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Study of Corelation of Obesity with Comorbidities in Respect of Geriatric Age Groups

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Abstract: This study reveals that both men and women of older age between 60 to 80 years are having many co-morbidities while passing high body fat percentage and poor lean muscle mass. Though old aged people have naturally less bone and muscle mass and chances for the health issues cannot be specified all time by improper fat distribution into body but accumulation of body fat or lipid or adipose tissue can lead a crucial role for being co- morbid at old age both for male and female. Accumulated excess fat leads to the issue of obesity. Obesity is corelated with cardiovascular disease, type 2 diabetes, and metabolic syndrome [2,3]. Geriatric or old age group is very relevant to these co-morbidity and also the association with bone loss or bone related problems are also found specially among obese old people[4].

Keywords: Co-morbidities, LMM- Lean Muscle Mass, Obesity: Accumulation of excess body fat

Introduction:

It has been found in the study based on obese and old aged people both men and women have been facing so many co-morbidity or health related problems. Especially those who passes higher BMI than normal and who are in the group of geriatric people are more concerned to type II diabetes, cardiovascular disease along with arthritis and metabolic syndrome[2]. Insulin resistance is the main concern of type II diabetes provoked by one of the reasons; i.e., obesity especially visceral adiposity. Excess free fatty acids get released from the excess adipose tissue surrounding body and those free fatty acids inhibits the entry of blood glucose to cell for the release of energy, thus blood sugar gets elevated[5]. Bone health is affected too for the accelerating body weight or excess adipose tissue. Proliferation of two type of cells, i.e., osteoblasts and adipocytes affect each other. Due to ageing the adipocyte cells increases into mesenchymal stem cells of bone marrow and due to the excess adipogenesis in bone marrow osteoblastogenesis get supressed. Maturation of osteoclast for adipogenesis triggers bone loss by decreasing osteoblastogenesis as osteoblasts helps in bone reformation[4] .Cardivascular disease is also associated with old age population. Both men and women from this old aged group are more prone to have ischaemic heart disease, atherosclerosis, myocardial dysfunction and stroke which are all related to cardiovascular disease. High production of ROS (Reactive Oxygen Species) due to oxidative stress, and proinflammatory factors like interleukin-6 (IL-6), tumor necrosis factor-α [TNF- α] , CRP (C- reactive protein) are very much linked to increasing age or geriatric persons which have also the association with cardiovascular health[6]. Endothelial dysfunction, i.e., the dysfunction of cell lining of lumen of blood vessels and central arterial stiffness stand for the old aged person as because these reduces the vasodilation and antithrombotic property that leads to increased oxidative stress and inflammatory cytokines[7].Obesity or overweight indicates BMI (Body Mass Index) higher than normal range. Especially central obesity or improper waist circumference for both men and women are very much linked to CVD (Cardiovascular disease) as the obesity can elevate Triglycerides, LDL (Low Density Lipoprotein) cholesterol that are related to CVD[8].Obesity alco can increase the blood glucose level by breakdown of adipose tissue and release of free fatty acidand these trigger LDL, triglycerides that are directly associated to cardiovascular disease[5,9].

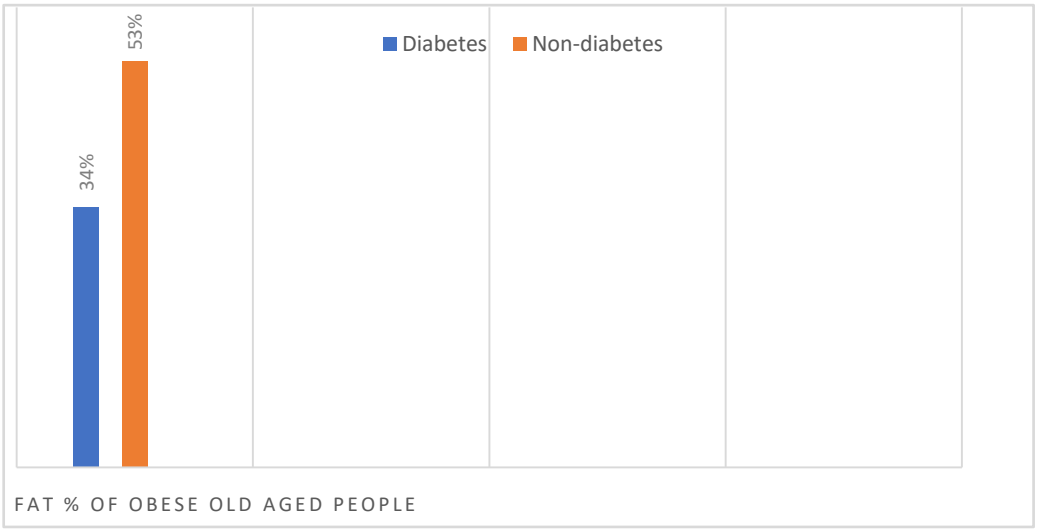
Method of the Study:

