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ORIGINAL RESEARCH

# Magnitude of Overweight, Obesity and Associated Factors among Middle Aged Urban Residents of West Ethiopia

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## Abstract

**Purpose:** Obesity becomes the major public health problem worldwide and unhealthy lifestyles are the most risk factors of it. People wrongly perceive central obesity as an indicator of wealth group in western Ethiopian; however it is a midfielder for cardio-metabolism disorders. Thus, study aimed to assess the prevalence of overweight, obesity and associated factors among middle aged urban residents of west Ethiopia.

**Methods:** A community based cross sectional study was applied. Data was collected from 266 participants as of world health organization approach in February 2019. Statistical package for social science version 24 was used to analyze. Descriptive statistical analysis was reported with frequency, percentage and mean ± standard division. A binary logistic analysis resulting with P < 0.25 candidate to multivariable and significant association was considered at p-value ≤ 0.05.

**Results:** The prevalence of overweight, obesity and its combined index was 19.5%, 24.4% and 43.9% respectively. Based on Ethiopian references for waist circumference, about 58.6% adults were at risk of developing central obesity. The mean and standard division of twelve food groups was 5.4 ± 1.9. On binary analysis, being raised (systolic blood pressure; P = 0.034, diastolic blood pressure; P = 0.090, fasting blood sugar; P = 0.013), and high dietary diversity score (P = 0.038) were associated with central obesity. On multivariate analysis being: Raised triglycerides (P < 0.001); elevated diastolic blood pressure (P = 0.047) and high dietary diversity score (AOR = 1.52; 95% CI: 1.12-2.25) were associated with central obesity, but dietary diversity was not significant (P = 0.379).

**Conclusion:** Both general and central obesity was highly prevalent and associated significantly with independent variables. Consequently, age targeted Nutrition education needs attention to reduce the prevalence and complications from obesity related diseases.

## Keywords

Overweight/Obesity, Risk factors, Middle age, Urban, West Ethiopia

## Introduction

Obesity is accumulation of excess fat in the body [1,2] and it is becoming one of the major public health problems [3]. About 2.8 million people die each year due to combination of overweight and obesity worldwide [4,5]. Unhealthy diets connote countries with scarce resources and dietary diversity score (DDS) is an indicators of risk of non-communicable disease (NCDs) [6].

Globally NCDs is increasing rapidly and projected to reach 57% in 2020 [7]. The combined prevalence of overweight and obesity has increased by 27.5 % for adults between 1980 and 2013 [8]. In Sub-Saharan Africa, obesity and other metabolic markers are emerging problems of public health [9].

Evidence based studies shows that dietary diversity is a good proxy of dietary quality globally [6,10-14]. In low and middle income countries, people typically base their diets on few food groups [15]. Dietary diversity refers to a variety of foods across and within the food groups to ensure adequate amounts of key nutrients and maintain acceptable levels of growth and development [6,12].

DDS is cost effective, non-invasive tools to assess dietary patterns and familiarize public health policies, communicate risk and targeted interventions [2]. High

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DDs was associated with higher economy at household level [16,17]. Socioeconomic disparity in nutrition helps to explain some of the observed social inequalities in health [13,18].

Different studies indicate that most of Ethiopian practices unhealthy diet [19,20]; where cereals contribute about 75% of diet [6,20], and 60% of households had low DDS [21,22], keeping the effect of other risk factors. Unhealthy diet contributed to 14.8% of the global burden of diseases and it was estimated that one in every five deaths was due to poor dietary practices [23]. Nutrition interventions are primarily focus only vulnerable groups [24], where adult's neglected. Thus, this study aimed to assess magnitude central obesity and associated risk factors among middle aged urban residents of West Ethiopia.

## Methods

### Study area and period

This study was conducted purposively in Nekemte which is the hub of west towns and located 328 Km from Addis Ababa in February 2019.

