Original Research Article

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A cross-sectional study of prevalence of overweight and hypertension among veterans in Eastern Uttar Pradesh

Saibal Adhya¹, Arun Tyagi^{2*}, Vivek Anand¹, Pavithra V.³

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*Correspondence:

Dr. Arun Tyagi,

E-mail: aruntyagidr@gmail.com

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ABSTRACT

Background: Health problems of veterans have not been studied extensively. Obesity though not a major problem while in service, could be a major factor leading to morbidity and mortality due to lifestyle diseases seen among overweight/obese people.

Methods: Status of overweight and hypertension was studied among ex-servicemen population of a military station in the age group of primarily 50-70 years.

Results: More than 35% veterans were found to be overweight/obese. Underweight was a more serious problem than overweight among those above 70 years of age. Prevalence of hypertension was also high (25%). There was weak association of overweight with hypertension among ex-servicemen because the problem seems to appear late in life. This association was stronger upto 60 years of age after which it starts decreasing.

Conclusions: The problems of overweight and obesity and hypertension constitute considerable health burden among the veterans. However, a significant causal association could not be established between overweight and hypertension.

Keywords: Veterans, Hypertension, Overweight, Obesity

INTRODUCTION

Veterans in any country constitute an essentially geriatric population. There are approximately 2.7 million veterans in India, and they are believed to be as physically and mentally fit people as they used to be while in service. Since overweight/obesity is associated with ageing and obesity in elderly can cause serious health concerns, it is pertinent to determine the extent of the problem among the retirees. World Health Organization (WHO) declared obesity as a global epidemic In 1998, with nearly half-abillion of the world's population considered to be overweight or obese. India is also facing the epidemic of obesity and its associated diseases, especially among middle aged and elderly. Obesity has significant comorbidities, and these are associated with considerable health care and social costs.

Senior citizens above 60 years currently constitute 9% of India's population and this ratio is likely to rise along with increasing average life expectancy.⁴ Though studies on prevalence of overweight and obesity in western world do exist, exhaustive data on the prevalence of obesity among veterans in India is limited.⁵ This study was therefore conducted to ascertain the prevalence of overweight and obesity among veterans and find out correlation with hypertension and certain sociodemographic factors.

Aim

The aim of this study was to find the prevalence of overweight and obesity among veterans and find out association, if any, with hypertension and certain sociodemographic parameters.

¹Department of Community Medicine, Armed Forces Medical College, Pune, Maharashtra, India

²Department of Medicine, DVVPF's Medical College, Ahmednagar, Maharashtra, India

³Military Hospital, Agra, Uttar Pradesh, India

METHODS

This study was conducted in a metropolitan city of eastern Uttar Pradesh where a large population of veterans from nearby states converges for medical treatment. This opportunity was taken to carry out the study by medically examining all veterans visiting the station over a period of six-months; thereby covering almost the entire veteran population frequenting the station. Obligatory preliminary medical examination was carried out in the station health care facility on 1032 veterans during their first visit in the six-month period to include height, weight, blood pressure (BP), distant and near vision and hearing. Those with positive findings were referred to the medical facilities in the city for further evaluation.

Inclusion criteria

All veterans visiting the city's cantonment were included in the study.

Exclusion criteria

Veterans who were under treatment for ischemic heart disease (IHD), cerebrovascular accidents (CVA) and diabetes were excluded from the study.

A total of 1032 persons were included in the study. Data on sociodemographic parameters were recorded. All recordings were measured by standardized anthropometric rod, weighing scales and sphygmomanometer.

Body mass index (BMI) was used to categorize veterans into- under-weight (BMI <21), normal (BMI=21-22.9), overweight (BMI=23-24.9), pre-obese (BMI=25-29.9) and Obese (BMI >30) as per international WHO classification of BMI.⁶ In addition, those with systolic BP of more than 140 mm of Hg or diastolic BP of more than 90 mm of Hg were categorized as hypertensive as per Indian guidelines.⁷

RESULTS

The study population comprised of 1032 veterans.

Age

The age of the study population ranged from 38 to 93 years (mean 55 years±10.24). Age distribution at 10-year intervals is as shown in Figure 1. Majority of the study population (61.2%) was in the 51-60 years and 61-70 years age group. About 5% veterans included in the study were more than 70 years old.

Weight

The weight record of the study population ranged from 46 kg to 93 kg, mean weight 65.93±9.12 kg. The status of overweight/obesity was studied by calculating the BMI. BMI ranged from 16.1-35.3 kg/m². The mean BMI was 22.97 kg/m². It was seen that 33% of the study population

was overweight and another 2% were obese. Interestingly, about 13% of the veterans were underweight. Thus, only 52% of the veterans were able to maintain their body weight within normal range (Figure 2).