In this study of co-morbid obese geriatric persons, survey has been done with almost 60 old aged man and women. The aim of this study is to clear the relation practically if all the co-morbidities, i.e., type 2 diabetes, cardiovascular disease, bone decaying are related with obese old people both men and women or not. The study has been cooperatively done by few members of our team with the consent of those old aged persons. All geriatric men and women have been measured anthropometrically by measuring their body weight in

kilogram, height in centimetre, waist circumference, hip circumference for women and neck circumference. After collecting all the datas of their bodily measurement, Body Mass Index (BMI) has been calculated. After collecting waist, hip and neck circumference individual body fat percentage and lean body mass have been calculated to relate the consequences of being obese among both old aged men and women with all the common co-morbidities. Besides all these anthropometric measurements, blood parameter through biochemical tests, i.e., post prandial blood sugar by the process in which Hexokinase or Glucose 6 phosphate dehydrogenase enzyme is required, HbA1C, blood pressure, electrocardiogram have been done to examine all the old aged men and women. The frequency of illness, fatigue, appetite level, any bone related problem, i.e., osteoporosis, osteopenia that generates back pain, knee pain, discomfort in standing, walking etc. have been asked for the interest of this study.

Result:

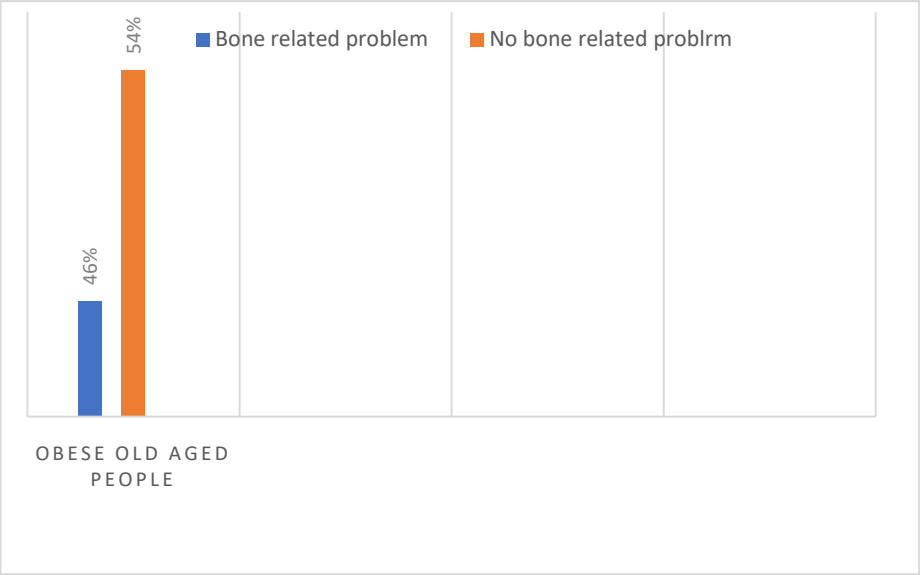
To relate some co-morbid conditions like type two diabetes, osteoarthritis, osteopenia and all others bone related problems, cardiovascular disease with obesity of both men and women geriatric people, this study has been done. After completion of all anthropometric measurements body fat percentage, lean body mass and BMI have been calculated. Among 60 aged persons both male and female, 60% have been found obese with high BMI, high body fat percentage and low muscle mass. In a relation of obesity and diabetes there is 34% people is found to be corelated and 53% does not have any relation although the body fat percentage is higher of them. Almost 13% aged person is with normal body fat percentage and normal rage of post prandial diabetes.



