Central obesity, obesity, and physical activity among university staffs

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Article Info

ABSTRACT

Waist circumference (WC) is considered as a superior indicator to predict central obesity and its related comorbidities. Limited studies were conducted to infer central obesity using WC among university staffs. A cross-sectional study through the convenience sampling method was employed using the short form international physical activity questionnaire, anthropometric measurements, and WC measurement to infer a level of physical activity, body mass index (BMI), and central obesity. Seventy staff from three private universities in Malaysia participated in this study. There is a high prevalence (78.6%) of central obesity among the participants irrespective of their age. Majority of the participants fall under the overweight (37.1%) and obese (21.4%) category of BMI 48.6% reported to be involved in low level of physical activity. No difference in prevalence of central obesity based on age, gender, and level of physical activity. There is a moderately strong correlation between BMI and WC. In this study notably a high prevalence of central obesity in participants with underweight and desirable weight category of BMI was reported, which synergizes the concept of including WC measurement in health promotion activities. Appropriate multi-component and multi-level interventions can be considered to this population to prevent/combat obesity.

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1. INTRODUCTION

Globally it has been found that there is a drastic increase in obesity and its related economic costs, and immediate action is required to avert worldwide health crisis [1], [2]. Malaysia National Health and Morbidity Survey [3], reported that senior officers and managers group, and the technical and associate groups have the highest prevalence for overweight. University staffs are similar to this category of employees, since their job demand is prone to prolong sitting and desk bound job as acknowledged. Their nature of job placed them under light exercise group [4]. The prevalence of overweight and obesity among university staffs in Turkey is 68.2% [5], whereas the prevalence of obesity among university staffs in Peshawar, Pakistan is 8% [4] in Ghana is 20% [6] and 15.5% in Iran [7]. The 11.8% of prevalence of obesity was noted among university staff in Serdang, Malaysia [8]. There is a deficient literature on the prevalence of

obesity among staffs in the academic settings [9]. Body mass index (BMI) is a commonly used measure for obesity [10]–[12] whereas it would overrate obesity among individuals with good muscle built at the same time it may underrate obesity in elderly who have lost body mass.

The individuals with obesity not only vary according to the amount of excess fat the body has but also based on region of distribution of fat within the body [13]. BMI replicates the entire body fat without considering in what manner it is distributed [14]. A normal value of BMI would conceal the health risks due to excess abdominal obesity [12]. In fact, excess deposit of fat in abdomen which is termed as abdominal obesity [15] or Central obesity [16] is a risk for developing diseases [13] and it is considered as the worst of worst [14]. There is a significant association of hypertension, hyperlipidemia, and diabetes among individual with central obesity though their BMI was in normal category. Efforts should be made to improve the low awareness about central obesity among individuals with normal BMI and central obesity [17].

Waist circumference (WC) is a simple, inexpensive method to measure central obesity [18], [19] which alone can substantially forecast the comorbidity associated with obesity [20] and it would be a superior indicator for predicting obesity related cardio-vascular disease (CVD) risk factors [21], and metabolic risk factors for developing metabolic syndrome [22] when compared to BMI. The association was noted between abdominal obesity and risk for developing breast cancer among pre-menopausal women [23]. In a recent study higher total cholesterol among males is also a significantly correlated with higher WC [24]. Waist circumference increases by two centimeters, and risk of cardiovascular diseases by 0.2%, for every additional hour of sitting on top of five hours [25]. Hence, it is indispensable to include WC in health monitoring and health promotion programme [26]. A major study involving 1,893 participants in Malaysia, has reported a high prevalence of central obesity. To the best of authors knowledge very few studies had been conducted to infer central obesity [9], [27], [28] especially among university staffs [9]. Technological advancements have reduced the energy requirements of daily living, populations spending more hours sitting at work, in transport and indirectly increase leisure-time [29]. It is important to know the level of their physical activity and its impact on obesity/central obesity. Owing to the above reasons, this study aimed to study the prevalence of central obesity and obesity among university staffs and to find the relationship between obesity, central obesity, and physical activity level among university staffs. This would aid in understanding the present scenario so that appropriate health promotion strategies can be considered to this population.

2. RESEARCH METHOD

This is a cross-sectional study and convenience sampling was used. The study used short form international physical activity (IPAQ-SF) questionnaire, anthropometric measurements, and WC measurement to infer level of physical activity, BMI, and central obesity, respectively. Demographic information such as designation, gender, and age were collected from the participants.

IPAQ-SF is a reliable test [30]. WC was measured at umbilical level (WC-U) which is an easy, most intuitive [31] valid, reliable [32] and highly feasible [33] measure of visceral fat. This method was also advocated by Thailand Ministry of Health owing to difficulty in palpation of lower ribs and iliac crest in obese and overweight people when WC measured at mid-level (WC-M). Whereas WC-U is easier to measure for obese individual and also can be performed in general population with less training [26].

