ORIGINAL ARTICLE

A Preliminary Study on Prevalence of Non-Communicable Diseases and their Association with Physical activity among the Urban Geriatric Population

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Abstract

Background: India is experiencing a rapid health transition with a rising burden of Non-Communicable Diseases (NCDs) and inappropriate lifestyle is the most remarkable risk factor associated to NCDs. **Aim & Objective**: To assess the prevalence of NCDs and their association with physical activity among urban elderly. **Material and methods**: A community based cross-sectional study was conducted among 112 geriatric population (≥60 years) in cities of Hyderabad and Secunderabad. The data on medical history, lifestyle, diet and physical activity was obtained using a pre-tested questionnaire. Anthropometric measurements such as weight, height and waist circumference were measured. Intravenous blood samples were collected to estimate the biochemical parameters. **Result**: About 64.3 % of elderly have been practicing physical activity i.e. predominantly walking, while 35.7% were sedentary. The prevalence of hypertension (87.5%), diabetes (65.3%), central obesity (77.8%) and metabolic syndrome (59.7%) was higher among walkers as compared to non-walkers and the prevalence of metabolic syndrome was significantly ($p<0.005$) high among the elderly suffering from Cardio Vascular Diseases (CVDs). **Conclusion**: In general, the prevalence of non-communicable diseases was high among urban geriatric population. Therefore, primordial and primary preventive measures should be adopted during adolescence and early adulthood for the prevention and control of NCDs.

Keywords

Non-communicable Diseases; Aged; Metabolic Syndrome; Urban Population

Introduction

There has been an increase in elderly population (≥ 60 years) in India from 7.7% in 2001 to 8.6% in 2011(1) and this increase is associated with burden of Non-Communicable Disease (NCD). NCDs are commonly known as chronic or lifestyle-related diseases are the major global causes of morbidity and mortality. About 63% (36 million) of the 57 million global deaths in 2008 were due to NCDs.(2)

The major NCDs, such as cardiovascular disease (CVD), cancer, chronic respiratory disease and diabetes, account for about 80 % of total NCD related deaths.(3,4) India is experiencing a rapid health transition with a rising burden of NCDs and about 60 % of global deaths took place in India.(5) According to World Health Organization (WHO) report 2002, tobacco use, alcohol consumption, overweight, physical inactivity, high blood pressure and high cholesterol are the most remarkable risk factors associated with NCDs.(6) Thus, NCDs could diminish quality of life of elderly, raise health-care costs, and increase pressure on family members who are responsible for their care.(7) Although there are studies on prevalence of NCDs among adult population in India, (8,9,10,11,12), they have not reported the association between physical activity and the prevalence of NCDs among urban elderly.

Aims & Objectives

1. To assess the prevalence of non-communicable diseases among the urban elderly
2. To study the association between prevalence of non-communicable diseases and physical activity among urban elderly

Material & Methods

Study Type: A community based, cross sectional study.

Study Population: Elderly subjects (60 years and above).

Study Area: Twin cities of Secunderabad and Hyderabad.

Study Duration: Six months.

Sample Size: In this study, we adopted purposive sampling and recruited 112 urban elderly subjects.

Inclusion criteria: People aged 60 years and above residing in Secunderabad and Hyderabad willing to participate in the study were included.

Exclusion criteria: People aged below 60 years, not willing to participate and bed redden/critically ill were excluded from the study.

Strategy for collection: Data was collected by visiting the households of elderly.

Ethical Approval, Consent: The study protocol was approved by the Institutional ethical committee and written consent was taken from each of the participating subjects after explaining them the details of the study.

Data collection: A pre-tested and validated questionnaire was used to collect the data on medical history, lifestyle, diet and physical activity. The subjects were interviewed by investigators in different locations of Hyderabad and Secunderabad. Anthropometric measurements such as height, weight, waist circumference and hip circumference were measured for all the subjects using standard equipment by adopting standard procedures. Blood pressure was measured three times with 5 minute interval between each measurement by using an OMRON digital BP apparatus. Blood pressure was recorded on the left arm of the subject in sitting position. Systolic and diastolic blood pressure was calculated as the mean of the three measurements. Blood glucose was measured using glucometer (Acu-Check) from each subject who were fasting since last 12 hours.

Biochemical analysis: Six ml fasting venous blood was collected by venipucture from each subject and glucose was estimated from whole blood using glucometer. After glucose estimation, plasma was separated using table top centrifuge and kept at -80^{0}C for further analysis. Total cholesterol, triglyceride (TG) and HDL cholesterol were estimated in plasma samples using Bio-Systems kits.

