Association of waist circumference with perception of own health in urban African males and females: the Sympathetic Activity and Ambulatory Blood Pressure in Africans (SABPA) study

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Abstract

Background: Current waist circumference (WC) cut-points of the Joint Statement Consensus (JSC) (male ≥ 94 cm, female ≥ 80 cm) were compared with a recently proposed WC cut-point (RPWC) (male ≥ 90 cm, female ≥ 98 cm). In this study, we aimed to compare the two cut-points to assess the association between central obesity and perception of own health.

Method: We determined blood pressure and fasting bloods [glucose, high-density lipoprotein (HDL) and triglycerides] as metabolic syndrome markers for 171 urban teachers. Perception of own health was determined via the General Health Questionnaire-28 (GHQ-28) to indicate probable psychological distress or a psychiatric disorder or caseness (≥ 4).

Results: The RPWC was an improved discrimination between the WC groups on perception of own health as reflected in the GHQ-28 subscales. In the male group, higher scores were found in the RPWC high WC group (≥ 90 cm) with regard to somatic symptoms, social dysfunction and GHQ-28 caseness, compared to those of the low WC groups (< 90 cm). Compared to the RPWC high WC females (≥ 98 cm), the low WC (< 98 cm) reflected significantly higher anxiety and sleeplessness subscale scores.

Conclusion: Our results suggest that the RPWC (men 90 cm, women 98 cm), (determined in this African cohort when adding GHQ-28 caseness as a discriminatory variable between WC cut-point), distinguished better between WC groups based on their perception of own health than the JSC cut-point.

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Introduction

Obesity is a well-known cause of cardiovascular disease burden and premature death, but associations with psychological morbidity remain uncertain.[3] Several studies have showed that decreased mental health is associated with obesity.[4-7] *Au contraire*, other studies have found no association between mental health and obesity.[3,8]

It has been suggested that psychological co-morbidity in patients with obesity is associated with a variety of medical and dietary problems, as well as demographic, social and cognitive risk factors.[9] Björntorp and Rosmond[10] proposed that psycho-social and socio-economic handicaps could be expected following frequent stress reactions and alcohol and smoking habits, as well as robust associations with depressive and anxiety traits. In South Africa, coping with urbanisation and its accompanying insecurities and disruption regarding social relationships could also contribute to a poorer perception of own health or psychological distress.[11]

Urbanisation is a critical factor that has influenced the traditional ideal body image among Africans, who have always been inclined towards a larger, fuller body shape.[12] According to this "big is beautiful" mindset, obesity is associated with dignity, health, wealth and respect.[13] However, in view of current massive socio-economic changes that have taken place in the country, and increased social integration following the abolishment of the previous apartheid legislation, young black South Africans are rapidly being exposed to different belief systems. This exposure might have altered their value system regarding body size,[14] which in turn, could have influenced their perception of own health.

Consequently, we aimed to compare two cut-points measurements relating to central obesity, namely JSC[1] and the RPWC,[2] and their association with perception of own health in a cohort of urban African school teachers.

Method

This sub-study formed part of the Sympathetic Activity and Ambulatory Blood Pressure in Africans (SABPA) prospective cohort study, conducted from February to May 2008. Permission to participate was granted by the North West Department of Education and the South African Democratic Teachers Union, as well as the ethics committee of North-West University (project number: NWU-00036-07S6). The study conformed to the ethical guidelines of the World Medical Association Declaration of Helsinki, revised in 2004. All participants signed an informed consent form.

Study population and sample

Male and female urban African school teachers (n = 200, aged 25-65 years) were recruited and included as participants from governmental organisations in the Dr Kenneth Kaunda District in North West province. Exclusion criteria for this study included ear temperature > 37.5^{0}C, alpha- or beta-blocker usage, donated blood or having received a vaccination in the previous three months. Clinically confirmed diabetes (n = 7), use of antidepressant medication (n = 1) and human immunodeficiency virus-infected (n = 13) participants were also excluded. The final participant sample comprised 171 African subjects (n = 81 males, and n = 90 females).

