An Epidemiological Study of Obesity Among Elderly in Chandigarh


Abstract

Methods: The study was conducted in Union Territory of Chandigarh, a modern city in Northern India having a population of over 0.8 million. 362 subjects over the age of 65 years were interviewed after having been selected through stratified random technique covering 7937 family members in 1882 houses. Objectives: This community based study assessed the prevalence of obesity and associated factors among elderly population. Results: Overweight (BMI>25kg/m2) was observed among 120 subjects (33.14%), obesity (BMI>30) in 28 (7.54%) of the elderly. 14.36% elderly subjects were undernourished (BMI<18.5)). Overweight/obesity was higher among females (42.1%) than males (20.9%). Prevalence of hypertension was 82.5% among overweight elderly in comparison to 45.87% among non-overweight/obese. Similarly probable diabetes was 15.0% and 9.92% in overweight and non-overweight elderly, respectively. Conclusion: Overweight among one-third elderly reveals existence of a high prevalence. Higher prevalence of hypertension and diabetes among overweight elderly was observed. There is an urgent need to adopt multidisciplinary approach to weight control by awareness campaign and adopting strategies to increase physical activity and changing eating behaviour.

Key words: Elderly, Obesity, BMI, Hypertension, Diabetes, Prevalence

Introduction

The prevalence of obesity is increasing in the developed as well as developing countries. Central obesity in the elderly population of India is a major public health problem. Obesity is associated with significant increase in morbidity and mortality.

India is gradually observing a phenomenon of graying of her population. Increase in life expectancy has resulted in growing population of aged throughout the world and it has raised a number of issues concerning the developing world as well. Projection indicate that by the year 2020 there will be 470 million people aged 65 and above in developing countries which will be more than double the number of developed world. Thus, with more people surviving in later life, more obese will be living and having certain morbidities as the effect of obesity.

Obesity is a significant risk factor for coronary artery disease, hypertension, cholelithiasis, diabetes, osteoarthritis. The prevalence of obesity in different countries varies from 10%–40%. The body mass index associated with the lowest mortality falls within the range of 18.5 to 24.9 in men & women between the ages of 30 & 74. It was found that BMI of 26 or more is a significant risk factor for diabetes & BMI more than 30 was significantly associated with arthritis & hypertension. Desegregated data on burden of disease & risk factors is essential in designing primary prevention strategies.

The study was conducted in urban and rural areas of Chandigarh having about 90% population in urban and 10% in rural areas. The city has 47 sectors and 26 villages. Each sector is a unit. Therefore, the list of all sectors with approximate number of households was prepared & subsequently households were selected by stratified random technique in proportion of population in urban and rural area. The team visited the selected number of the houses and enquired if any elderly of the age of 65 years or more is staying. In case, the old person was not available, the next house was visited till the elderly was contacted. Four villages were selected randomly from the list of all villages. The number of households was decided on the basis of population of the village. In all 250 households in urban area and 50 households in rural area were selected.

A team comprising of consultants, medical officers, medical social workers, laboratory technicians were given training in the Department of Community Medicine, Government Medical College, Chandigarh, so as to collect uniform information from the subjects. The team from the department visited the selected number of houses and collected information in a predesigned and pre-tested format. The obesity was assessed by measuring height & weight of the individual and thereafter calculating body mass index. Assessment of obesity was made according to WHO which classified adults according to BMI as undeweight <18.50, normal rage as 18.50-24.99, overweight as >25.0. In the overweight category: Pre-obese as 25.00 - 29.99, obese class 1 as 30.00-34.99, obese class II as 35.00-39.99 and obese class III as >40.00. The blood pressure was detected by taking two readings in lying down position at 30 minutes interval by sphygmomanometer. The cut off points were taken at 140/90mm of Hg as per JNC criteria. Random blood sugar was done by glucose quick test. Data was entered in the computer and analysed on the Foxpro programme.

