension was found to be 34.4% and 19.7% among males and 24.5% and 17.5% in females. The risk for diabetes was equal in both men (6.1%) and women (6.5%), while that for high blood pressure was higher in females (22.9%) as compared to males (17.8 %). The percentage of individuals with BMI between 23 - 25 males was 12.1 % and for > 25 was 18.7%. Among the females the percentage of individuals with BMI between 23 - 25 was16.0% and for > 25 it was 20.1%. Females were found to have a higher BMI as compared to males. Prevalence of liquor consumption was (57.6 %) among male individuals. The results of our screening suggest that long exposure to an unhealthy lifestyle involving cigarette smoking, obesity, and sedentary lifestyle, consumption of diets rich in highly saturated fats, sugars, and salt, typified by "fast foods" to increase higher levels of risk factors, such as hypertension, dyslipidemia, diabetes, obesity, coronary and other vascular disease.

Keywords: *Urban Population; Type 2 Diabetes; Screening; Hypertension; Body Mass Index (BMI)*

Introduction

Udaipur is one of the Lake city districts Kashmir of Rajasthan having geographical area of 1,936 sq km. The district lies between North latitude 30°44'53" to 31°22'01" and East longitude 76°36'10" to 77°15'14" The rural and urban population is 4, 09,362 (81.78%) and 91,195 (18.22%) respectively. The local inhabitants mainly depend on agriculture for their subsistence and adopt several traditional practices conducive for farming in sloping terrains. Large and small scale industrial development however has taken place randomly all over the district, especially rapid industrial development is taking place in areas adjoining Baghpura plains viz., at Rishabh dev, Nathdwara and shri nath in Udaipur district.

Non-communicable diseases continue to be important public health problems in India, being responsible for sizable mortality and morbidity. Demographic changes and changes caused in the environment and the economy are the major reasons for shift against a predominantly communicable diseases scenario. Aging population allows manifestation of cardiovascular diseases, cancer and mental disorders which also result in high prevalence of chronic disability.

Non-communicable diseases (NCDs) usually emerge in middle age after long exposure to an unhealthy lifestyle involving cigarette smoking, obesity, and sedentary lifestyle, consumption of diets rich in highly saturated fats, sugars, and salt, typified by "fast foods" are

known to increase higher levels of risk factors, such as hypertension, dyslipidemia, diabetes, obesity, coronary and other vascular disease. Metabolic syndrome refers to the cluster of risk factors that increases the risk of developing type 2 diabetes mellitus (DM) and cardiovascular diseases. Risk factors associated with metabolic syndrome include an increased waist circumference, elevated triglycerides, reduced high density lipid-C (HDL-C), high blood pressure and elevated fasting blood glucose. In past century, communicable diseases were the major contributor of burden of diseases in the world. But nowadays, NCDs have replaced them even in the developing countries. This is mainly due to changing demographics and lifestyles of the population. Eighty percent of the NCDs can be prevented by adopting good lifestyle like physical exercise, balance diet, avoiding use of smoking and alcohol.

Overweight and Obesity

Obesity has become a global public health issue. Overweight and obesity are important risk factors that underlie the emergence of chronic diseases. The other intermediate risk factors of chronic diseases (i.e. high blood pressure and high blood cholesterol levels) are intimately linked to and determined by the body weight of an individual [1]. Obesity itself is directly associated with increased risk of a range of health problems like osteoarthritis, but also increases the risk of NCDs like cardiovascular disease and type 2 diabetes. Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. BMI is defined as weight in kilograms divided by the square of height in meters (kg/m^2). A BMI greater than 30 is associated with elevated blood pressure and increased risks of diabetes and coronary heart disease [1]. BMI has emerged not only as the diagnostic criteria for overweight and obesity, but also as the principal anthropometric measure used to assess chronic disease risks related to body size and composition.

Obesity and Cardiovascular disease

Along with smoking, high blood pressure and high blood cholesterol levels, obesity is an intermediate risk factor for cardiovascular diseases (CVD) like coronary heart disease and strokes. Overall, obesity contributes up to 40 per cent of the risk of hypertension and between 20 per cent and 30 per cent of the risk of CVD and stroke (James and others, 2004). Obesity is also a risk factor for other cardiovascular events such as cardiac failure, arrhythmia's, peripheral vascular disease and pulmonary hypertension [2]. The risk of heart disease and stroke increases continuously with BMI (Field and others, 2001). Obesity thus has a similar relationship with mortality as hypertension and hyper cholesterolemia-the risk of mortality rises with the degree of obesity.