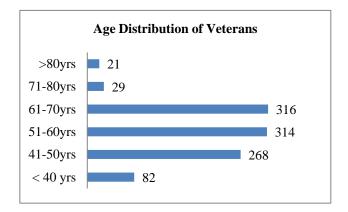


Figure 1: Age distribution.

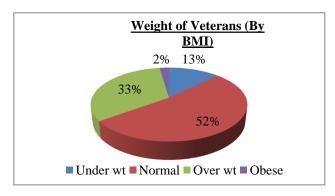


Figure 2: Weight distribution.

Age specific BMI status

The age specific rates for BMI in different age groups brought out certain significant trends as is shown in Figure 3. The percentage of overweight and normal weight veterans were almost static till the age of 70 years (35% and 55% respectively). The percentage of underweight start increasing after 70 years of age. Approximately 60% of underweight veterans were over 80 years of age.

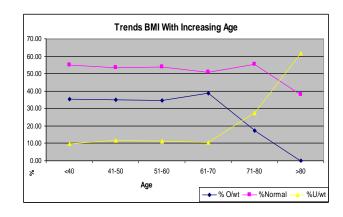


Figure 3: Age specific BMI status.

Overweight and type of veterans

Comparison of overweight among different categories of retirees was studied. 45% veterans belonging to officer category and 48% belonging to veterans below officer rank were found to be overweight. This difference was not statistically significant ($X^2 = 0.12$; p>0.05).

Overweight and job profile

The veterans were grouped as per their role during service; those belonging to the fighting arms (involved in battle directly) and those from supporting services (Table 1). It showed that veterans who were once in fighting arms had higher number of overweight (56%) compared to those who were in supportive role (43%). Interestingly, air force retirees were also found to be fitter (43% overweight) compared to Navy (61%). These differences were statistically significant. ($x^2=16.1$; p<0.05).

Table 1: Distribution as per role in service.

Role	Normal weight	Over w eight	Under weight
Combat role	104	251	97
Non-combat role	101	173	126
Supporting services	9	18	5
Air force	29	41	24
Navy	6	17	5
Chi square	16.1	p<0.05	

Blood pressure

BP recordings of all these veterans showed that systolic BP ranged from 112 to 164 mm of Hg (mean 132±8.26 mm of Hg). Diastolic BP ranged from 70 to 116 mm of Hg (mean 88 mm±8.86 mm of Hg). Almost 25% of the veterans were found to be hypertensive.

Veteran category and hypertension

22% of the veterans below officer category were found to be hypertensive compared to much higher rate among retired officers (42%). This difference was statistically significant (x2 of 11.62 with p<0.05). This shows that officers were much more exposed to the risk factors leading on to hypertension and comorbid diseases like IHD and CVA.

Overweight and hypertension

An effort was made to establish the relationship of overweight with hypertension. Table 2 elaborates the findings in this study. As seen in the table, nearly 27% of overweight individuals developed hypertension compared to 23% among normal weight. The odds of developing Hypertension were higher among overweight (1.29) and underweight (1.05) veterans and the difference was statistically significant. So, in the present study the

probability of developing hypertension was higher among overweight and underweight veterans. This seemingly higher incidence of hypertension among underweight veterans may be because the hypertension developed among all with advancing age but those above 70 years of age lost weight owing to poor nutrition and/or appearance of other co-morbidities.

Table 2: Overweight and hypertension.

Weight category	Hypertensive (%)	Normotensive
Overweight	98 (27)	267
Normal weight	101 (23)	342
Under weight	55 (24)	176

Age adjusted rates

The age adjusted rates of hypertension and overweight were calculated and the same is depicted in Table 3. Trends were studied for the age adjusted overweight and hypertension rates in various weight categories as shown in the graph (Figure 4). In this study, it was observed that there was a rising trend of hypertensives up to the age of 60 years after which it started decreasing. Among overweight veteran too the pattern was also similar. No significant association was detected between overweight and hypertension after adjusting for age.

Table 3: Age adjusted rates hypertensives and overweight.

Age (years)	Overweight %	Hypertensives %
<40	18.52	16.05
41-50	35.07	22.76
51-60	34.71	27.39
61-70	39.56	25.63
71-80	24.24	27.27
>81	0.00	14.81

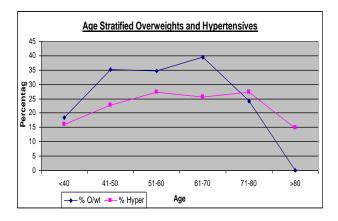


Figure 4: Age stratified overweights and hypertensives.

