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Research Article

COMMUNITY BASED SCREENING FOR DETECTION OF LIFESTYLE RISK FACTORS IN WOMEN OF REPRODUCTIVE AGE GROUP IN CITY OF NORTH INDIA

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A B S T R A C T

Introduction–India is the world's second most populated with one-fifth of the world's population. Over past 20yrs, there is dramatic rise in number of people suffering from lifestyle diseases.Lifestyle disorders encompass those risk factors that results in developing heart disease, diabetes, abdominal obesity, dyslipidemia, glucose intolerance, and hypertension.

Material and Methods - Community-based cross-sectional studyconducted in military station North India for six monthsby home visits. All the participants underwent biochemical tests, for Homoglobin, Cholesterol, Blood sugar andanthropometric measurements to assess blood pressure, weight and height. Data were collectedand analyzed using SPSS 20 Statistical Software.

Results - In 856 participants, majority belonged to age group of 29-38yrs, 50% were overweight, 37.7% (95% CI 125.9-127.2/82.7-83.3)were pre-hypertensive, 13.3%(95% CI 145.6-150.9/93.5-95.7) hypertensive, 3.3% (95% CI 137.73-156.99) had raised blood sugar. Another 119 (13.9%, 95% CI 224.60-230.24) were detected with cholesterol levels >200mg/dL and 213 (24.9%, 95% CI 10.76-10.97) had Hb<12g/dL, suggesting Anemia.

Conclusion - Prevalence of life style diseases is linked with risk factors like Obesity, Hypertension, Increase Blood Sugar and Blood Cholesterol level. Early detection of the risk factors,by screening in community using simple tests and anthropometric examination would help in detecting and treating these otherwise healthy individuals well in time.

INTRODUCTION

India is the world's second most populated country housing almost one-fifth of the world's population. Over the past 20yrs, there has been a dramatic rise in the number of people suffering from lifestyle diseases especially Type II diabetes mellitus (T_2DM) and cardiovascular diseases (CVDs). Numerous factors like chronic stress, genetic susceptibility, atherogenic dyslipidemia, insulin resistance, elevated blood pressure, visceral adiposity obesity, hyperinsulinemia, impaired glucose tolerance have been postulated to play a role in their increasing prevalence.[1]The prevalence of obesity is higher in western countries as compared to Asia, however lifestyle diseases are becoming a major health problem in Asian countries.

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At a given BMI (Body Mass Indices), there are increased metabolic responses to obesity in South-East Asians as compared to the western population. The over-responsiveness to obesity and elevated percentage body fat in Asians partially explains the higher rate of lifestyle diseases in this population.[2]

With improvement in economic situation in developing countries, increasing prevalence of obesity and the metabolic syndrome is seen in adults as well as in children. The main causes for this correlation are increasing urbanization, nutrition transition, and reduced physical activity.

Keeping this in mind, the present study was conducted to estimate the prevalence of risk factors of T2DM and CVDs in the community with an aim of generating information to help in the early diagnosis and management of these diseases. It would also help in planning adequate preventive measures for affected population and to avoid the development of these diseases and their complications in them.

MATERIAL AND METHODS

Study setting - This community-based cross-sectional study was conducted in a large military station in North India from June to December 2019.

Inclusion and exclusion criteria- The resident female members of families of army personnel aged 18yrs and above, were included in the study. Those with debilitating diseases and psychiatric problems were excluded from the study.

Sample size- Based on the 40% prevalence of metabolic syndrome in Northern India[3], keeping alpha at 0.05 and power at 80% the sample size was calculated as 366, however entire station was covered and 856 participants were studied.

***The variables studied were*: BMI[4]-** to assess the nutritional status of adults and was calculated as the ratio (kg/m^2) between weight of the individual in kilograms (kg) and height of the individual in metre square (m^2). It was classified as <18.5 underweight, 18.5-24.9 normal, 25-29.9 overweight and >30 obese;

Blood Pressure[5]–<120/80 mmHg was considered normal and ≥140/90 mmHg as hypertension; systolic blood pressure between 120-139 mmHg and diastolic blood pressure between 80-89 mmHg was taken as pre-hypertension.

Diabetes[6]–fasting plasma glucose levels ≥126 mg/dL;

Total cholesterol[7]–>200 mg/dL was considered unhealthy;

Haemoglobin[8]– <12 g/dLwas considered diagnostic of anaemia.