Experimental procedure

On every working day of the week for the extent of the project, the physical activity monitor (Actical®) apparatuses were fitted at 07h00 to four participants for 24 hours. Software programmes were activated and participants resumed their daily activities.

At 16h30, they were transported to the metabolic unit research facility of North-West University for an overnight stay where participants were welcomed and introduced to the experimental setup. The first half of a psycho-social battery of tests was completed under the supervision of trained field workers. At 18h00, participants received a standardised dinner. After dinner, the last part of the psycho-social battery questionnaires was completed. Last beverages were given at 20h30.

After an overnight fast, the Actical® apparatuses were disconnected. Anthropometric measurements were taken in triplicate by anthropometrists according to the standards of the International Society for the Advancement of Kinanthropometry (ISAK).[15] Two mercury sphygmomanometer BP readings using Korotkoff IV or V for BP were taken while the participants rested for five minutes in a semi-recumbent position. There was a three-minute rest between measurements. The second measurement was used for statistical analyses. BP measurements were taken by a medical doctor and registered nurse. Fasting blood samples were obtained by a registered nurse.

Anthropometric measurements

All anthropometric measurements[15] were performed by ISAK level two-accredited anthropometrists. The WC was taken in triplicate at the end of normal expiration, at the narrowest point of the abdomen between the lower costal (tenth rib) border and the top of the iliac crest, perpendicular to the long axis of the trunk. The subjects assumed a relaxed standing position. They folded their arms across their thorax.

Body mass index (BMI) was calculated via kg/m^2. The body weights were measured by means of a digital KRUPS® scale. The participants wore minimal clothes and stood with their weight evenly distributed, to the nearest 0.1 kg. Height was measured with a stadiometer to the nearest 0.1 cm, while the participant's head was in the Frankfort plane with the heels together and the buttocks and upper back touching the stadiometer.

General Health Questionnaire-28[16]

The General Health Questionnaire (GHQ-28) is a 28-item, self-reporting measuring tool that aims to distinguish people with some form of psychological disturbance from those who are relatively healthy.[16] The GHQ has four subscales, namely somatic symptoms, anxiety and insomnia, social dysfunction and depressive symptoms, each of which comprises seven items. The subjects reported on their perception of own health as experienced over the last month. Each item was scored according to bimodal scoring on a 0-0-1-1 scale. The value of response possibilities one (1) and two (2) were equal to nil (0), and three (3) and four (4) equal to one (1). The sum of these scale scores yielded a single score that ranged from 0 (for no symptoms) to 28 (severe pathology), for which threshold scores of ≥ 4 (bimodal scoring) indicated probable psychological distress or a psychiatric disorder, hereafter described as caseness.

Validity of the GHQ-28 is supported by numerous studies that have investigated the specificity (probability that a "true normal" case will be correctly identified) and sensitivity (probability that a "true abnormal" case will be correctly identified) of each scale across a variety of cultures. The median specificity of the GHQ-28 has been reported to be 0.82 and the median sensitivity,

0.86.[117] Cronbach alpha-reliability coefficients ranged from 0.78-0.85 in this study.

Biochemical analysis

Fasting blood samples were obtained by a registered nurse with a winged infusion set. The samples were taken from the forearm vein of the dominant arm, handled according to standardised procedures and stored at -80^{0}C. Serum gamma-glutamyl transferase (GGT) and cotinine were used as biomarkers of alcohol abuse and smoking respectively. Sodium fluoride tubes that prevent metabolism of glucose by the blood cells were used for sampling glucose.

Biochemical measurements for high-density lipoprotein and triglycerides were taken using the Konelab™ 20i sequential multiple analyzer computer (Thermo Scientific, Vantaa, Finland) and Unicel® DXC 800 (Beckman and Coulter, Germany) at accredited laboratories.