Graphical representation of higher body fat percentage with diabetes and non-diabetes old aged people

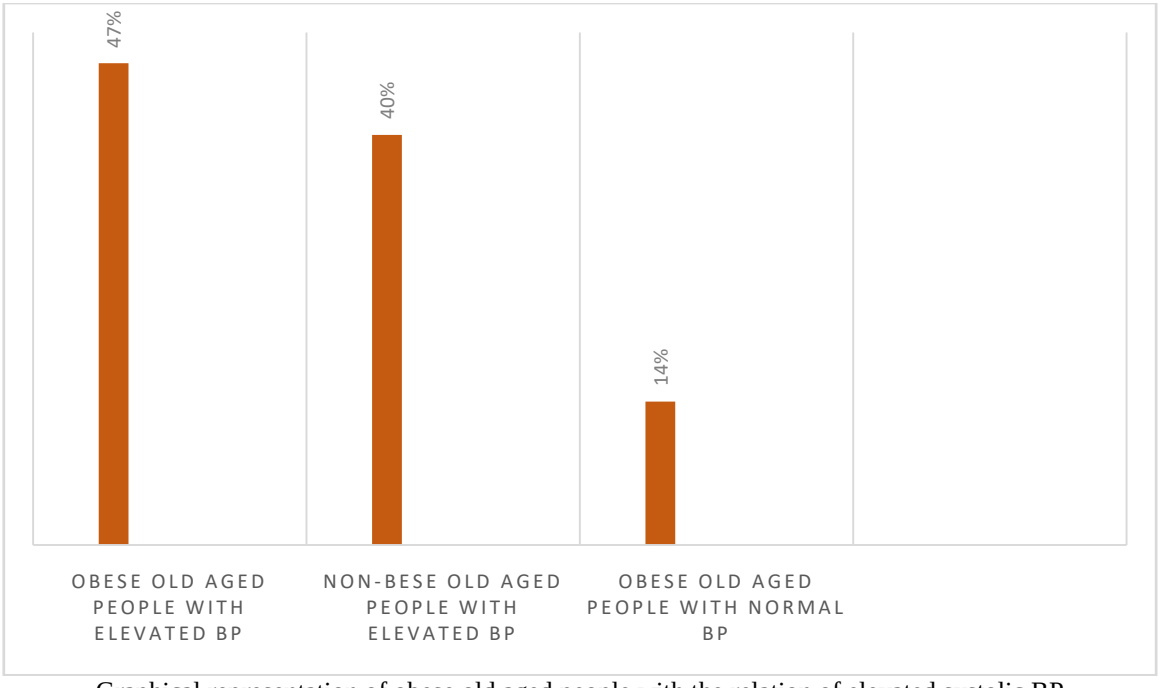
Graphical representation of normal body fat percentage and non-diabetes old aged people

According to this study about 46% of old aged person is found as with bone related problem, i.e., osteoporosis, osteopenia, osteoarthritis etc. are related for who are obese or overweight or who have higher BMI than normal range. Although 54% old aged men and women are not specified as their obesity or higher BMI is not co-related with any kind of bone problems.



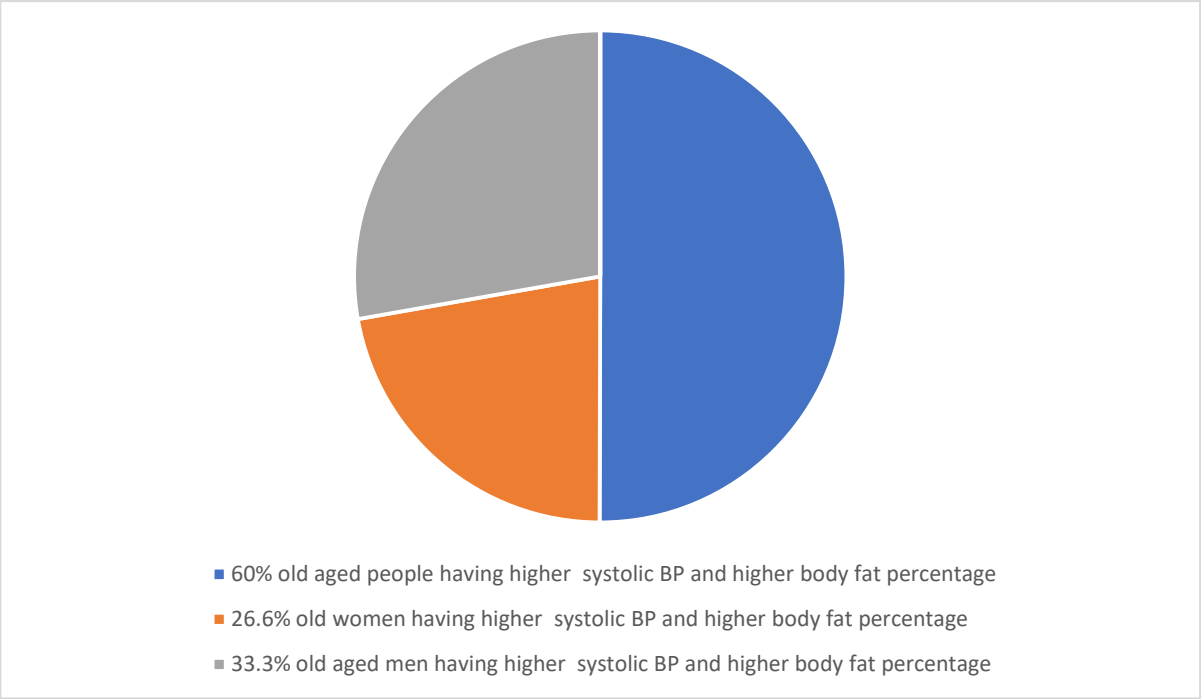
Graphical representation of obesity with diabetes and non-diabetes old aged people