Data collection-Community based home visits were conducted for data collection by trained health care workers. Informed consent was obtained, and confidentiality of participants was maintained. Height and weight were measured and BMI calculated. For blood pressure measurement, three consecutive recordings were made and an average of these three values was used for the data analysis. Data related to various other factors related to life-style diseases like diet, smoking, alcohol, physical activity and stress level were not collected and not assessed in this study.

Population was screened for hemoglobin, total cholesterol and blood sugar. Hemoglobin estimation was done by cyanmethemoglobin method based on colorimetric measurement of the intensity of color developed on addition of Drabkins solution to the blood, Total cholesterol was measured by CHOD – PAP method which works on enzyme catalyzed reactions done in semi-autoanalyzer. Blood Sugar was assessed by GOD – POD method which works on oxidation principle, also done in semi-autoanalyzer.

Statistical analysis– A database was created in MS Excel and SPSS 20 Statistical Software was used for analysis of data. Data were presented as frequency (percentage) and appropriate statistical of significance were utilized.

RESULTS

Total data of 856 participants were collected. The respondents were divided in age groups of 18-28yrs, 29-38yrs, 39-48yrs, 49-58yrs, and >58yrs. It was observed that 56.5% individuals (95% CI – 32.84 – 33.33) belonged to the age group of 29-38yrs. More than 50% respondents were found to be overweight. About 3% of them were also found to be underweight. Among the respondents, 37.7% (125.9-127.2 / 82.7-83.3) were found to have pre- hypertensive BP and about 13.3% (145.6-150.9 / 93.5-95.7) of them had hypertensive BP. About 3.3% (137.73 - 156.99) participants were found to have raised blood sugar level. A total of 13.9% (224.60 - 230.24) respondents were found to have cholesterol levels >200mg/dL. About 24.9% (10.76 - 10.97) respondents were found to have Hb<12g/dL, which suggests that they may be suffering from Anaemia. (Table 1)

Table 1 Distribution according to different parameters

Age (yrs)	N (%)	Mean	SD
18-28	237 (27.7)	25.40	2.417
29-38	484 (56.5)	33.08	2.741
39-48	96 (11.2)	41.14	2.035
49-58	19 (2.2)	51.68	2.770
>58	20 (2.3)	65.60	6.916
Total	856 (100.0)	33.03	7.975
BMI (weight in kg/height in m^2)			
Underweight (<18.5)	26 (3.0)	17.22	0.935
Normal (18.5-24.9)	391 (45.7)	22.44	1.717
Overweight (25-29.9)	334 (39.0)	27.07	1.374
Obese (>30)	105 (12.3)	32.52	2.591
Total	856 (100.0)	25.35	4.008
Blood Pressure (mmHg)			
Normal (<120/80)	419 (48.9)	108.9/70.3	6.7/5.7
Pre Hypertension(120-139/80-89)	323 (37.7)	126.5/83.0	5.3/2.7
Hypertension (≥140/90)	114 (13.3)	148.2/94.6	10.3/5.2
Total	856 (100.0)	117.0/76.6	13.4/9.7
Blood Sugar (mg/dL)			
Normal (<126)	828 (96.7)	85.49	13.255
Increased (≥126)	28 (3.3)	147.36	24.832
Total	856 (100.0)	87.51	17.626
Cholesterol(mg/dL)			
< 200	737 (86.1)	163.93	20.405
>200	119 (13.9)	227.42	15.546
Total	856 (100.0)	172.75	29.578
Haemoglobin (g/dL)			
<12.0	213 (24.9)	10.86	0.715
≥12.0	643 (75.1)	13.47	7.320
Total	856 (100.0)	12.90	6.559

It was observed that out of the 334 (39%, 95% CI 26.92-27.22) respondents who were overweight, majority belonged to the age group 18-48yrs. It was also seen that out of the 105 (12.3%) respondents who were obese, majority belonged to the age group 29-48yrs. Maximum overweight and obese individuals were aged 29-38yrs. About 50% of the underweight individuals were aged 18-28yrs. (Table 2) (Fig 1)