Statistical analyses

Data analyses were performed with Statistica® version 10.[18] Descriptive statistics and prevalence were obtained for the entire African sample. A 2 X 2 analysis of covariance (ANCOVA) was executed to test the interaction between WC (JSC[1] and the RPWC[2]) and gender with GHQ-28 caseness and metabolic syndrome markers as outcome variables. Subsequent ANCOVAs followed independently of a priori confounders (age, BMI and physical activity). Standardised differences in means as effect sizes (d) were also determined as a measure of practical significance, where practical significance can be understood to be a large enough difference to have an effect in practice.[19] As such, an effect size of 0.2 is described as small and not visible. Likewise, an effect size of 0.5 is described as medium and visible to a researcher. An effect size of 0.8 is practically significant and can be understood to represent a large enough difference to have an effect in practice. Logistic regression analyses were performed to assess the odds of each component predicting psychological distress (GHQ-28 caseness) in high WC gender groups independent of the covariates (age, BMI and physical activity). Statistical significance was a two-sided α level of ≤ 0.05 and $d \geq 0.8$ on a practical significance.

Results

In Table I, African subjects demonstrated levels of obesity, high normal glucose and BP values. 74.27% reported a perception of poorer own health. A significant interaction was found between RPWC x gender for somatic symptoms [F (1.171) = 5.28; p-value = 0.02] and GHQ-28 caseness [F (1.171) = 4.62; p-value = 0.02.] Subsequently, groups were stratified into high and low WC groups for JSC and the RPWC. Separate ANCOVAs independent of confounders (age, BMI and physical activity) was computed for the males (Table II) and for the females (Table III) to determine significant differences.

Table I: Descriptive statistics for the entire African group (mean ± standard deviation)

Total African group n = 171	
Males (n)	81
Females (n)	90
Age (years)*	44.05 ± 8.30
Lifestyle variables	
Physical activity (kCal)*	2 693.04 ± 809.67
Gamma-glutamyl transferase (µ/l)*	62.59 ± 72.27
Cotinine*	20.94 ± 51.66
Physiological and anthropometric variables	
Body mass index (kg/m^2)*	30.36 ± 7.14
Glucose (mmol/l)	5.50 ± 1.73
High-density lipoprotein (mmol/l)	1.15 ± 0.35
Triglycerides (mmol/l)	1.38 ± 1.30
Systolic blood pressure (mmHg)	134.00 ± 19.84
Diastolic blood pressure (mmHg)	89.00 ± 13.42
Psychological variables: General Health Questionnaire-28	
Somatic symptoms	2.54 ± 2.20
Anxiety and sleeplessness	2.64 ± 2.46
Social dysfunction	2.01 ± 2.12
Depressive symptoms	1.16 ± 1.93
General Health Questionnaire-28 total	8.37 ± 6.61
General Health Questionnaire-28 caseness, n (%)	127 (74.27%)
Medication usage	
Hypertension, n (%)	34 (19.88%)

* Lifestyle risk factors.
Variables indicated as arithmetic mean ± standard deviation (SD)

In Table II, for both WC cut-point (JSC and the RPWC), the lifestyle and physiological variables were less favourable for the high WC cut-point in males. The high WC cut-point male groups revealed higher BMIs, glucose and BP compared to the low WC cut-point male groups. Only the RPWC high WC males reported more somatic symptoms, social dysfunction and an overall higher score. This pertained to a perception of poorer own health than that of the RPWC low WC male group.