Definition of MS: Based on criteria suggested by International Diabetes Federation (IDF) the MS was defined as the presence of increased waist circumference (men: ≥90 cm, women: ≥80 cm) plus 2 of any of the following:

Raised triglyceride: ≥150 mg/dL or 1.7 mmol/l or specific treatment for this lipid abnormality

Reduced HDL cholesterol : <40 mg/dL or 1.03 mmol/l (males), <50 mg/dl or 1.29 mmol/l (females) or specific treatment for this lipid abnormality

Raised blood pressure: Systolic: ≥130 mm Hg, Diastolic: ≥ 85 mmHg or treatment for previously diagnosed hypertension

Raised fasting plasma glucose: ≥100 mg/dL or 5.6 mmol/l or previously diagnosed type 2 diabetes.(13)

Statistical analysis: Descriptive statistics performed to calculate mean (SD) and percentage for categorical variables. ANOVA F test was done with post hoc comparisons of LSD method. Chi square test was used to compare categorical variables. Statistical analysis was performed using SPSS software (version 19.0). P<0.05 was considered as significant.

Results

A total of 112 elderly subjects aged 60 years and above covered for the study. Of them, about two thirds of elderly were walkers, while the remaining 36% (40) were non-walkers. The mean height,

weight, BMI and WC of the urban elderly were given in the [Table 1]. The mean SBP and DBP were 135.5±16.9 mmHg and 82.6±8.6 mmHg respectively. The mean fasting blood sugar, triglycerides, total cholesterol, and HDL was 133.3±46.0 mg/dL, 119.4±67.5 mg/dL, 155.6±37.7 mg/dL and 36.6±8.9 mg/dL respectively.

About more than three fourth of the urban elderly were suffering from central obesity and hypertension, nearly 63% of the elderly had high levels (>126mg/dL) of blood sugar [Table 2]. About one fourth of the elderly subjects were diagnosed with hypertriglyceredemia and low plasma HDL, whereas 10.7% of the elderly was diagnosed with hypercholesterolemia.

The association between the NCDs and physical activity is presented in [Table 3]. About 87.5% of the walkers were hypertensive and 65% of non-walkers were hypertensive. A significant ($p < 0.005$) association was found between physical activity and hypertension. The prevalence of hypertriglycerdemia was 23.6%, among walkers, while 27.5% of non-walkers were found to have hypertriglycerdemia. Similarly, about 78% of walkers and 75% of non-walkers were overweight/ obese. The proportion of the walkers and non-walkers with higher levels of fasting blood glucose was 65.3% and 57.5% respectively, while, 23.6% of the walkers and 22.5% of the non-walkers had low HDL levels respectively. There was no association between the physical activity and components of NCDs except for hypertension. No significant association was observed between the physical activity and MS.

Association of morbidity pattern and prevalence of metabolic syndrome among urban elderly population has been presented in [Table 4]. The prevalence of metabolic syndrome (MS) was significantly ($p<0.05$) higher among the elderly suffering from Cardiovascular and Central Nervous System disorders. However, there was no significant association observed between other morbidities and metabolic syndrome.

Discussion

We have studied the prevalence of NCDs among urban elderly population and their association with physical activity i.e. walking. In general, the prevalence of NCDs was very high where about 80% of urban elderly was suffering from HT followed by central obesity (76.8%) and diabetes (62.5%). The proportion of urban elderly with metabolic syndrome was 54.1%. The overall prevalence of diabetes and hypertension in the present study was high compared to the reported prevalence of diabetes (36%) and hypertension (59%) for rural elderly population (14), while the corresponding figures reported for the urban elderly population of Delhi were 24.0% and 67% respectively (15). The prevalence of central obesity observed among urban elderly in the present study was relatively higher as compared to their rural counter parts in India (72.5%) (16). The prevalence of hypertriglyceridemia and hypercholesterolaemia levels in the present study was comparable to the prevalence reported by the ICMR-DIAB,(17) while the corresponding figures reported for urban elderly residing in Delhi were higher(18). However, the prevalence of low HDL levels was lower in the present study (23.2%) as compared to the figures (72.5%) reported by Joshi *et al*.(17) and Sharma *et al*.(42.0%)(18).