For the purpose to conclude the relation of blood pressure and obesity in accordance withhigher than normal Body Mass Index (BMI), 60% of obese old aged person both men and women with higher BMI is related with their more than normal systolic blood pressure. About 47% obese old aged men and women have been found as elevated systolic blood pressure. About40% non- obese old aged people with normal BMI are found as elevated blood pressure and about 14% old aged persons both men and women are found who have normal blood pressure without taking drugs and without being obese.



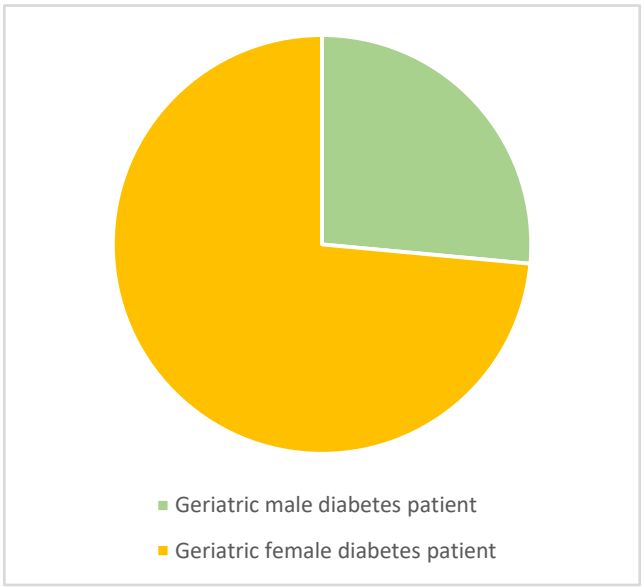
Graphical representation of obese old aged people with the relation of elevated systolic BP

Another finding of this study over 60 old men and women participants view* that with higher than normal body fat percentage 60% both men and women are having elevated systolic blood pressure. To be specific with the 60% of higher body fat percentile old aged person, about 26.6% female are showing elevated BP with higher body fat percentage. 33.3% men are having elevated BP with the relation of higher body fat percentage.



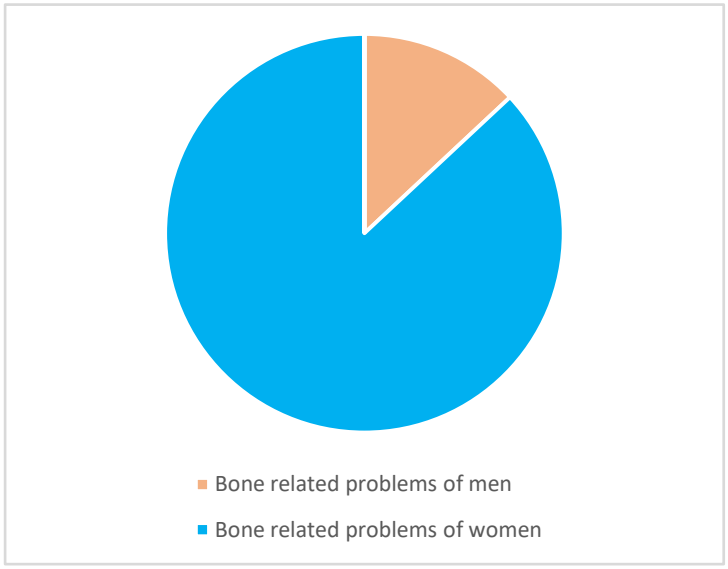
Pie chart representation of the percentage of geriatric people with the relation of geriatric people with the relation of elevated systolic BP and the percentage of man and woman