In Table III, within both WC cut-points (JSC and the RPWC), a similar trend pertaining to higher BMI and glucose was evident among the high WC females, even though only the RPWC high WC group (≥ 98 cm) demonstrated a higher mean BP. Unlike the males, the

Table II: Comparing males' Joint Statement Concensus[1] waist circumference cut-point and the RPWC[2] waist circumference cut-point (men 90 cm, women 98 cm) (mean ± 95% confidence interval), independent of covariates (age, body mass index and physical activity)

	2009 JSC males (n = 43) < 94 cm	2009 JSC males (n = 38) ≥ 94 cm	Effect size (d)	RPWC males (n = 36) < 90 cm	RPWC males (n = 45) ≥ 90 cm	Effect size (d)
Age (years)*	41.37 ± 9.33	44.08 ± 6.90		40.50 ± 9.79	44.36 ± 6.60**	0.39
Lifestyle variables						
Physical activity (kCal)*	2 350.24 ± 654.08	3 145.41 ± 797.02**	1.00	2 341.32 ± 705.58	3 028.85 ± 788.40**	0.87
Gamma-glutamyl transferase (µ/l)*	66.72 ± 86.10	87.10 ±52.21		71.08 ± 93.41	80.45 ± 50.78	
Cotinin*	25.42 ± 48.84	22.53 ± 46.76		25.81 ± 46.94	22.67 ± 48.61	
Physiological and anthropometric variables						
Body mass index (kg/m2)*	23.52 ± 3.15	32.37 ± 4.73**	1.87	23.06 ± 3.10	31.36 ± 5.03**	1.65
Glucose (mmol/l)	5.19 (4.41; 5.96)	6.94 (6.10; 7.79)**	0.67	5.21 (4.37; 6.05)	6.66 (5.93; 7.38)**	0.57
High-density lipoprotein (mmol/l)	1.16 (1.02; 1.29)	1.0 (0.85; 1.15)		1.15 (1.01; 1.30)	1.02 (0.90; 1.15)	
Triglycerides (mmol/l)	1.48 (0.82; 2.13)	2.18 (1.46; 2.89)		1.63 (0.92; 2.34)	1.95 (1.33; 2.56)	
Systolic blood pressure (mmHg)	132 (124.51; 139.20)	149 (140.53; 156.54)**	0.67	131 (123.34; 139.16)	146 (139.60; 153.25)**	0.64
Diastolic blood pressure (mmHg)	89 (84.11; 94.62)	99 (92.79; 104.24)**	0.52	91 (85.32; 96.81)	96 (90.77; 100.68)	
Hypertension medication, n (%)	4 (9.30 %)	9 (23.68 %)		4 (11.11 %)	9 (20 %)	
Psychological variables: GHQ-28						
Somatic symptoms	1.88 (1.12; 2.64)	3.01 (2.18; 3.84)		1.58 (0.77; 2.38)	3.08 (2.39; 3.77)**	0.62
Anxiety and sleeplessness	2.59 (1.65; 3.53)	2.44 (1.42; 3.46)		2.26 (1.25; 3.26)	2.73 (1.86; 3.60)	
Social dysfunction	1.60 (0.78; 2.41)	2.07 (1.18; 2.95)		1.01 (0.16; 1.86)	2.46 (1.73; 3.20)**	0.57
Depressive symptoms	0.54 (-0.07; 1.15)	1.36 (0.69; 2.02)		0.56 (-0.10; 1.22)	1.21 (0.65; 1.78)	
GHQ-28 total	6.62 (4.12; 9.12)	8.89 (6.17; 11.61)		5.42 (2.79; 8.05)	9.49 (7.22; 11.77)**	0.51
GHQ-28 caseness, n (%)	26 (60.47 %)	28 (73.68 %)		21 (58.33 %)	33 (73.33 %)	

* Lifestyle factors are indicated as arithmetic mean ± standard deviation
Subsequent data are presented as mean ± 95% confidence interval (95% CI). Statistical difference indicated with **; p-value ≤ 0.05
GHQ: General Health Questionnaire-28, JSC: Joint Statement Consensus, RPWC: recently proposed WC cut-point

RPWC low WC females reported more anxiety and sleeplessness symptoms. Of note, there was a trend of more self-reported somatic and depressive symptoms and an overall higher GHQ-28 total score in the low WC females.