Table 2 Distribution according to Age and BMI

Age Groups	BMI (weight in kg/height in m^2) under weight	Normal	Overweight	Obese
18-28	13 (7.73) [3.59]	142 (108.00) [10.70]	72 (92.26) [4.45]	10 (29.00) [12.45]
29-38	11 (15.79) [1.46]	206 (220.56) [0.96]	205 (188.41) [1.46]	62 (59.23) [0.13]
39-48	2 (3.13) [0.41]	30 (43.75) [4.32]	38 (37.37) [0.01]	26 (11.75) [17.29]
49-58	0	6 (9.11) [1.06]	9 (7.79) [0.19]	4 (2.45) [0.98]
>58	0	7 (9.57) [0.69]	10 (8.17) [0.41]	3 (2.57) [0.07]
Total	26	391	334	105

chi-square for trend = 60.9603, *p*-value < 0.00001

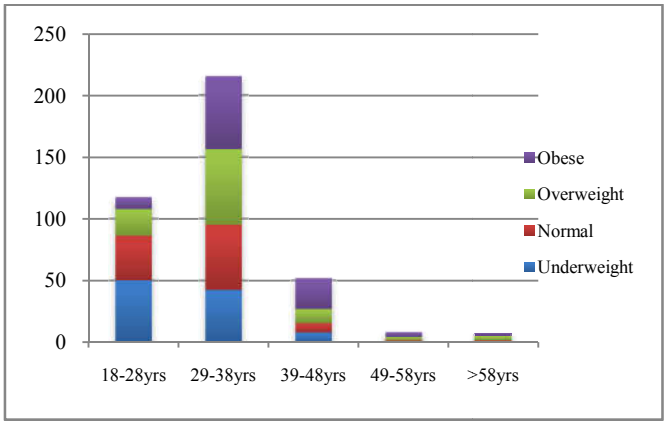

Fig 1 Distribution according to Age and BMI

Majority of prehypertensive and hypertensive individuals were aged 18-48yrs, most of which were in the age group 29-38yrs (60.7% and 54.4% respectively) and this association was found to be statistically significant. (Table 3)

Table 3 Distribution according to Age and Blood Pressure

Age Group	Blood Pressure	
	Prehypertension	Hypertension
18-28	77 (72.43) [0.29]	21 (25.57) [0.82]
29-38	196 (190.70) [0.15]	62 (67.30) [0.42]
39-48	41 (41.39) [0.00]	15 (14.61) [0.01]
49-58	6 (10.35) [1.83]	8 (3.65) [5.18]
>58	3 (8.13) [3.24]	8 (2.87) [9.17]
Total	323	114

Chi-square for trend = 21.0955, p=0.001 < .05.

It was observed that out of 28 respondents who had raised blood sugar level, maximum (50.0%) were aged 29-38yrs. Out of a total of 119 respondents who had cholesterol levels >200 mg/dL, 58.8% were aged 29-38yrs. Out of a total of 213 respondents who had Hb levels <12 g/dL, maximum (27.2%) were aged 18-28yrs. (Table 4)

Table 4 Distribution according to Age and Biochemical parameters

Age/ Parameter	18-28yrs	29-38yrs	39-48yrs	49-58yrs	>58yrs
Blood Sugar (≥126mg/dL)	7 (6.58) [0.03]	14(15.92) [0.23]	4 (4.17) [0.01]	2 (0.75) [2.08]	1 (0.58) [0.30]
Cholesterol (>200mg/dl)	22 (27.98) [1.28]	70(67.65) [0.08]	18 (17.71) [0.00]	4 (3.19) [0.21]	5 (2.48) [2.56]
Haemoglobin (<12g/dL)	50 (44.44) [0.70]	107(107.44) [0.00]	28 (28.12) [0.00]	3 (5.06) [0.84]	1 (3.94) [2.19]

Chi-square for trend = 10.51, p=0.231

It was observed that raised blood pressure levels and hypercholesterolemia were significantly associated with higher BMI levels, i.e. risk of high blood pressure and cholesterol levels was significantly more in overweight and obese people. (Table 5)

Table 5 Distribution according to BMI and other parameters

Parameters	BMI (kg/m^2)		Total	P
	Overweight n (%)	Obese n (%)		
Blood pressure (>120/80mmHg)	203 (46.5)	66 (15.1)	437	0.000
Blood sugar (≥126 mg/dL)	12 (42.9)	4 (14.3)	28	0.902
Cholesterol (>200 mg/dL)	59 (49.6)	36 (30.3)	119	0.000
Hb (<12 g/dL)	66 (34.9)	21 (11.1)	189	0.364

