Original Article

Study of waist cercumference in Obesity Related Hypertension with Non-obesity Related Hypertension Without not Diagnosis Other Diseases

Ahlam A. Alwaan[1], Mohammed A. Albyati[2], Mahmoud K. Shaker[3]
[1,2]Al-Nahrain University /College of Medicine / Department of Chemistry and Biochemistry / Iraq
[3]Al-Nahrain University /College of Medicine / Department of Medicine / Iraq
Email: ahlamaltay@gmail.com
DOI: 10.47750/pnr.2022.13.S01.11

Abstract

The aim of our study is to find the relationship between waist circumference and obesity associated with high blood pressure and non-obese people associated with high blood pressure and to know the effect of waist circumference on pressure in the presence and absence of obesity, based on people diagnosed with high pressure without the presence of any other disease. The total number of participants is 120 sick participants. and healthy. Where we made a comparison between several groups, where the groups of obese people associated with high blood pressure and non-obese people associated with high blood pressure had an increase in waist circumference, as it was high pressure with waist circumference regardless of whether they were obese or otherwise Al-immamain Al-Kadhimayn Hospital, Baghdad, Iraq.

The sensitivity analysis indicated a consistent trend between waist circumference and new-onset hypertension in all BMI categories. This study suggested high waist circumference as an independent risk factor for new-onset hypertension based on a nationwide cohort of adults aged ≥18 years old. Our results supported that waist circumference should be routinely measured.

Keywords: body mass index, hypertension, normal-weight obesity, waist circumference.

INTRODUCTION

The prevalence of hypertension has grown significantly, and it now accounts for 20% of global cardiovascular disease mortality and 50% of morbidity. 2–5 Obesity is one of numerous risk factors and a chronic metabolic condition that is intimately linked to hypertension. Although the prevalence of obesity has increased, deaths from coronary artery disease and stroke have decreased over the past ten years. This is likely due to better public health management of other cardiovascular risk factors. Hypertension is becoming more and more common, and this tendency is continuing. The most popular tool for tracking obesity and determining the cardiovascular risk that goes along with it is the body mass index (BMI). In contrast, as BMI is unable to account for the geographical distribution of body fat, obesity as defined by BMI is a heterogeneous condition at the individual level. The "obesity paradox" states that those with slightly higher BMIs tend to live longer and experience fewer cardiovascular events. Another anthropometric parameter that is highly linked to the absolute distribution of abdominal fat, compared to BMI, is waist circumference. The possibility of waist circumference giving the practitioner additional information beyond BMI was recently addressed in a consensus statement. Additionally, only after accounting for BMI could the full impact of waist size on cardiovascular risk be seen. The secret to managing abdominal obesity-related cardio metabolic risk better and opening up more options for the primary prevention of cardiovascular illnesses is to gain a deeper understanding of the relationship between waist circumference and hypertension. This study aims to investigate the relationship between waist circumference and the development of obesity-related hypertension based on a nationwide cohort of Iraqi population where other chronic diseases have not been diagnosed. Our recent publications have revealed a significant association between waist circumference and the prevalence of hypertension, consistent with the evidence from other research groups. (1)

Body Mass Index:

Body mass index enables weight comparisons among populations, regardless of stature. BMI correlates well with percentage