The metabolic syndrome component and lifestyle predictors for psychological distress in African JSC and RPWC males were determined (Tables IV and V). We demonstrated that alcohol abuse best predicted psychological distress in both JSC and RPWC high WC male groups, although clinically, they did not indicate risk with an OR of > 1. In the female group, only a trend of alcohol abuse predicted psychological distress in the JSC high WC female group. Interestingly, the RPWC high WC female group cut-point showed no odds of any of the variables predicting psychological distress.

Discussion

The main purpose of this study was to compare two proposed WC cut-points measurements of central obesity, the JSC[1] and an ethnic-specific RPWC.[2] The association between each proposed WC and perception of own health was assessed in a group of urban African males and females. Main findings demonstrated that both the JSC and the RPWC cut-points models discriminated well between high WC and low WC groups for lifestyle and metabolic syndrome component markers. However, only the RPWC was able to demonstrate higher blood pressure and psychological distress in the high WC African groups, especially the males.

The RPWC high WC group demonstrated a less favourable metabolic profile, and also reported a

Table III: Comparing females' Joint Statement Consensus[1] waist circumference cut-points and the RPWC cut-points[2] (mean ± 95% confidence interval), independent of covariates (age, body mass index and physical activity)

	2009 JSC females (n = 17) < 80 cm	2009 JSC females (n = 73) ≥ 80 cm	Effect size (d)	RPWC females (n = 58) < 98 cm	RPWC females (n = 32) ≥ 98 cm	Effect size (d)
Age (years)*	42.77 ± 6.54	45.92 ± 8.35		44.31 ± 7.28	47.16 ± 9.25	
Lifestyle variables						
Physical activity (kCal)*	1 957.67 ± 383.15	2 830.74 ± 783.68**	1.11	2 325.34 ± 487.42	3 282.97 ± 891.26**	1.07
Gamma-glutamyl transferase (µ/l)*	39.99 ± 44.65	49.71 ± 73.99		39.00 ± 35.02	63.91 ± 105.22	
Cotinin*	20.31 ± 48.72	17.56 ± 56.90		18.26 ± 61.36	17.68 ± 42.72	
Physiological and anthropometric variables						
Body mass index (kg/m2)	25.70 ± 3.50	34.43 ± 6.95**	1.26	29.26 ± 4.53	39.16 ± 7.04**	1.41
Glucose (mmol/l)	4.25 (3.65; 4.85)	5.20 (4.95; 5.45)**	0.79	4.75 (4.42; 5.07)	5.54 (5.05; 6.02)**	0.58
High-density lipoprotein (mmol/l)	1.32 (1.14; 1.50)	1.20 (1.12; 1.26)		1.23 (1.14; 1.33)	1.18 (1.04; 1.32)	
Triglycerides (mmol/l)	0.78 (0.48; 1.08)	1.04 (0.91; 1.16)		0.90 (0.75; 1.06)	1.15 (0.92; 1.38)	
Systolic blood pressure (mmHg)	128 (118.98; 136.19)	130 (126.21; 133.72)		125 (120.25; 129.32)	138 (131.34; 144.80)**	0.69
Diastolic blood pressure (mmHg)	83 (77.25; 88.28)	85 (82.16; 86.97)		82 (78.57; 84.44)	89 (84.79; 93.50)**	0.62
Hypertension medication, n (%)	1 (5.88 %)	20 (27.40 %)		7 (22.58 %)	14 (24.56 %)	
Psychological variables: GHQ-28						
Somatic symptoms	2.92 (1.62; 4.22)	2.61 (2.03; 3.17)		2.97 (2.26; 3.68)	2.10 (1.04; 3.16)	
Anxiety and sleeplessness	2.23 (0.84; 3.62)	2.88 (2.27; 3.48)		3.32 (2.57; 4.07)	1.74 (0.63; 2.85)**	-0.44
Social dysfunction	1.55 (0.36; 2.74)	2.34 (1.82; 2.86)		2.10 (1.44; 2.76)	2.36 (1.38; 3.404)	
Depressive symptoms	1.57 (0.37; 2.77)	1.32 (0.80; 1.84)		1.58 (0.92; 2.23)	0.99 (0.01; 1.96)	
GHQ-28 total	8.37 (4.68; 11.07)	9.13 (7.51; 10.74)		9.98 (7.96; 11.99)	7.19 (4.20; 10.19)	
GHQ-28 caseness, n (%)	13 (76.47 %)	60 (82.19 %)		28 (87.5 %)	45 (77.59 %)	