Type 2 Diabetes Mellitus and obesity

Overweight and lack of physical activity have been consistently associated with increased risk of type 2 diabetes. Obesity is a major risk factor for non-insulin dependent diabetes mellitus (NIDDM), also known as type 2 diabetes, and the risk appears to be related both to the duration and degree of obesity. Type 2 diabetes, in turn, is a major risk factor for CVD, as are hypertension and dyslipidemia. The association between obesity and the risk of developing type 2 diabetes has been confirmed by several long-term studies [3]. Long term follow-up has demonstrated that the additional risk of developing diabetes may increase 40-fold in women who are obese as compared to women within the normal range of weight-for-height. The risk increases continuously with BMI and decreases with weight loss. It appears that the relationship between BMI and diabetes risk is very consistent across populations, despite variations in the degree of fatness across populations for the same BMI. More importantly, the links between obesity and diabetes seem to be determined by the extent of fat accumulation in the abdominal region. The increased risk of diabetes with abdominal obesity places some population groups, like those from the Asian region, at increased risk of type 2 diabetes, even at BMI levels considered to be within the normal range [4]. This crucial observation may account for the emergence of high levels of adult-onset diabetes in countries like India.

Metabolic and other disorders linked to obesity

Obesity is linked to insulin resistance and dyslipidemia. Dyslipidemia is characterized by an increase in levels of plasma triglycerides and an unhealthy pattern of plasma cholesterol's with LDL cholesterol ("bad" cholesterol) levels raised and HDL ("good" cholesterol) levels lowered, features that have been shown consistently to be related to an increase in the risk of cardiovascular disease [1]. Moderate

obesity in women is frequently associated with polycystic ovary syndrome, a common endocrine disorder of reproduction (Magnotti and Futterweit, 2007).

Obesity and cancers

The World Cancer Research Fund (WCRF) Report [5] concluded that the evidence that overweight and obesity increase the risk of some cancers is convincing. The cancers include that of the esophagus, pancreas, kidney, and bowel and probably that of the gallbladder. In women, high BMI is linked to breast cancer in post menopausal women and to cancer of the endometrium (womb).

Objectives

- To find the risk factor associated with non-communicable diseases and life-style disorders in Udaipur.
- To study metabolic syndrome.

Methodology

The data for the given diseases were collected randomly (taken 568 male and female individuals from rural population of Udaipur District) from hospitals and on familial basis. The parameters included age of respondents, gender, profession, annual family earnings, and members in the family, culture, caste, and living condition. Men and women > 18 years of age were considered. Intensive interview was taken from each participant to know incidence of type 2 DM in the family, history of blood pressure in the family and their status of physical activities and other kinds of diseases was also taken into account for this study. Systolic and diastolic blood pressure, fasting plasma glucose and/or random plasma glucose test was also taken. Body mass index (BMI) is a measure of body fat based on height and weight that applies to adult men and women. Height weight and circumferences were taken with light outfit and without shoes. For taking standing height, the measurement has been taken with the help of stadiometer. Hip circumference was measured at the widest point and waist circumference measured at narrowest point of abdomen or at the belly button or just above it. Blood pressure was taken after a 10-min rest using a digital blood pressure machine. Classification of hypertension was based on American Diabetes Association guidelines. Healthy blood pressure was taken to be < 120/80, early high blood pressure was taken to be between 120/80 and 140/90 while blood pressure 140/90 or higher was considered to be hypertension. For diabetes, also the diagnostic criteria of the American Diabetes Association were used.

Statistical Analysis

Chi square test, proportion and percentage were used as statistical methods for analysis of data.

Result

The present study was carried out in 568 individuals comprising of 230 males and 338 females. The urban population consisted of 230 males (mean age, 35.67 + 16.19) and 338 females (mean age, 55.80 + 14.69) respectively. Table 1 shows demographic, anthropometric and other clinical characteristics of both the male and female individuals.