of body fat, with the exception of those who have gained lean weight through intense exercise or resistance training (such as bodybuilders). However, this relationship is independently influenced by sex, age, and race, particularly in South Asians where evidence suggests that BMI-adjusted percent body fat is higher than in other populations. In the United States, obesity in adults is defined as a BMI of 27.3 kg/m or more for women and a BMI of 27.8 kg/m or more for men, according to data from the second National Health and Nutrition Examination Survey (NHANES II). These parameters were developed using the gender-specific BMI 85th percentile values for people aged 20 to 29. The World Health Organization (WHO) classification for overweight and obesity was adopted by the National Institutes of Health (NIH) Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults in 1998. According to the WHO classification, which mostly applied to people of European ancestry, people with higher BMIs (Table 1) are at an increased risk of developing comorbid conditions, such as hypertension, type 2 diabetes, and cardiovascular disease, in comparison to people who are considered to be healthy weights (BMIs between 18.5 and 25 kg/m). Due to the preponderance of central fat distribution, Asian individuals are known to have higher rates of diabetes type 2 and hypertension at lower BMI ranges than non-Asian ethnicities (see below). Among order to reduce the danger of therapeutic intervention in Asians, the WHO has proposed lower cutoff points: a BMI of 18.5 to 23 kg/m represents acceptable risk, 23 to 27.5 kg/m confers elevated risk, and 27.5 kg/m or higher constitutes high risk. (2)

Table 1 Classification of Overweight and Obesity by BMI, Waist Circumference, and Associated Disease Risk .

	BMI (kg/m^2)	Obesity Class	Disease Risk* (Relative to Normal Weight and Waist Circumference)	
			Men ≤40 inches (≤ 102 cm) Women ≤ 35 inches (≤ 88 cm)	> 40 in (> 102 cm) > 35 in (> 88 cm)
Underweight	< 18.5		-	-
Normal†	18.5–24.9		-	-
Overweight	25.0–29.9		Increased	High
Obesity	30.0–34.9 35.0–39.9	I II	High Very High	Very High Very High
Extreme Obesity	≥ 40	III	Extremely High	Extremely High

*Disease risk for type 2 diabetes, hypertension, and cardiovascular disease.

†Increased waist circumference can also be a marker for increased risk even in persons of normal weight.

Hypertension definition classification:

Pressure (DBP) is ≥90 mm Hg following repeated examination . Table 2 provides a classification of BP based on office BP measurement, Table 3 provides ambulatory and home BP values used to define hypertension; these definitions apply to all adults (>18 year old). These BP categories are designed to align therapeutic approaches with BP levels.

• High-normal BP is intended to identify individuals who could benefit from lifestyle interventions and who would receive pharmacological treatment if compelling indications are present .

• Isolated systolic hypertension defined as elevated SBP (≥140 mm Hg) and low DBP (<90 mm Hg) is common in young and in elderly people. In young individuals, including children, adolescents and young adults, isolated systolic hypertension is the most common form of essential hypertension. However, it is also particularly common in the elderly, in whom it reflects stiffening of the large arteries with an increase in pulse pressure (difference between SBP and DBP).

• Individuals identified with confirmed hypertension (grade 1 and grade 2) should receive appropriate pharmacological treatment.(3)

Table 2. Classification of Hypertension Based on Office Blood Pressure (BP) Measurement.

Category	Systolic (mm Hg)		Diastolic (mm Hg)
Normal BP	<130	and	<85
High-normal BP	130–139	and/or	85–89
Grade 1 hypertension	140–159	and/or	90–99
Grade 2 hypertension	≥160	and/or	≥100

Table 3. Criteria for Hypertension Based on Office-, Ambulatory (ABPM)-, and Home Blood Pressure (HBPM) Measurement.

	SBP/DBP, mm Hg
Office BP	≥140 and/or ≥90
ABPM	
24-h average	≥130 and/or ≥80
Day time (or awake) average	≥135 and/or ≥85
Night time (or asleep) average	≥120 and/or ≥70
HBPM	≥135 and/or ≥85

Methodology:

A case control study was employed. In This study was conducted from February 2022 to April 2021, where this study included 120 (60 female & 60 male) people and they were distributed as follows

The study subjects were divided into two main groups and each group subdivides into two subgroups.