* Lifestyle factors are indicated as arithmetic mean ± standard deviation. Subsequent data are presented as mean ± 95% confidence interval (95% CI). Statistical difference indicated with **; p-value ≤ 0.05
GHQ: General Health Questionnaire-28, JSC: Joint Statement Consensus, RPWC: recently proposed WC cut-point

Table IV: Metabolic syndrome component and lifestyle predictors for psychological distress in African JSC and RPWC men

Covariates	JSC men (n = 38)			RPWC men (n = 45)		
	OR	± 95 CI	p-value	OR	± 95 CI	p-value
Triglycerides	0.71	0.23, 2.13	0.54	0.80	0.33, 1.95	0.89
cGGT	0.97	0.93, 1.00	0.05	0.98	0.95, 1.00	0.08
High-density lipoprotein	0.81	0.01, 47.20	0.92	1.99	0.11, 36.05	0.49
Diastolic blood pressure	0.10	0.94, 1.06	0.92	0.10	0.95, 1.05	0.45

cGGT: serum gamma-glutamyl transferase, CI: confidence interval, JSC: Joint Consensus Statement, RPWC: recently proposed WC cut-point, OR:odds ratio
Data presented as odds ratio with 95% confidence interval and p-values for significance of odds ratio.
Adjusted for covariates (age, body mass index and physical activity).

Table V: Metabolic syndrome component and lifestyle predictors for psychological distress in African JSC and RPWC women

Covariates	JSC women (n = 73)			RPWC women (n = 32)		
	OR	± 95 CI	p-value	OR	± 95 CI	p-value
Triglycerides	0.90	0.21, 3.96	0.89	0.15	0.00, 55.89	0.53
cGGT	0.95	0.89, 1.05	0.08	0.93	0.81, 1.07	0.33
High-density lipoprotein	0.45	0.05, 4.37	0.49	0.04	0.00, 23.97	0.32
Diastolic blood pressure	0.97	0.91, 1.05	0.45	1.06	0.83, 1.34	0.66

cGGT: Serum gamma-glutamyl transferase, CI: confidence interval, JSC: Joint Consensus Statement, RPWC: recently proposed WC cut-point, OR: odds ratio
Data presented as odds ratio with 95% confidence interval and p-values for significance of odds ratio.
Adjusted for covariates (age, body mass index and physical activity).

significant perception of own poorer mental health as represented by somatic symptoms and social dysfunction. This is in line with findings by Bodenlos et al[7] who reported that the relationship between mood disorders and obesity demonstrated a trend towards significance in African Americans. The prominence of somatic symptoms in this group also seemed to confirm the findings of Kirmayer and Young[20] who indicated that ethno-cultural groups in the same urban milieu, with equal access to healthcare services, almost exclusively demonstrated somatic symptoms rather than psychosocial distress.

The female cut-points differed extensively between the two WC cut-points (JSC ≥ 80 cm vs. the RPWC ≥ 98 cm). In an attempt to suggest population-specific cut-points for this population, Prinsloo et al[2] carried out receiver-operating characteristic analyses for each of the metabolic syndrome components. The BP cut-points, used in our current sub-study, was the most significant predictor of pathology. BP is a major risk factor in people of African descent generally, regardless of country of residence.[21-25] However, recent findings in a Zulu-speaking rural community in South Africa demonstrated that the optimal WC cut-point to predict the presence of at least two other components of the metabolic syndrome was 86 cm for males and 92 cm for females.[26] More research is needed to clarify the matter on WC cut-points in different ethnic groups in South Africa.

