Frequency of Central obesity in adults having normal Body mass index visiting tertiary care hospital Peshawar

Fahad Naim[1], Awais Naeem[2], AamerUbaid[2], Farishta Waheed[2], Asif Ullah[2], Junaid Jallal uddin[2]

ABSTRACT

Objectives: This study was done to find the frequency of central obesity in adults having normal body mass index.

Study Design: Descriptive cross sectional study.

Setting: Khyber Teaching Hospital, Peshawar. Period: March 2015 to May 2015.

Patients and Methods: Study was done in attendants accompanying medical outpatients. A total of 178 adults with normal body mass index were observed for central obesity. We used non-probability consecutive sampling method.

Results: The frequency of central obesity was found to be 47% in adults having normal body mass index.

Conclusion: Our study concludes that the central obesity is very common finding in adults with normal body mass index.

Key Words: Central obesity, body mass index, adults

INTRODUCTION:

Obesity is defined as excessive fat deposition that can affect health1. It is one of today's most neglected public health problems. Obesity is spreading throughout the world and will affect at least half a billion people worldwide by 2030.2Various observational studies in Western and Asian populations have associated different measures of obesity with increased total mortality and morbidity.3Moreover rapid increase in the rates of obesity has been widely documented in the poorest countries of Africa and South Asia.4 According to World Health Organization, 44% of the diabetes, 23% of the ischemic heart disease and between 7% and 41% of certain cancer burdens are attributable to overweight and obesity.5

Body mass index as recommended by World Health Organization is used to measure and determine degree of adiposity and values greater than 30kg/m2 are categorized as obese.1 The magnitude of obesity as defined by only Body Mass Index should be considered cautiously as it is a poor indicator of overall fat distribution.6BMI can neither differentiate between overweight due to fat or muscle deposition nor it can differentiate between subcutaneous and visceral adiposity and it is the visceral adiposity which is linked with hyperlipidemia, diabetes and hypertension.7Central obesity is associated with a higher risk of incident hypertension within normal Body Mass Index category.7,8Furthermore, in patients with coronary artery disease, normal weight with central obesity was associated with the highest risk of mortality.9 Normal weight obesity is defined by a normal body mass index but increased abdominal or waist circumference and it is associated with a significantly higher risk of developing metabolic syndrome.10

Many studies have been done all over the world to find out prevalence of central adiposity in people with normal body mass index so that this segment of population at increased risk of obesity related complications is not missed. Asian population in particular is at higher risk even at lower abdominal circumference as compared to Europeans due to higher visceral and body fat deposition ratio.11 Data on normal weight obesity and central adiposity is scant and no work has been done locally. The rationale of this study is to find prevalence of central obesity in adults having normal body mass index, who are at high risk of obesity related complications.

OBJECTIVE:

To determine the frequency of central obesity in adults having normal body mass index.

MATERIAL AND METHODS

Setting: The study was done in attendants of medical outpatients visiting Khyber Teaching Hospital, Peshawar.
Study design: Cross sectional descriptive study.
Duration: Total duration 3 months.
Sample size: Sample size, 178, WHO sample size calculator was used, anticipated population 21.1%12, Confidence level 95%.

Sampling method: Non- probability with consecutive sampling technique

A. Inclusion criteria:

1-Patients aged 20 to 60 years.
2-Either gender.
3-Normal body mass index (18.5 to 24.9 kg/m2)

B. Exclusion criteria:

1-Subjects with known endocrine disease causing obesity like hypothyroidism.
2-Subjects with Drug induced weight gain like taking steroids or antipsychotic.
3-Pregnant females

1. Department of Medicine
KMU Institute of Medical Sciences, Kohat, KP
2. Department of Medicine
Kyber Teaching Hospital, Peshawar, KP

Address for Correspondence:
Dr. Awais Naeem
Assistant Professor of Medicine
Khyber Teaching Hospital, Peshawar, KP
Email: awaisnaeem06@gmail.com
Cell: +923239713171

OPERATIONAL DEFINITIONS

BMI: Body Mass Index (BMI) is used to determine overweight and obesity. It is calculated by dividing weight in kilograms by the square of height in meters. Normal BMI Range is 18.5-24.9.1

Central obesity: Waist circumference >90cm in males and >80cm in females.13

DATA COLLECTION PROCEDURE:

Consecutive attendants who visited medical out-patient department of Khyber Teaching Hospital were enrolled after taking informed consent and fulfilling the inclusion and exclusion criteria. Abdominal circumference of these participants was measured after calculating Body Mass Index. Weight was measured on Sencor digital weight scale SBS 2507 WH which can measure up to 150 kilogram with sensitivity of 100 gram. Single machine was standardized and was used throughout the data collection duration. Participants stood on machine bare footed, with light clothing and average of 2 readings was taken for study. A portable extendable stadiometer was used for measuring height while standing. Shoes and socks were removed while measuring height. The subjects were made stand with head position in Frankfort horizontal plane. Participants were stood with heels together and toes slightly outward. Heels, Buttocks and occiput of head were in contact with wall or vertical part of stadiometer. Subjects were put in standard anatomical position of body with arms hanging down and palms facing forward. The head piece of stadiometer was rest firmly on vertex of head with sufficient pressure to compress hair and reading was taken in centimeters which were then converted in meters. Android ideal weight calculator was used for calculating BMI.