Over 60 geriatric individual man and woman who have been taken for the purpose of this study 34% diabetes is found related to higher body fat percentage and among them specifically 9% old aged male is to be found as diabetes patient in a relation with their higher body fat percentage and 25% old aged female is to be found as diabetes patient in a relation with their higher body fat percentage.



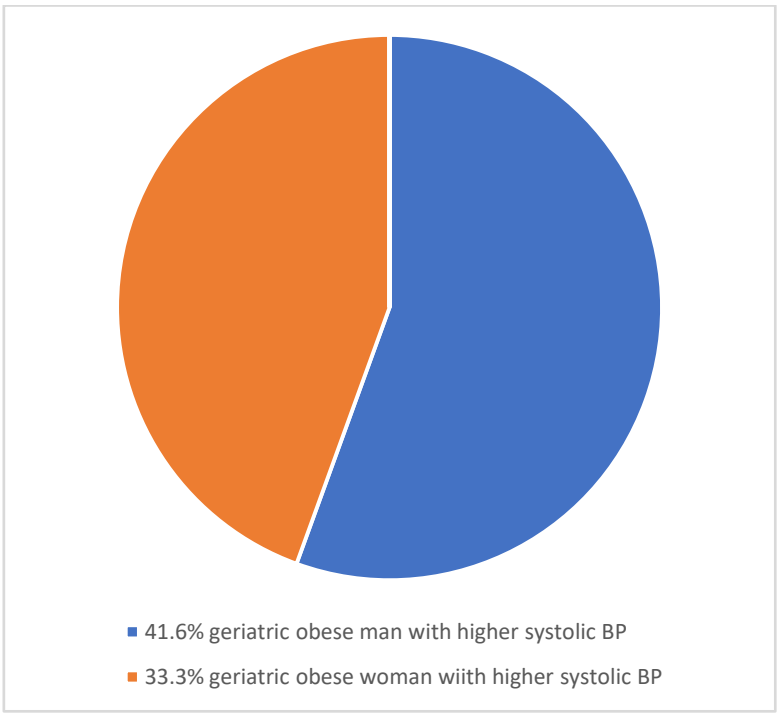
Pie chart representation of the percentage of geriatric diabetes men and geriatric diabetes women and their relation with higher body fat percentage

About 46% both men and women geriatric people are related to the bone problem along with obesity according to their more than normal BMI (Normal range: 18.5-22.9 for Asian), and 6% male are suffering from various kind of bone problems among them and 40% female are suffering from bone related problems.



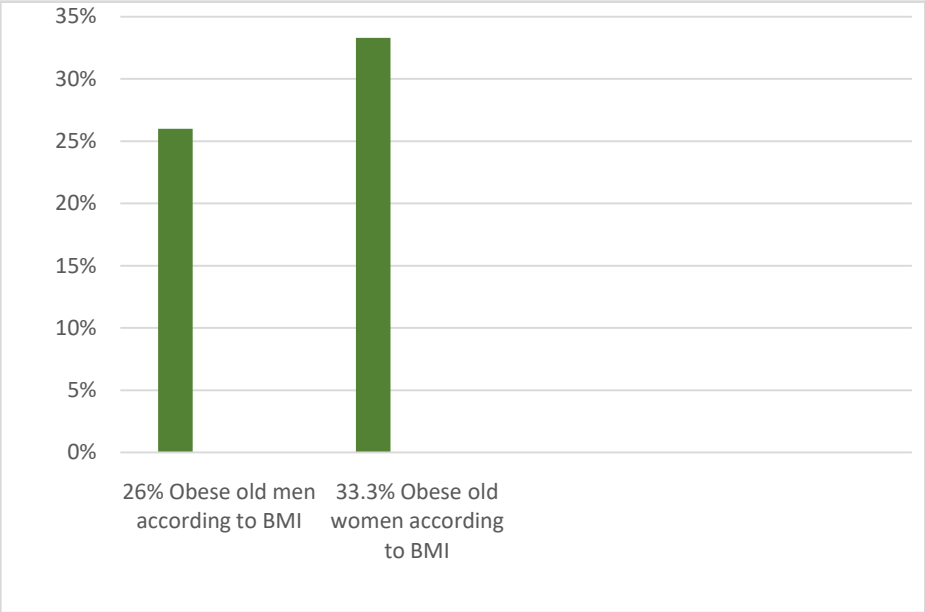
Pie chart representation of the percentage of bone related problems of geriatric man and woman and their relation with higher body fat percentage