Ethical approval was acquired from the ethics in human research committee, Asia Metropolitan University, Malaysia (AMU/HEC/10/2019). Written participation permission was obtained from respective departments of the concerned universities. All staffs from three private universities were invited to participate in the study. The university staffs who volunteered to participate in the study were provided with information sheet and consent form prior to data collection. Pregnant women were excluded from the study. The anthropometric measurements such as height, weight and WC were documented. The WC was measured on subjects who were requested to stand in a relaxed position with their clothing's on. Measurement was then taken around the umbilicus. An average from two trials of measurement was taken.

The collected data were evaluated using SPSS (IBM Corp., Armonk, New York, version 22). Descriptive statistics such as frequency and percentage were calculated as shown in Table 1. The chi-square test was used to infer difference in prevalence of central obesity based on age, gender and physical activity as presented in Table 2. The variable WC is not normally distributed based on Shapiro-wilk test hence Spearman's Rho test was used [34] to correlate age, BMI with WC as shown in Table 3. The level of significance set for this study is 0.05 with 95% as confidence interval. This study used WC $\geq$90 cm in males and $\geq$80 cm in females has cut off value for central obesity [21]. Though the above cut off value is advocated for WC-M measurements, since WC-M & WC-U are found to be similar [35] and have good high intraclass correlation [26] the same cut off value is used in this study. The cut off value for BMI in this study is as per Ministry of Health, Malaysia criteria [36].

Table 1. Summary of participants socio-demographic information

Variable	n (%)
Gender	
Male	28 (40)
Female	42 (60)
Country of origin	
Malaysian	58 (83)
Non-Malaysian	12 (17)
Ethnicity	
Malay	31 (44.3)
Indian	34 (48.6)
Chinese	2 (2.9)
Others	3 (4.3)
Participants based on age group	
25-30	13 (18.6)
31-40	33 (47.1)
41-50	15 (21.4)
51-60	4 (5.7)
61-72	5 (7.1)
Participants based on institution	
University X	28 (40)
University Y	19 (27.1)
University Z	23 (32.9)
BMI range (Reference Value)	
Underweight (<18.5 kg/m²)	4 (5.7)
Desirable weight (18.5-24.9 kg/m²)	25 (35.7)
Overweight (25-29.9 kg/m²)	26 (37.1)
Obese (≥30 kg/m²)	15 (21.4)
Prevalence of central obesity n (%)	
Participants with central obesity	55 (78.6)
Participants without central obesity	15 (21.4)
Participants' level of physical activity n (%)	
Low	34 (48.6)
Medium	24 (34.3)
High	12 (17.1)

Table 2. Difference in prevalence of central obesity based on gender, age, physical activity level and ethnicity

Variable	Participants without CO n (%)	Participants with CO n (%)	Total n (%)	Sig (2-tailed)
Gender				
Male	8 (28.6)	20 (71.4)	28	0.234[a]
Female	7 (16.7)	35 (83.3)	42	
BMI range				
Underweight	2 (50)	2 (50)	4	0.000[a*]
Desirable weight	12 (48)	13 (52)	25	
Overweight	1 (3.8)	25 (96.2)	26	
Obese	0	15 (100)	15	
Age				
25-30	0	13 (100)	13	0.259[a]
31-40	9 (27.3)	24 (72.7)	33	
41-50	3 (20)	12 (80)	15	
51-60	1 (25)	3 (75)	4	
61-72	2 (40)	3 (60)	5	
Physical activity level				0.352[a]
Low	7 (20.6)	27 (79.4)	34	
Medium	7 (29.2)	17 (70.8)	24	
High	1 (8.3)	11 (91.7)	12	
Ethnicity				0.674[a]
Malay	7 (22.6)	24 (77.4)	31	
Chinese	1 (50)	1 (50)	2	
Indian	6 (17.6)	28 (82.4)	34	
Others	1 (33.3)	2 (66.7)	3	

*p<0.05, [a]Chi-square test

Table 3. Relationship between age, BMI with waist circumference

Variable	Waist circumference	
	r	p
Age	-0.204[b]	0.090
BMI	0.644[b]	0.000*
Physical activity	-0.085[b]	0.485

[b]Spearman's Rho, * p<0.05

3.   RESULTS AND DISCUSSION

3.1. Results

A total of 78 participants from the three private universities involved in this study, however eight participants were excluded due to incomplete information. The response rate in this study is not satisfactory. Many staffs neither show interest nor willingness to participate in the study. Sociodemographic details of the participants are as shown in Table 1.