Waist circumference was measured as per WHO protocol with measuring tape. Measurement was taken at the end of expiration in the mid axillary line at midpoint between lower margin of last rib and superior most part of iliac crest while standing at a level parallel to floor. Data was analyzed using SPSS version 17.

Data analysis:

SPSS version 17 was used for data analysis. Mean ± Standard deviation was calculated for numeric variable like abdominal circumference and age. Frequency and percentage were calculated for qualitative variable like gender and central obesity. Central obesity was arranged among gender and age to see effect modification. After stratification chi-square test was applied. P-value of less than or equal to 0.05 was considered significant. Results were presented in the form of tables.

RESULTS:

A study population of 178 subjects was observed in duration of 3 months to determine the frequency of central obesity in adults having normal body mass index and the results were analyzed. There were 110 female and 68 male participants in our study. Age distribution is shown in table no.1. Waist circumference analysis among the study population showed that 94(53%) subjects ranged between 70-90 cm, 52(29%) ranged between 91-100 cm and 32(18%) subjects ranged between 101-110 cm. Mean waist circumference was 93cm with SD ± 3.96(as shown in table no. 2). Central obesity was present in 84(47%) subjects in study population (as shown in table no. 3), 52 were females and 32 were males. Central obesity was further classified on basis of age. (Table no. 4).

TABLE NO. 1: DISTRIBUTION BY AGE (n=178)

AGE	FREQUENCY	PERCENTAGE
20-30 years	30	17%
31-40 years	36	20%
41-50 years	53	30%
51-60 years	59	33%
Total	**178**	**100%**

Mean age was 51 years with SD ± 2.17

TABLE NO.2 WAIST CIRCUMFERENCE (n=178)

WAIST CIRCUMFERENCE	FREQUENCY	PERCENTAGE
70-90 cm	94	53%
91-100 cm	52	29%
101-110 cm	32	18%
Total	**178**	**100%**

Mean waist circumference was 93 cm with SD ± 3.92

TABLE NO.3 CENTRAL OBESITY (n=178)

CENTRAL OBESITY	FREQUENCY	PERCENTAGE
Present	84	47%
Absent	94	53%
Total	**178**	**100%**

TABLE NO 4. CENTRAL OBESITY AMONG DIFFERENT AGE GROUPS (n=178)

CENTRAL OBESITY	20-30 years	31-40 years	41-50 years	51-60 years	Total
Present	14	17	25	28	84
Absent	16	19	28	31	94
Total	**30**	**36**	**53**	**59**	**178**

Chi Square test was applied in which P value was 0.003

DISCUSSION:

Normal weight obesity is an important entity that can predispose to all obesity related complications. This unique subset of population is apparently lean but not healthy and has been labeled as normal weight but metabolically obese. Our study showed that in a total of 178 study population, 47% of adults had central obesity with normal body mass index, which places this subset at risk for obesity related metabolic dysfunction although their body mass index was normal.

A study was done in China on 52023 adults and data was collected from 1993 to 2009 which showed an upward trend in normal weight obesity in Chinese with overall prevalence of abdominal obesity in adults with normal body mass index was 21.1% in 2009.12Similarly in the United States, the prevalence of abdominal obesity was found to be 46% in NHANES 1999 to 2000.14Another study in Caucasians conducted on 6123 subjects showed that 29% of subjects classified as lean and 80% of individuals classified as overweight on basis of BMI had a body fat percentage within the obesity range.15Almost similar findings were observed in Turkish population where abdominal obesity was present in 30.4% adults.11 Central obesity, abdominal obesity or normal weight obesity may have impact on cardiovascular mortality as well. A study was done on 15,184 adults, aged 18 to 90 years in Third National Health and Nutrition Examination Survey. It showed that persons with normal-weight central obesity had the worst long-term survival.16 Another study was done in Indian population to see link between body fat percentage and BMI along with health risks such as hypertension and diabetes in Lucknow city, India. 44% subjects showed higher Body fat percent i-e >25% with BMI range 24-24.99 kg/m2.17Various local studies also found higher prevalence of visceral obesity. A study done by Mahmood M et al which included a total of 477 patients, showed abdominal obesity in 318 (67%) of patients.18 Almost similar results were found in another study conducted by Noor M et al in which abdominal obesity was present in 57% subjects.19 Another study done in Lahore which included 250 people also showed that above normal visceral fat content and body fat percentage was present in 44 % and 76% of the study population respectively.20

There were several limitations in our study. Our sample size was 178 which was relatively small. Secondly we didn't collected data on prevalence of diabetes and other obesity related complications in our sample population due to financial limitations. Thirdly, a larger community based study can be done including pediatric age group to see prevalence of normal weight obesity in children as childhood obesity is on rise globally.