Group I: including 60 subjects subdivides into

a. included 30 healthy subjects with no obese and no hypertension in the age group (above 18 year), who were used as a control Group. The control group samples will be collected from healthy people,

b. included 30 subjects with no obese with hypertension (dose not receive treatment) in the age group (above 18 year(who were used as a positive control

Group II : including 60 subjects subdivides into:

a.30 subjects with obese and hypertension) Patients dose not receive treatment) in the age group (above 18 year(.

b.30 subjects with obese and no hypertension in the age group (above 18 year).

Exclusion Criteria:

The requirements for exclusion criteria were as follow:

1. Patients with adrenal tumor or cancer.
2. Patients with any type of cancer or tumor will be excluded.
3. Patients with cardiac surgery.
4. People suffering from chronic diseases.

Inclusion criteria:

1. People diagnosed with high pressure.
2. Do not take any medication for high pressure.
3. They do not suffer from kidney or heat disease.
4. Obese BMI over 30 kg/m2 .

Waist circumference was measured at each of the following sites:

1. the Midpoint between the bony markers of the ribs and superior iliac crest (method A).

2. the level of the lateral Crease that appears when the person leans to one side (method B).

3 .4 cm above the umbilicus (method C).(4)

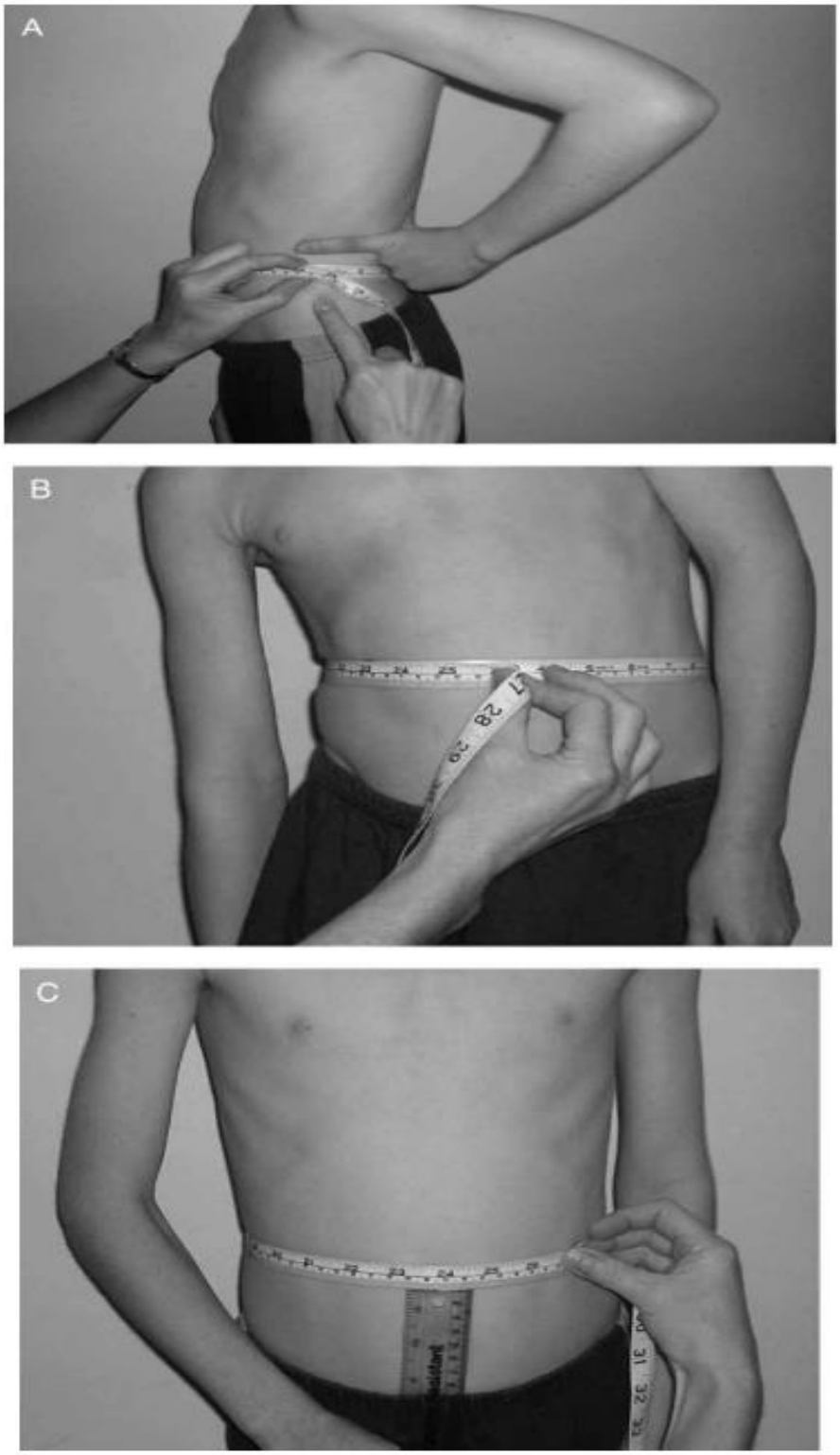

Figure 1. Three methods currently recommended for measuring children's waists: A) midpoint between lowest rib and iliac crest; B) crease on lateral flexion; C) 4 cm above umbilicus.

Waist circumference measurement:

After the participant was kept in a standing position, a trained examiner would locate the belly button and then place a soft measuring tape around the waist at the navel level. Next, the participant would be asked to take a normal breath and hold a breath at the end of exhaling. Then, waist circumference was measured after the participant exhaled one normal breath. A detailed description of waist circumference measurement was provided in the CHARLS Biomarker Questionnaire Protocol (http://charls.pku.edu.cn/pages/data/2011-charls-wave1/zh-cn.(1)