Results

In the present study, 1882 families having 7937 members were visited. There were 434 elderly in the study population & the proportionate geriatric population (65 years & above) constituted 5.47% of the total study population. Out of 362 elderly who were interviewed, 313 were from urban area and 49 from rural area. Sex wise distribution was 153 (42.3%) elderly as males while remaining 209 (57.7%) as females. Majority (66.6%) were in the age group of 65-74 years followed by 26.8% and 6.6% in 75-84 years and 85 years and above age-group, respectively.

On the basis of WHO classification of BMI among adults,
under nutrition was noticed among 52 (14.36%), normal weight in 190 (52.49%) and overweight in 120 (33.15%) elderly. However, the prevalence of pre-obesity and obesity was seen in 25.41% and 7.54% of elderly, respectively. (Table I).

It is observed that 14.4% of the elderly were under nourished (BMI<18.5) and it increased from 10.3% to 20.6% and 29.1% in the three age-groups of 65-74, 75-84 and >85 years, Nealy half (52.4%) of the subjects were in the normal range of BMI. Obesity/overweight was noticed to be 39.8% in 65-74 years age group & came down to nearly half (20.9%) as the increased to 85 years and above. As far as sex wise prevalence of overweight is concerned, it was found that 42.1% of the female elderly were obese/overweight in comparison to 20.9% of the males.

Relationship of hypertension & diabetes mellitus with overweight/obesity in elderly is shown in Tables II and III. Overweight was present in 60% of the subjects when consumption was more than 2000 Kcal/day and prevalence of was obesity was lower level (18.75%) when consumption was consuming below 1000 Kcal/day.

<table>
<thead>
<tr>
<th>Types of obesity</th>
<th>No. of subjects</th>
<th>% age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under Weight &lt;18.5</td>
<td>52</td>
<td>14.36</td>
</tr>
<tr>
<td>Normal Weight 18.5-24.99</td>
<td>190</td>
<td>52.49</td>
</tr>
<tr>
<td>Over Weight &gt;25</td>
<td>120</td>
<td>33.15</td>
</tr>
<tr>
<td>Pre-obese 25-29.99</td>
<td>92</td>
<td>25.41</td>
</tr>
<tr>
<td>Obese class 30.00-34.99</td>
<td>16</td>
<td>4.42</td>
</tr>
<tr>
<td>Obese class II 35.00-39.99</td>
<td>9</td>
<td>2.49</td>
</tr>
<tr>
<td>Obese class III&gt; 40</td>
<td>3</td>
<td>0.83</td>
</tr>
</tbody>
</table>

Table I : Prevalence of Obesity Among Elderly According to BMI Classification

Discussion

The present community based study in the Union Territory of Chandigarh with over 0.8 million population recorded a high prevalence of overweight/obesity 33.15%. Obesity was seen more in females as compared to males. Our findings are in accordance with the study conducted in Delhi where 13,723 adults were screened between age group of 25-64 years & prevalence of obesity was found 24% in males & 46.1% in females. The trend of higher prevalence of obesity among females adult age continues in the geriatric age-group as was observed in the present study. More obesity in women is associated with reproductive disorders. The levels of estrogen & androgens are higher in obese women along with a reductions in the levels of sex hormones binding globulin (SHBG). The cumulative incidence of overweight or obesity in men ranged from 10.8% in Chinese to 18.2% in creoles & in women from 16.1% to 27.5% in Chinese & Creoles. The prevalence of obesity (BMI>25) increased from 26.1% to 35.7% in men & from 37.9% to 47.7% in women. About 34% of the people in USA have relative weights in excess of 120%. As per national trends in the prevalence of obesity in USA the prevalence of obesity in the age-group of 20-74 was observed to have increased from 15% (1986-90) to 17.9% (1988-99) among males & 15% to 24.9% among females.

The prevalence of hypertension in obese was 82.5% as compared to non-overweight/obese 45.87% in present study. Evidence for a direct, strong and consistent relationship between weight and blood pressure emerges from cross sectional and prospective observational studies. Overweight is associated with a two to six-fold increase in risk of developing hypertension. Community wide surveys in USA (NHANES-II) show that the prevalence of hypertension in overweight adults is 2.9 fold higher than that for non-overweight adults. The risk in those aged 20-44 years is 5-6 times greater than that in those aged 45-74 years.