With regard to the females' perception of own health, the RPWC distinguished between low and high WC cut-point groups in relation to the anxiety and sleeplessness subscale. This indicated that the low group (< 98 cm) had a higher occurrence of anxiety and sleeplessness, even though the high group (≥ 98 cm) demonstrated higher mean BP. Katzman and Lee[27] theorised that women juggling two cultural worlds, and who were exposed to Western ideals in their home countries, showed an increase in disordered eating. The results of this study might also offer a hypothesis regarding metabolically healthy obese females, as first proposed by Walker et al.[28] Kruger et al[29] found that WC was associated with the risk of acquiring noncommunicable disease in black South African women. In line with this, the current study shows that the high WC group was not metabolically healthy, but healthy according to their perception, whereas the low WC group was metabolically healthy, but with a very high occurrence of psychological distress. Healthy obesity in this group does not seem to refer to metabolic health, but rather to improved perception of own health. This trend seems to be particularly prominent when the RPWC cut-points are used.

Dallman et al[30] proposed that people eat comfort food in an attempt to reduce the activity of the chronic stress-response network. In line with this, Kivimäki et al[4] suggested that internalisation of negative obesity-related stereotypes, negative perception of own body image and unsuccessful weight control through dieting related to poorer mental health among individuals who were obese. Oswald and Powdthavee[31] demonstrated that a 10-point increase in BMI was associated with a drop in mental health of approximately 0.3 points on the General Health Questionnaire.[16] Whether these findings hold true for the African population is not certain, especially in view of our findings.

There were no differences in GGT levels in the low vs. the high JSC and the RPWC cut-point groups. This might rule out the fact that obesity is responsible for the increased GGT levels. Higher levels of GGT, in both the JSC and the RPWC high WC cut-point male groups especially, were evident, although ORs revealed that alcohol abuse showed odds with low clinical significance regarding psychological distress in the JSC high WC males (OR 0.97, ± 95% CI 0.93; 1.00; p-value = 0.05), and in RPWC high WC males (0.98, 0.95;1.00; p-value = 0.08).

Malan et al[32] stated that Africans residing in an urban environment reported higher alcohol abuse, perhaps as a way of coping. Furthermore, Hamer et al[33] confirmed that objectively measured alcohol abuse, as indicated by GGT, exceeded normal cut-point values and demonstrated that the odds of early structural vascular changes based on high GGT levels were 3.1 (95% CI; 0.6-15.5) in African men, independent of other confounders. Saxena[34] and the World Health Organization[35]reported that Africa was one of the two regions with the most rapid rise in alcohol consumption, where the consumption of absolute alcohol per person per year is as much as six litres. Levels of alcohol consumption are an indication of the burden of disease for South Africa, leading to serious health and social consequences.[35] The absence of the RPWC high WC female group's odds of presenting with increased alcohol abuse should be noted. Possibly, this is indicative of a good perception of own health and that alcohol was not needed as a coping strategy. Using GGT as a measure of alcohol abuse may be limiting as fatty-liver disease and oxidative stress cannot be ruled out. Further research is needed on this topic.

The results of the study must be viewed in light of its limitations. Given the cross-sectional nature of this study, causal relationships between central obesity and perception of own health could not be determined currently. Another limitation was that the study sample was not representative of the entire African population. The participants included 94.5% Setswana-speaking

Africans, only one of 11 ethnic groups residing in South Africa. It is recommended that the findings are verified in other African communities.

In conclusion, we compared two WC cut-point measurements relating to central obesity and their association with perception of own health in a group of urban Africans. The WC cut-point proposed by Prinsloo et al[2] appears to be a better predictor pertaining to psychological distress in both African males and females, with WC cut-points set at 90 cm and 98 cm, respectively.

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Disclosure

There was no conflict of interest.

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