Hypertension definition:

The lower border of the cuff was positioned about.5 inches above the elbow after the subject had rested for about 30 minutes while seated. One qualified examiner used an automated blood pressure monitor to take three readings of the patient's systolic and diastolic blood pressure (Omron HEM-7200 Monitor). Accordingly, the average blood pressure was determined. The person in this study was classified as having hypertension if they met one of the three criteria listed below: self-reported hypertension; average systolic or diastolic blood pressure 140 mmHg or 90 mmHg19; current use of antihypertensive drugs. (1)

Body Mass Index (BMI)

Body mass index (BMI) was obtained from measuring weight in kilograms & height in meters by using suitable scales and applied the following equation:-

BMI (Kg/m2) = Weight / Height 2

Statical analysis:

Continuous variables are reported as mean ± standard deviation. When comparing clinical parameters between BMI groups, an analysis of variance (ANOVA) test was performed for continuous variables, and post hoc LSD for compared with multi groups. Statistical significance was established at a P-value 0.05.

Results:

Table 1: show descriptive of variables

Statistics

		GROUP	waiscircumference(cm)	AGE (YEARS)	DIASTOLIC B.P.	SYSTOLIC B.P.
N	Valid	120	120	120	120	120
	Missing	0	0	0	0	0
Mean		2.50	104.13	35.88	85.81	129.54
Median		2.50	102.00	36.00	87.50	127.50
Mode		1[a]	102	32	100	120
Std. Deviation		1.123	15.160	10.789	16.916	21.322
Variance		1.261	229.831	116.396	286.139	454.620
Range		3	92	53	60	100
Minimum		1	71	14	60	100
Maximum		4	163	67	120	200
Sum		300	12496	4305	10297	15545

a. Multiple modes exist. The smallest value is shown

Table 2: show compression between groups of gender .