Insufficient physical activity is one of the risk factors associated with increased prevalence of NCDs and there was a great association between physical activity and NCDs.(19) In some of the earlier studies it also has been reported that high physical activity was associated with low prevalence of diabetes and hypertension.(20,21) Similarly, the prevalence of diabetes was reported low in tribal people due to engagement of moderate to heavy type of physical activity than the urban counterparts.(22) However, in the present study, we have found inverse association between physical activity and NCDs such as diabetes, hypertension, central obesity etc. This finding could be attributed to initiation of physical activity after being diagnosed with NCDs. Similar finding were reported in other studies where the prevalence of hypertension was more among physically active subjects .(23,24) As reported by the studies carried out in India, the prevalence of central obesity and dyslipidemia among elderly population was a major public health concern, where there was significant association between insufficient physical activity, central obesity and dyslipidemia.(17, 18)

Metabolic syndrome is a cluster of diseases which may associate with different morbidities. In the present investigation we studied association of MS with different morbidities. It is well known that people with MS have been shown to be at an increased risk of developing cardiovascular disease (25) and in the present study we observed a significant ($p<0.005$) association between MS with CVDs. Diabetes is one of the criteria for considering

MS and retinopathy & cataract are the major secondary complications of diabetes. However, we have not observed significant difference in prevalence of MS among elderly with and without eye disorders. However, Poh *et al*., in their review article reported the association of eye complications with MS.(26)

Conclusion

In general, the prevalence of non-communicable diseases and metabolic syndrome was high among urban elderly population of Hyderabad metropolitan city. We observed a significant association between MS and subjects suffering from various CVDs. Therefore, the community should adopt sustainable healthy lifestyles during adolescence and early adulthood as a primary measure for the prevention and control of NCDs and their complications at a later life. It is also suggested that the community should utilize optimally the Primary Health Care facilities for the secondary prevention and treatment of NCDs.(27)

Recommendation

Promoting physical activity before onset of NCDs may help in delay these diseases.

Limitation of the study

Since it is pilot study and subjects were selected purposely, we can't generalize the results of this study.

Relevance of the study

The proportion of elderly population with NCDs in India is increasing rapidly. Therefore, they need to adopt healthy lifestyles including physical activity to avoid or delay the occurrence of NCDs.

Authors Contribution

SM: Data collection and manuscript writing, NA: Designing the study and critical review of the paper, PS: Designing the study; SS: Data collection.

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Tables

TABLE 1 MEAN (± SD) VALUES OF DIFFERENT COMPONENTS OF NON-COMMUNICABLE DISEASES

Parameters	n	Mean (± SD)
Height (cms)	112	160.2±8.4
Weight (kgs)	112	67.1± 10.1
BMI (kg/m2)	112	26.0±3.5
WC (cms)	112	92.6±9.1
Systolic blood pressure (mmHg)	112	135.5±16.9
Diastolic blood pressure (mmHg)	112	82.6±8.6
Fasting blood sugar (mg/dL)	112	133.3±46.0
Triglycerides (mg/dL)	112	119.4±67.5
Total cholesterol (mg/dL)	112	155.6±37.7
HDL (mg/dL)	112	36.6±8.9

TABLE 2 PREVALENCE (%) OF THE NON-COMMUNICABLE DISEASES AMONG URBAN ELDERLY

Particulars	n	Percent
Central obesity	86	76.8
Hypertension	89	79.5
Diabetes	70	62.5
Hypertriglyceridemia (>150mg/dL)	28	25.0
Hypercholesterolaemia(≥ 200mg/dL)	12	10.7
Low HDL	26	23.2

TABLE 3 ASSOCIATION BETWEEN THE NCDS AND PHYSICAL ACTIVITY AMONG URBAN ELDERLY POPULATION

Particulars	n	Percent	p-value
Hypertension			
Walkers	72	87.5	0.005
Non-walkers	40	65.0	
Hypertriglyceridemia			
Walkers	72	23.6	0.649
Non-walkers	40	27.5	
Central Obesity			
Walkers	72	77.8	0.739
Non-walkers	40	75.0	
High Blood Glucose			
Walkers	72	65.3	0.415
Non walkers	40	57.5	
Low HDL Level			
Walkers	72	23.6	0.894
Non-walkers	40	22.5	
Metabolic syndrome			
Walkers	72	59.7	0.134
Non-walkers	40	45.0	

TABLE 4 ASSOCIATION BETWEEN THE MORBIDITY PATTERN AND PREVALENCE OF METABOLIC SYNDROME AMONG URBAN ELDERLY POPULATION

Particulars	n	Percent	p-value
Gastro Intestinal Disorders			
Without disease	57	54.4	0.986
With disease	55	54.5	
Respiratory Disorders			
Without disease	98	54.1	0.830
With disease	14	57.1	
Cardiovascular Disease			
Without disease	63	42.9	0.005
With disease	49	69.4	
Musculo- Skeletal Disorders			
Without disease	59	52.5	0.667
With disease	53	56.6	
Eye Disorders			
Without disease	10	60.0	0.713
With disease	102	53.9	
Central Nervous System			
Without disease	104	51.9	0.052
With disease	8	87.5	
Urinary Tract Disorders			
Without disease	91	53.8	0.785
With disease	21	57.1	
Liver Disorders			
Without disease	111	54.1	0.358
With disease	1	100	