CONCLUSION

Central obesity can be present in apparently normal weight people who may have normal body mass index. Measuring abdominal circumference and other parameters like Waist-hip ratio will help to identify this particular group who is at risk of obesity related co-morbidities. Our study concludes that the central obesity is very common finding in adults having normal BMI. By calculating only BMI for obesity, we can miss people who are metabolically obese. Moreover Life style change can be advised early in this subset to prevent cardio metabolic complications associated with adiposity.

REFERENCES:

1. Tillin T, Sattar N, Godsland IF, Hughes AD, Chaturvedi N, Forouhi NG. Ethnicity-specific obesity cut-points in the development of Type 2 diabetes–a prospective study including three ethnic groups in the United Kingdom. Diabet. Med. 2015Feb;32(2):226-34.

2. Ezzati M, Riboli E. Behavioral and dietary risk factors for non communicable diseases. N Engl J Med. 2013 Sep 5;369(10):954-64

3. Abdelaal M, le Roux CW, Docherty NG. Morbidity and mortality associated with obesity. Ann Transl Med. 2017 Apr;5(7).

4. Popkin BM, Adair LS, Ng SW. Global nutrition transi-

tion and the pandemic of obesity in developing countries. Nutr Rev. 2012 Jan;70(1):3-21.
5. Obesity and overweight Fact sheet N°311.[online].[cited on aug,2014]. Available at www.who.int/mediacentre/factsheets/fs311/en/.
6. Oliveros E, Somers VK, Sochor O, Goel K, Lopez-Jimenez F. The concept of normal weight obesity. Prog Cardiovasc Dis. 2014 Jan 1;56(4):426-33.
7. Nazare JA, Smith J, Borel AL, Aschner P, Barter P, Van Gaal L et al. Usefulness of measuring both body mass index and waist circumference for the estimation of visceral adiposity and related cardiometabolic risk profile. Am. J. Cardiol. 2015 Feb 1;115(3):307-15.
8. Lee JJ, Pedley A, Hoffmann U, Massaro JM, Fox CS. Association of changes in abdominal fat quantity and quality with incident cardiovascular disease risk factors. J. Am. Coll. Cardiol. 2016 Oct 4;68(14):1509-21.
9. Coutinho T, Goel K,Carter RE, Hodge DO, Kragelund C, KanayaAM et al.Combining body mass index with measures of central obesity in the assessment of mortality in subjects with coronary disease. J. Am. Coll.Cardiol. 2013 Jul 16;61(5):553-60.
10. Gómez-Ambrosi J, Silva C, Galofré JC, Escalada J, Santos S, MillánD et al.Body mass index classification misses subjects with increased cardiometabolic risk factors related to elevated adiposity. Int. J.Obes. 2012 Feb;36(2):286-94.
11. Oguz A, Temizhan A, Abaci A, Kozan O, Erol C, Ongen Z et al.Obesity and abdominal obesity; an alarming challenge for cardiometabolic risk in Turkish adults. Anadolu Kardiyol Derg 2008;8:401–6.
12. Tingting Du, Xingxing Sun, Ping Yin, Rui Huo, ChaochaoNi,Xuefeng Yu.Increasing trends in central obesity among Chinese adults with normal body mass index, 1993–2009. BMC Public Health. 2013 Apr; 13:327
13. Liu X, Chen Y, Boucher NL, Rothberg AE. Prevalence and change of central obesity among US Asian adults:NHANES 2011-2014.BMC Public Health.2017 Aug 25;17(1):678.
14. D Earl S. Ford, Ali H, Wayne H. Trends in waist circumference among US adults. Obes Res 2003;11(12):23–31.
15. Gómez-Ambrosi J, Silva C, Galofré JC, Escalada J, Santos S, Millán D et al. Body mass index classification misses subjects with increased cardiometabolic risk factors related to elevated adiposity. Int. J. Obes. 2012 Feb;36(2):286.
16. Sahakyan KR, Somers VK, Rodriguez-Escudero JP, Hodg DO, Carter RE, Sochor O et al. Normal-Weight Central Obesity: Implications for Total and Cardiovascular Mortality.Ann. Intern. Med. 2015 Dec 1;163(11):827-35.
17. Kesavachandran CN, Bihari V, Mathur N. The normal range of body mass index with high body fat percentage among male residents of Lucknow city in north India. Indian J. Med. Res.. 2012 Jan;135(1):72.
18. Mahmood M, Ashrafc T, Memon MA, Achakzai AS. Abdominal obesity pattern among various ethnic groups presenting with acute coronary syndrome. J.Ayub. Med. Coll. Abbottabad. 2010;22(3)32-43.
19. Noor M, Raza UA, Zeeshan MF, Wazir M. frequency of abnormal waist circumference and associated risk factors in healthy adults. JPMI. 2007;21:248-255.
20. Kitchlew R, Chachar AZK, Latif S.Body mass index-;visceral fat and total body fat distribution and its relation to body mass index in clinical setting using bio-impedance body composition monitor.Professional Med. J. Feb-Feb 2017;24(2):326-34.