GROUP * GENDER Crosstabulation

			GENDER		
			female	male	Total
GROUP	OBESE WITH HT	Count	8	22	30
		% within GENDER	13.3%	36.7%	25.0%
	OBESE WTH NO HT	Count	16	14	30
		% within GENDER	26.7%	23.3%	25.0%
	NO OBESE WITH HT	Count	17	13	30
		% within GENDER	28.3%	21.7%	25.0%
	NO OBESE WITH NO HT	Count	19	11	30
		% within GENDER	31.7%	18.3%	25.0%
Total		Count	60	60	120
		% within GENDER	100.0%	100.0%	100.0%

Tables 3: show chi-square test of groups

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9.333[a]	3	.025
Likelihood Ratio	9.622	3	.022
N of Valid Cases	120		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.00.

Table 4: show compression between groups of waist circumference and other vatiables by one way anova .

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
waiscircumference(cm)	Between Groups	12735.667	3	4245.222	33.696	.000
	Within Groups	14614.200	116	125.984		
	Total	27349.867	119			
DIASTOLIC B.P.	Between Groups	27402.225	3	9134.075	159.370	.000
	Within Groups	6648.367	116	57.314		
	Total	34050.592	119			
SYSTOLIC B.P.	Between Groups	42772.292	3	14257.431	146.004	.000
	Within Groups	11327.500	116	97.651		
	Total	54099.792	119			

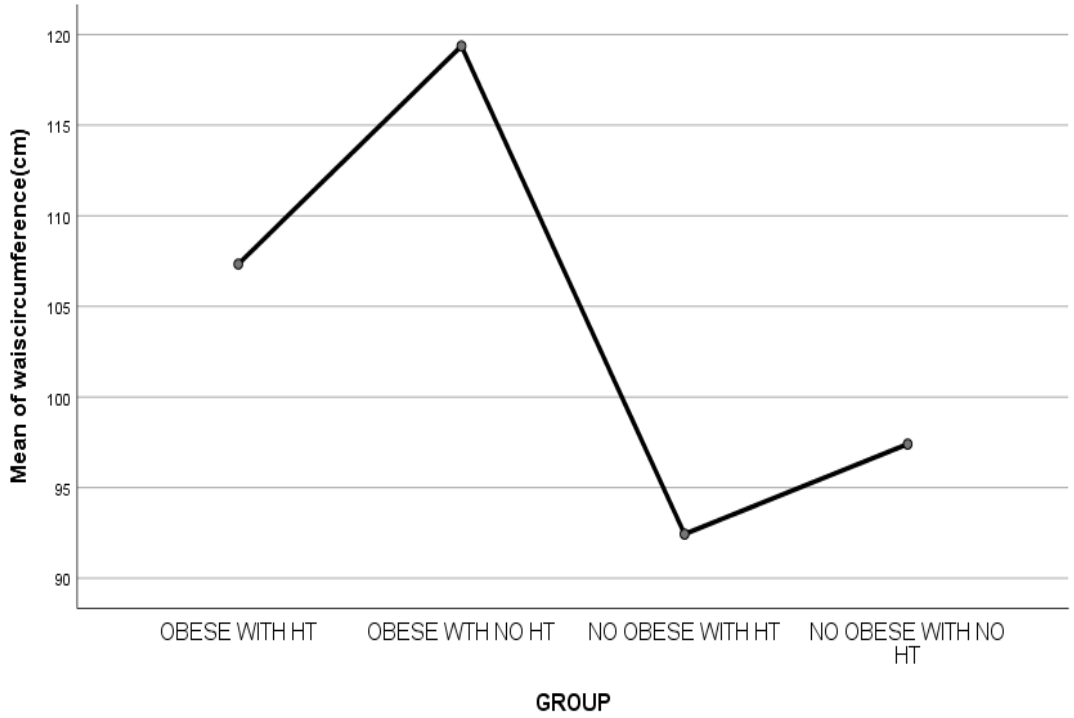

Fig.1: show waist circumference compared with groups in this study

Fig.2: show mean of diastolic B.P compared with other groups in this study .