NIDDM would theoretically be prevented if no one had BMI>25. Obesity is common in type II diabetic patients and is generally associated with abdominal distribution of fat. CT scan have documented that a visceral obesity due to accumulation of fat in mental and mesenteric regions, correlates with insulin resistance. Exercise may affect the deposition of visceral fat as suggested by CT scan of Japanese Sumo wrestlers whose extreme obesity is predominantly subcutaneous. They have normal serum lipids and normoglycemia despite daily intakes of 5000-7000 Kcal and development of massive subcutaneous obesity. When women aged 30-35 years were monitored for 14 years the additional risk of developing NIDDM for those who were obese was over 40 times greater than for women who remained slim (BMI<22). Relative weights of 130%, 150% and >200% are associated with an excess mortality rate of 35%, two-fold and ten-fold increase in death rate. In the 75% of the newly diagnosed NIDDM patients who are overweight, a 15-20% weight less in the first year after

Table II : Overweight/Obesity & Hypertension in Elderly

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Non H.T.</th>
<th>H.T.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Overweight/ Obese BMI &lt;25</td>
<td>131 (54.13)</td>
<td>111 (45.87)</td>
<td>242 (100.0)</td>
</tr>
<tr>
<td>Overweight/Obese BMI ≥ 25</td>
<td>21 (17.5)</td>
<td>99 (82.5)</td>
<td>120 (100.0)</td>
</tr>
<tr>
<td>Total</td>
<td><strong>152 (41.99)</strong></td>
<td><strong>210 (58.01)</strong></td>
<td><strong>362 (100.0)</strong></td>
</tr>
</tbody>
</table>

\[ \chi^2 = 44.19, \text{ df} = 1; \text{ P}<0.001 \]

Table III : Overweight/Obesity & Diabetes in Elderly

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Random Bl. Sugar Level &lt; 180 mg/dl</th>
<th>≥ 180 mg/dl</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Overweight/ Obese BMI &lt;25</td>
<td>218 (90.08)</td>
<td>24 (9.92)</td>
<td>242 (100.0)</td>
</tr>
<tr>
<td>Overweight/Obese BMI ≥ 25</td>
<td>102 (85.0)</td>
<td>18 (15.0)</td>
<td>20 (100.0)</td>
</tr>
<tr>
<td>Total</td>
<td><strong>320 (88.4)</strong></td>
<td><strong>42 (11.6)</strong></td>
<td><strong>362 (100.0)</strong></td>
</tr>
</tbody>
</table>

\[ \chi^2 = 12.12, \text{ df} = 1; \text{ P}<0.001 \]
diagnosis seems to reverse the elevated mortality risk of NIDDM\(^9\).

There is need to strengthen geriatric health care services in the community. Health education campaign should be started for elderly to create awareness with regards to physical activity to reduce obesity, regular treatment for control of blood pressure, diabetes mellitus to prevent further complications.

**Conclusion**

The study has revealed that prevalence of overweight (BMI \(\geq 25\)) exists in about one-third elderly population with higher prevalence in females. Hypertension and diabetes was found to be prevalent more in overweight elderly. There is need to develop comprehensive geriatric health care incorporating health education on nutrition and life style.

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**OBITUARY**

**SAD DEMISE**

We mourn the sad demise of Dr. Naimesh Poonambhai Kapadia who was working as a senior resident in Community Medicine Department of Government Medical College, Surat. Dr. Kapadia was born on 12th November 1977. He did his graduation and post graduation (MD in PSM) both from Government Medical College, Surat in 1995 and 2004 respectively. He did a research work on hearing problems amongst the aged persons as part of his dissertation work. He was a life member of IAPSM and took active interest in the activities of state chapter of IAPSM of Gujarat. He had a very social, and friendly personality. He was equally popular amongst his friends, teachers and students for his helping nature and sincerity. Cruel hands of death snatched him away on 7th November 2004 thus a promising career ended abruptly. The families of IAPSM and of IJCM offer deep condolence to the bereaved family members and pray to the almighty GOD to give strength to his friends and family members to bear this shock and may his soul rest in peace.