DISCUSSION

Our study found that 39% respondents were overweight, most of whom were aged 29-38yrs and 12.3% respondents were obese, most of whom were aged 29-38yrs. Similar results were observed in a study that was done in China in 2012 on adults aged 18-74yrs which found the prevalence of overweight and obesity were 19.2% and 15.0% respectively which was most commonly associated with individuals in the age group 18-34yrs (17.7%).[9]In contrast to our study, a study in USA that was done to assess the correlation between age and obesity found that maximum number of obese individuals were aged 40-59yrs.[10]Another cross sectional study done on the data from the 2015-16 National Family Health Survey found that 24.4% of the overweight/obese women belonged to the age group 40-49yrs.[11]

It was found that in our study, 37.7% individuals were prehypertensive and 13.3% individuals were hypertensive, and in both the groups, maximum respondents belonged to the age group 29-38yrs. A systematic review and meta-analysis of database from 1950 to 2013 was done to assess the prevalence, burden, awareness, and control of blood pressure and found the overall prevalence of hypertension in India was 29.8% with approximately 25% rural and 33% urban Indians were suffering from hypertension[12] which was quite similar to the results we obtained in our study. The fourth National Family Health Survey (NFHS-4) found hypertension in 13.8% men and 8.8% women aged 15-49yrs and 15-54yrs respectively. Another data from the Fourth District Level Household Survey found the prevalence of hypertension to be 25.3% with higher prevalence in men (27.4%) as compared to women (20.0%).[13]

In our present study, we found 3.3% respondents to have blood sugar ≥126 mg/dL out of which 42.9% were overweight and 14.3% were obese. An analysis of the prevalence and disability-adjusted life-years (DALYs) of diabetes was done in various states of India between 1990 to 2016 using all the data available and it was seen that the total number of diabetics had risen from 26 million in 1990 to 65 million in 2016. This was found to be highest in Tamil Nadu, Kerala and Delhi, followed closely by Punjab, Goa and Karnataka. The most important risk factor for Diabetes was found to be overweight.[14]The National Diabetes and Diabetic Retinopathy Survey found that about 12% men and 11.7% women suffered from Diabetes with an overall prevalence of 11.8% in the country where 8% of the total burden was accounted for by known diabetics and 3.8% were newly diagnosed cases.[15]In contrast to this, a study done to assess the trends of diabetes in USA from 1988-2010 showed an increase in the prevalence of diabetes over the years with maximum prevalence in individuals aged ≥65yrs.[16]

Dyslipidemia is an important atherosclerotic risk factor which further leads to cardiovascular diseases. There has been a rising trend in the total cholesterol levels among Indians. The present study found the prevalence of raised total blood cholesterol levels (>200mg/dL) to be 13.9% out of which maximum respondents were aged 29-38yrs. Similar results were observed in an Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) study that was carried out on representative population of Chandigarh, Jharkhand, Tamil Nadu and Maharashtra to assess dyslipidemia using the National Cholesterol Education Programme found that 13.9% subjects had hypercholesterolemia.[17]Studies have shown that

high cholesterol is prevalent in 15-20% rural and 25-30% urban population of India.[18] A study conducted in Saudi Arabia[19] found the overall prevalence of high total cholesterol was about 20% with females being more affected than males and the highest prevalence was seen in the age group >55yrs which is contrary to the findings in our study.

We found that about 25% of the participants were anaemic out which maximum were from the age group 18-28yrs. There was a decrease in prevalence of anaemia between 2005-06 and 2015-16 from 56.5% to 53% respectively for women in the reproductive age group (15-49yrs).[20]Contrary to our study, in 2017, a study done in Jordan on 2797 women aged 18-90yrs found that anaemia was most prevalent in women aged 40-49 yrs (28.2%).[21] Also, a study done on the data from the National Nutritional Survey 2015 of Bhutan revealed that risk of anaemia in women increased with age with maximum risk in women aged 40-49yrs.[22]

CONCLUSION AND RECOMMENDATIONS

Prevalence of life style diseases are linked with numerous life style risk factors, predominantly Obesity, Hypertension, Increased Blood Sugar and Blood Cholesterol level. It is suggested that early detection of life style disease can be done by screening community using simple tests and anthropometric examinations. This would help in catching otherwise healthy individuals well in time and thus curbing future morbidity and mortality.

Limitation of the Study

Data related to various factors related to life style diseases like diet, smoking, alcohol, physical activity and stress level are not collected and not assessed in this study and the data of this study is a small representation of the population, therefore, a larger representative population is needed to draw conclusions about the prevalence of life style diseases and the factors which influence them.

Conflict of Interest

Nil

Funding

Nil

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