Age of the participants ranged from 25 to 72 years. Majority of the participants were female (60%) and Malaysians (83%). All the non-Malaysians were also from South Asian region. Almost equal numbers of Malay and Indians participated in the study, however very small representation from Chinese and other ethnic groups.

More than ¾ of the participants have central obesity. Majority of the participants were in the overweight (37.1%) and obesity category (21.4%) of BMI. Most of the participants had low (48.6%) and medium (34.3%) level of physical activity. There is a significant difference ($p < 0.05$) in prevalence of central obesity with BMI category. Highest prevalence of central obesity is noticed among the participants under the category of overweight (96.2%) and obese (100%). The prevalence of central obesity is not influenced by gender, age group, physical activity level and ethnicity. A moderately strong correlation [37] was inferred between BMI and waist circumference ($r = 0.644$, $p < 0.05$). There is no significant correlation noticed between age, level of physical activity with WC.

3.2. Discussion

The findings indicate a higher prevalence of central obesity (78.6%) among participants in this study, when compared to previous studies conducted among Malaysian population which ranges between 11.3% and 55.6% [21], [27], [38], [39]. A Systematic review also indicated similar results of prevalence pattern of central obesity among Malaysian population [40]. A similar finding is noticed in a cross-sectional study among 18-82 years old medical service utilizers in Malaysia that indicated 81.7% prevalence of central obesity [1].

Majority of the participants (46%) reported to involve in low level of physical activity, this would be one reason for high prevalence of central obesity among the participants. Though the literature implies increasing physical activity can reduce the waist circumference [41], the level of physical activity and waist circumference was not correlated in this study. Surprisingly, this study shows a large percentage of participants who involved in high level of physical activity have been identified to possess central obesity (91%). Some possible reasons for this result would have been that IPAQ-SF may have overestimated the level physical activity [42], dietary habits [43], [44], lifestyle [41], job-related factors [4] and psychosocial factors [9]. There is a need for appropriate multi-component and multi-level interventions apart from focusing only on physical activity enhancement.

Coherent to previous studies [45] more prevalence of central obesity (78.6%) when compared to general obesity (21.4%) was noticed. In fact, in this study the prevalence of central obesity is threefold times higher than general obesity. The concerning factor is individuals under normal BMI category with heightened waist circumference possibly not aware of their risk for future development of non-communicable disease [46]. WC is more sensitive than BMI and relying on only BMI would underrate the obesity and risk of developing cardiovascular disease and diabetes [45], [47]. Though analogous to previous studies [28], [48], [49] there is a positive correlation between BMI and WC is inferred in our study, most of the participants in desired weight BMI category have central obesity which is an important factor to be considered. Persons with normal weight but possessing central obesity have an equal or higher risk than persons who have central obesity and general obesity [50].

There is a slightly higher prevalence of central obesity among females in this study is concur with other local studies [9], [27], [38], [40]. The probable reason could be difference in the level of physical activity and hormonal factors [51]. A higher prevalence of central obesity among Indian ethnic group was noticed as reported in the literature [27], [40] and similar to the Malaysia National health and morbidity survey, 2019. This would be due to Asian Indian Phenotype [52] influence. There is no significant difference in prevalence of central obesity based on age group and no-significant correlation between age and waist circumference, notably a higher prevalence of central obesity among the younger age groups, which may lead to long-term effects and complications [46]. In a previous study among similar population in Malaysia revealed increased prevalence of obesity among staffs with increasing age [9]. This has to be verified in future research whether there is an impact of age on prevalence of obesity among university staffs.

Appropriate multi-component and multi-level interventions [53] including lifestyle modification [51] combined intervention of physical activity, diet [54], counselling, skills training, and local projects [9] should be considered to combat or prevent central obesity among university staffs. The findings of this study cannot be generalized to entire Malaysian population because there is also participation from non-

Malaysians, only three private universities staffs involved, and all age groups were not included. This study used self- reported physical activity [55] questionnaire which provides only approximate level of physical activity [56]. This may also attribute the risk of usual errors and biases, such as overestimating or underestimating owing to inadequate recall effects [9]. We noticed more hesitancy from participants to involve in this study especially while involving in anthropometric measurements, it is recommended to engage reliable self-reported anthropometric measurements in the future studies. The proposed study can be conducted as a longitudinal study for more data analysis accuracy [57]. Large sample size with equal representation of all ethnicity and age group can be considered.

4. CONCLUSION

There is a high prevalence of central obesity among participants in the three universities in all BMI groups. There is no significant difference in prevalence of central obesity based on age, gender and level of physical activity based on this study. More notably there is also a high prevalence of central obesity in participants with underweight and desirable weight category of body mass index. WC measurement should be included in health promotion activities.

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