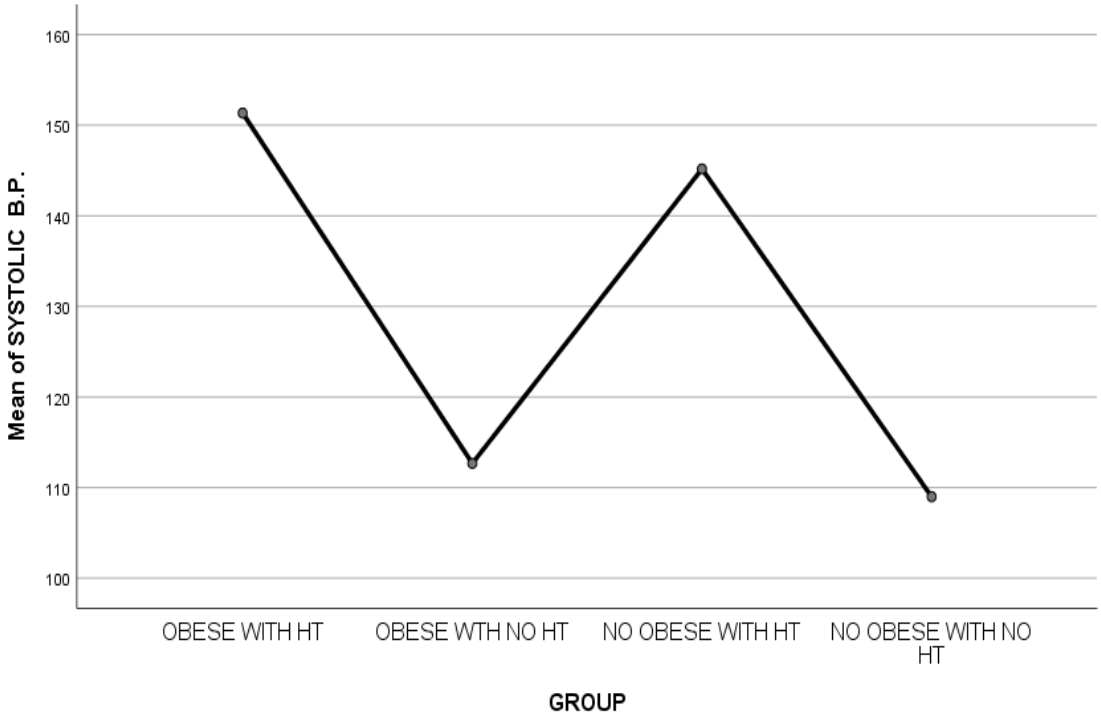

Fig.3: show mean of systolic B.P. compared with other groups in this study

Discussion:

According to the findings in the tables above, a larger waist circumference is linked to high blood pressure in people without other chronic diseases because a larger waist circumference and an accumulation of fatty tissue will stimulate high blood pressure without necessarily leading to the development of other chronic diseases. such as heart problems or kidney failure. The secretion of aldosterone, which increases blood pressure, is also stimulated by substances found in the fatty tissues.

Conclusion:

From the above, we conclude that the accumulation of fat in the waist circumference is linked to high pressure and may be one of the causes of other diseases in the long run.

REFERENCES

1. Sun JY, Ma YX, Liu HL, Qu Q, Cheng C, Kong XQ, et al. High waist circumference is a risk factor of new-onset hypertension: Evidence from the China Health and Retirement Longitudinal Study. J Clin Hypertens. 2022;24(3):320–8.
2. Purnell JQ. Definitions, Classification, and Epidemiology of Obesity. Endotext [Internet]. 2018;1–24. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25905390
3. Unger T, Borghi C, Charchar F, Khan NA, Poulter NR, Prabhakaran D, et al. 2020 International Society of Hypertension Global Hypertension Practice Guidelines. Hypertension. 2020;75(6):1334–57.
4. Rudolf MCJ, Walker J, Cole TJ. What is the best way to measure waist circumference? Int J Pediatr Obes. 2007;2(1):58–61.