Variables	Male N = 230	Female N = 338
Age (in yr)	35.67 + 16.19	55.80 + 14.69
Height (cm)	164.11 + 6.51	158.29 + 7.68
Weight (Kg)	51.32 + 10.779	53.34 + 12.8
Hip Circumference (cm)	84.57 + 10.1	88.70 + 13.69
Waist Circumference (cm)	74.09 + 12.55	78.22 + 13.2
BMI (Kg/m^2)	21.19 + 3.23	21.30 + 4.93
SBP (mm/Hg)	119.58 + 16	126.15 + 15.66
DBP (mm/Hg)	75.58 + 12.6	81.27 + 13.23
Liquor Consumption (ml)	431.37 + 234.93	0.00
FBG levels (mg/dl)	109.55 + 36.31	103.38 + 16.66

Table 1: Baseline characteristics of study participants.

Prevalence of Obesity

Table 2 shows the gender wise distribution of obesity. Prevalence of obesity in the study subjects was found to be 33.98%. The prevalence of obesity among males was found to be (29.13%) in comparison to (36.09%) in the females. The prevalence of underweight was higher in males 48 (20.9%) in males as compare to females 41 (12.1%). There was a statistically significant difference (χ^2 = 4.56, p < 0.50) in the distribution of BMI among male and female individuals. It was found that a higher number of females were overweight and higher numbers of males were underweight. Both overweight and underweight put the individual at risk for chronic non-communicable diseases in later life.

Degree of Obesity	Male		Female		Total	
	No.	%	No.	%	No.	%
Overweight 23 - 25	28	12.1	54	16.0	82	14.4
Obese 25	43	18.7	68	20.1	111	19.5
Underweight < 18	48	20.9	41	12.1	89	15.7
Normal 18 - 22.9	111	48.3	175	51.8	286	50.4
Total	230	100.0	338	100.0	568	100.0

Table 2: *Gender-wise distribution of study subjects according to degree of Obesity.*

χ^2 = 4.56, df = 1, p = 0.50

Prevalence of Hypertension

Table 3 shows the gender wise distribution of hypertension. The prevalence of early high blood pressure and high blood pressure was 19.6% and 28.7% in males, whereas in females the prevalence of early high blood pressure and high blood pressure was 14.5% and 35.5%. These differences was found to be statically significant (χ^2 = 6.49, df = 1, p = 0.01) that shows that the entire urban populations had inclination towards hypertension and it increase with increase in age. (Tab Females were found to be at a higher risk than males. Hypertension can be controlled with diet and physical activity and prescribed medication, which may need to be taken for life.

Degree of Hypertension	Male		Female		Total	
	No.	%	No.	%	No.	%
Healthy	119	51.7	169	50.0	288	50.7
Early	45	19.6	42	14.5	89	15.6
High	66	28.7	120	35.5	186	32.7
Total	230	100.0	338	100.0	568	100.0

Table 3: *Gender-wise distribution of study subjects according to degree of Hypertension.*

χ^2 = 6.49, df = 1, p = 0.01

Prevalence of Diabetes

Table 4 shows that out of total 568 individuals 198 (86.1%) males and 292 (86.4%) females were having normal while 18 (7.8%) and 24 (7.1%) females were having pre-diabetic. While 14 (6.1%) males and 22 (6.5%) females were having at risk zone of diabetes. Thus,

the differences was found to be statically significant (χ^2 = 0.143, df = 1, p = 0.70). Although type 2 diabetes commonly occurs in adults, an increasing number of children and adolescents who are overweight are also developing type 2 diabetes [6]. In this study high BMI, total cholesterol, physical inactivity, high blood pressure, use of tobacco and alcohol and diabetes were available the risk factors for chronic diseases of lifestyle in urban population.

Degree of Prediabetic	Male		Female		Total	
	No.	%	No.	%	No.	%
< 200mg/dl	198	86.1	292	86.4	490	86.3
> 200mg/dl	18	7.8	24	7.1	42	7.4
At risk (> 140 < 200mg/dl)	14	6.1	22	6.5	36	6.3
Total	230	100.0	338	100.0	568	100.0

Table 4: Prevalence of Prediabetes and Diabetes in male and female individuals.