Stratified analysis was carried out to find whether age had any effect on the association between overweight and hypertension. The study population was divided into two strata- less than 60 and more than 60 years of age. For less than 60 years the OR was found to be 1.24 with x^2 of 1.31 (p>0.05). For those more than 60 years the odds of developing hypertension among overweight were 1.18 with x^2 of 0.47 (p>0.05). The OR without stratification was 1.3; thus, revealing that age did act as a confounder in the association between the two variables.

DISCUSSION

The age distribution of the veterans in the study is slightly different from the civilian retired population since they retire at an early age and hence relatively younger.

Weight

The findings of weight in the study (33% overweight) are like those from the elderly civilian population in the country - Sharma et al reported 21% population in Chandigarh over 65 years age being overweight, whereas Swamy et al reported 33% overweight among those over 65 years from the same city.^{8,9} Preeti et al found that 34% of men and 40.3% of women among elderly population (mean 68.5 years) were overweight and obese, respectively at AIIMS Delhi. 10 A study done by Almond et al in 2008 among United States armed forces veterans revealed prevalence of overweight to be 47% while prevalence of obesity was 25%.5 Data from the 2003 behavioral risk factor surveillance system (n=242,362) in US significantly showed the highest rates of overweight/obesity (p<0.001) among veterans (72.2%) compared with civil population (57.4%). Only 27.8% of veterans are of normal weight (versus 42.6% of the general population).¹¹ Similar high prevalence of overweight/obesity among US veterans was reported in other studies too.¹²⁻¹⁴ More than 35% prevalence of overweight as well as obesity was also reported among help seeking UK veterans by Williamson et al in 2019. 15 These variations seen in different studies could be because the studies were performed in different geographic locations on veterans belonging to different socio-economic strata having different cultural and dietary habits It seems that the veterans are just not able to maintain the high level of fitness required in service after the retirement and the degree of overweight/obesity seem to match their elderly civil counterparts in India. The personnel of fighting arms are worse off in this aspect as they are supposed to be among physically more fit and active during service and not able to maintain their level of fitness after retirement; may be because maintaining physical fitness is not obligatory post-retirement.

Hypertension and its association with overweight/obesity

The prevalence of hypertension among veterans in the present study (25%) was slightly lower than the prevalence of hypertension reported among adult Indian population through survey by Ramakrishnan et al in 2020.¹⁶

Innumerable studies have documented that there is a strong relationship of overweight/obesity with hypertension. ¹⁷⁻¹⁹ However, in the present study this relationship could not be conclusively established. One of the reasons could be that the study was carried out on veterans who for most part of their lives remain physically fit and maintain normal weight. These people are subjected to certain other risk factor for hypertension like stress and strain rigorous military life, inclement climatic conditions, and separation from families for prolonged period. Only after retirement from service do these people become overweight and hence the weak relationship with hypertension.

The study was conducted on veterans who predominantly belonged to the age group 50-70 years, majority of whom were in combat role while in service. Though while in service being overweight is a rare phenomenon the same cannot be said post retirement with over 35% being found overweight or obese among all categories. As the age increased beyond 70 years being underweight was a more serious health problem than overweight. This might be due to the natural aging process, problems with availability, ingestion and digestion of nutritious food, higher prevalence of chronic diseases and psychosocial factors that may lead to weight loss. In present study, veterans from fighting arms were significantly more overweight than those from other groups. Prevalence of hypertension was also found to be high. There was only a weak association of overweight with hypertension among veterans in contrast to the general population probably because the problem of weight-gain take place later in life as compared to the general civil population. This association between overweight and hypertension was stronger up to 60 years of age after which it starts declining.

Overweight, therefore, seems to be a major health problem among the veteran population. A switch over from an active and disciplined life where physical fitness is always on top priority to a more sedentary lifestyle following retirement seem to be the most important contributing factor. Moreover, the diet which the soldier is used to during service also changes to the more traditional one in the village. The 2003 behavioral risk factor surveillance in US reported obese military veterans were less likely to follow diet and exercise guidelines, and more likely to report poor health and disability than their normal-weight counterparts. Most of the obese veterans reported either insufficient (35.3%) or no physical activity (27.4%), and only 19.2% reported eating 5 or more fruits and vegetables per day. 11 Thus, even though the problem may not be as severe as in western countries, the reasons for its development among military veterans are comparable.

CONCLUSION

Although a significant association could not be established between overweight and hypertension among veterans, the results of the current study show a substantial health burden of overweight/obesity among them. The extent of

the problem necessitates that a curriculum be introduced during the pre-retirement period putting emphasis on healthy lifestyle practices to be followed in the post-retirement phase of life. An effort should be made to educate the veterans on the prevention of lifestyle diseases and warning them about the risk of malnutrition—both overweight and underweight and resulting health consequences.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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