Among 60 old aged obese people of higher BMI of this study, 75% have been found having higher systolic blood pressure (BP) and among them 41.6% old men and 33.3% old woman are having higher systolic BP in relation to their higher body fat percentage.



Pie chart representation of the percentage of higher systolic BP of geriatric obese man and woman and their relation with higher body fat percentage

Among 60 geriatric participants 60% have been found obese people and among them 26% men are found as obese and 33% women are found obese according to the higher than normal BMI range of 18.5-22.9.



Graphical representation of old aged obese man and woman.

Discussion:

Co-morbidities like type 2 diabetes is the onset of being obese especially for the accumulation of excess fat at the region of abdomen that indicates central obesity or increased waist and hip circumference for old aged man and woman. Excess free fatty acids come from excessive adipose tissue and promotes non-oxidative pathway for energy production by β-oxidation. Some metabolites of free fatty acids by β-oxidation like diacylglycerol or ceramide inhibits intracellular insulin signalling pathway for the uptake of blood glucose to the cell and thus increased blood sugar causing type two diabetes. The results of having higher body fat percentage of the participants in this study implies that excess body fat can cause type two diabetes for 9% men and 25% women who are in geriatric group of this study that indicates negative impact for old aged men and partially or average positive impact for old aged women in this study[5]. Aged man and woman having higher BMI are reported also having hypertension. For old aged with higher BMI person 41.6% men and 33.3% women are showing the consequences of higher systolic BP in this study that implies positively with this reference[6]. Too high body fat percentage for both man and woman are more prone to have cardiovascular problem or hypertension for their improper lipid metabolism. One of the foremost causes of having CVD (Cardiovascular disease) is Oxidative stress for hyperlipidaemia for having higher body fat percentage or too much visceral fat. There in this study in accordance with geriatric group and higher body fat percentile people, about 26.6% old women and about 33.3% old men with higher body fat percentage are showing results in which old men are showing more positive impact to these references than women in this study [11,12]. Adipose tissue for man and woman higher than normal within the body. Leptin produced from adipocytes of obese people is connected with the cardiovascular complications like atherosclerosis, ischemic heart disease by inducing oxidative stress[9]. Obese men and women with higher Body Mass Index also faces bone related problems like osteoarthritis, osteopenia, knee pain, back pain, some are not able to stand straight or stand with stick because of the poor bone strength. Whenever age comes, calcium starts decaying from bone itself and hypercalcemia in blood occurs.Especially for obesity bone problems happen for the accumulation of lipid metabolites in Mesenchymal Stem Cells (MSC) that inhibits osteoblast for regrowth of bone. In this study, 40% obese women from geriatric group of this study shows positive result on bone related problems in contrast with this reference whereas 6% old obese men from all the participants shows bone related problems which is not considerable as positive impact relating with this reference[4].

Conclusion:

Ageing is a natural phenomenon during everybody's life span and physical retardation is also the common consequences. Different types of co-morbid conditions are associated as a person goes towards the geriatric conditions. Not all the aged man and woman are suffered from so many co-morbidities but the major complaint comes from most of the geriatric people. In this study the relation between obesity and bone problems, bone decaying all these obvious consequences are very much relatedto old aged man and woman and the study results the obese old woman are more sufferer in bone related problems than obese old man. When another common co-morbidity i.e., diabetes is a subject for old obese people, female is more prone or sufferer for the complaint of type two diabetes along with higher BMI than obese male. For the co-morbidity of cardiovascular health related higher blood pressure, systolic pressure is shown to be higher for old aged people. As per higher BMI men have higher systolic blood pressure than old aged women and as per the higher body fat percentage there also men show greater result than women.

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