$\chi^2 = 0.143, df = 1, p = 0.70$

Variables	Male		Female		Total	
	N	%	N	%	N	%
High density lipoprotein(HDL) <40 mg/dLfor men and < 50 mg/dL for women)	91	39.6	144	42.6	235	41.37
Triglycerides ≥ 150 mg/dL for men and ≥ 150 mg/dL for women	44	19.1	56	16.6	100	17.61
Low density lipoprotein(LDL) ≥ 100 mg/dL for men and ≥ 100 mg/dL for women	58	25.2	80	23.6	138	24.30
Total cholesterol ≥ 200 mg/dL for men and ≥ 200 mg/dLfor women	37	16.1	58	17.2	95	16.72
Total	230	100.00	338	100.00	568	100.00

Table 5: Lipid profile of the participants.

Discussion

The prevalence of non-communicable lifestyle diseases and metabolic syndrome has shown a rapid increase in developing countries over the past few decades. Ezzati., *et al*. [7] reported that in both developing and developed regions, alcohol, tobacco, high blood pressure, and high cholesterol are major causes of the disease burden. Results of the study revealed distinct risk factor profiles for both male and female individuals and identified poorly controlled lifestyle diseases. Another risk factor for non-communicable diseases that was found to be a major problem, especially in the female population, was obesity. The high prevalence of obesity in females is indicative of long standing problem of diabetes and cardiovascular diseases. Overweight and obesity, unhealthy diet, tobacco use, alcohol consumption, high blood pressure, high cholesterol levels, and lack of physical activity have been described as the major risk factors in non-communicable diseases. A ten-fold increase the prevalence of obesity among women in the rural population over a 10-year period was reported by Njelekela., *et al* [8]. The prevalence of overweight and obesity is estimated to be around 22% in males and 26% in females [9].

In the present studies prevalence of prediabetes, diabetes prehypertension and hypertension among the male and female population in Solan. The prevalence of prediabetes (7.8%), diabetes, 6.1%), prehypertension (19.6%) and hypertension (28.7%) in male individuals observed in this study. The incidence of prediabetes, diabetes was equal in male and females and hypertension was higher in the females than the male individuals owing to stressful living, obesity, lack of physical activity and adoption of significant lifestyle changes different from ancestral indigenous lifestyle. The main risk classical factors for NCDs namely smoking, alcohol intake, unhealthy diet and low physical activity were found to be prevalent in both rural and urban communities. The socio-demographic and economic transition has a big role in the current rise of non-communicable diseases in developing countries. Increased urbanization in developing countries means that people are more at risk because the urban environment exposes to more risky behaviour [10,11]. These diseases mainly result from life-style related factors such as unhealthy diet, lack of physical activity, tobacco and alcohol use etc. Changes in life style, behavioral patterns, and demographic profile, socio-cultural are leading to sharp increase in the prevalence of non-communicable diseases like diabetes, cardiovascular diseases, stroke, cancer etc. These diseases can be prevented by making simple changes in the way of we live their out or simple by changing over life-style. The lifestyle intervention programmes can improve the overall health profile of the communities. Dietary programmes and Physical activity programmes that encourage better control of existing diseases such as obesity, hypertension, diabetes and dyslipidemia, can also promote the community health status. Poor life-style includes, poor diet, lack of exercise, smoking, excess alcohol, poor sleep, stress due to heavy workload. Several factors are resulting in the increasing burden of lifestyle disease which includes longer average life span, rising income, increasing tobacco consumption, decreasing physical activity and increased consumption of unhealthy food. In Rajasthan, rapid urbanization and globalization mainly contribute towards increased number of people suffering from life-style disorders [12-14].

Conclusion

The main risk factors for NCDs namely smoking, alcohol intake, unhealthy diet and low physical activity are prevalent in both rural and urban communities. There are initiatives to control the burden of non-communicable diseases in the country. However, there is need to focus more on primary prevention at population level targeting interventions to reduce exposure to tobacco, reduce alcohol intake, reduce salt intake, promote healthy diets and physical activity. The observed differences in risk factors and prevalence of non-communicable diseases in urban areas could also be explained by the fact that in urban areas people have more access to refined processed foods which are energy dense and or high fat diets than the traditional foods characterized by high roughage content. This could either be due to poverty or lack of information and misconceptions also lack of access to healthy food which means that many are forced to eat what is cheaply available especially during business hours when outside their homes hence at increased risk of NCDs. Further community mobilization is needed to implement prevention strategies and reduce and prevent exposure to the non-communicable diseases risk factors and subsequently reduce the burden of the diseases.

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