### Study design

A community based cross-sectional study was used to assess magnitude of overweight, obesity and associated risk factors. From six communes of Nekemte administrations, two communes were selected. One commune was randomly selected and the other one purposively allocated with natural geographical buffering zone. Each of the study subjects were allocated proportionally and selected randomly.

### Sample size and techniques

Sample size was calculated using single proportion formula taking prevalence of dependent variable among healthy Ethiopian adults. Abdominal obesity (19.6%) was the most common prevalent [25], with margin of error of 5%, CI 95% and 10% gnawing away, totally 266 samples.

### Inclusion and exclusion criteria

Participants who lived at least six months and aged 41 to 64 years were included. However, those on medication and have known cardiovascular disease; attended behavioral change communication program; pregnant & lactating; bariatric surgery; psychotics and physically disables were excluded

### Dietary diversity score

Using food frequency questionnaires, DDS constructed from twelve food groups by counting the intake of the food groups over a period of one week and converted to tertiles [26,27].

### Anthropometric measurement

The weight was measured using a SECA electronic scale to the nearest 0.1 KG and WC with tape meter nearest to 0.1 CM. Nutritional status reported based on cut off points of obesity and metabolic syndrome markers for Ethiopian adults [28].

### Analysis

The data was analyzed using SPSS version 24 (SPSS Inc., Chicago, IL, USA). Descriptive statistics like frequency, percentage, means, were used to describe and assess association between central obesity and DDS. A logistic regression analysis at p-value ≤ 0.05 was accepted as significant.

## Results

### Socio-demographic characteristics

From 266 participants comprised, the average

**Table 1:** Mean of dietary diversity score for middle aged, urban residents, Ethiopia, 2019, n = 266.

| Variable | Categories | N (%) | Dietary diversity score | | |
|---|---|---|---|---|---|
| | | | Mean | SD | P-value |
| Sex | Female | 167(62.80) | 5.60 | 1.90 | 0.003 |
| | Male | 99(37.20) | 4.90 | 1.80 | |
| Age in years | 41-48 | 145(54.50) | 5.40 | 1.90 | 0.276 |
| | 49-56 | 77(28.90) | 5.60 | 1.90 | 0.035 |
| | 57-64 | 44(16.00) | 4.90 | 1.80 | |
| Income | < 37.5$ | 146(54.89) | 5.90 | 0.20 | 0.002 |
| | > 37.5$ | 120(45.01) | 4.70 | 0.20 | |
| Marital status | Single | 13(4.90) | 5.50 | 2.30 | 0.100 |
| | Married | 178(66.90) | 5.30 | 2.00 | 0.929 |
| | Widowed | 56(21.10) | 5.30 | 1.50 | 0.905 |
| | Divorced | 19(7.10) | 5.50 | 1.50 | |
| Urban farming | Yes | 20(7.50) | 4.50 | 0.20 | 0.001 |
| | No | 246(92.50) | 5.30 | 0.10 | |

**Abbreviations:** SD: Standard Division

age of adults was 52.2 years. Majority (62.8%, 54.5% and 54.89%) of the participants was females, aged between 41-48 years and lives below poverty threshold respectively. Significant difference was observed between gender, age, income and urban farming with DDS (Table 1).

### Dietary practices

From the twelve food groups, the participants asked to list the food groups they ate from that day to back for seven days. Most (99.62%) of participants consuming cereal based monotonous foods and all dishes missing fishes. The highest mean consumption score was for cereals (11.974 ± 0.026) followed by tuber and roots (2.6917 ± 1.1567), legumes groups (2.0489 ± 1.1822) and overall mean ± SD of DDS was 5.4 ± 1.9. Few of them eat vegetables and fruits as of recommended while the rest consume it seasonally (Table 2).

Out of the total, majority (68.0%) of the participants was consuming low DDS and 62% of adults consuming mixture of oil and animal fat. In the low tertiles, 40.23% adults consumed mixture of oil & fat, and 26.69% consumed clotted oil (Table 3).

### Magnitude of central obesity

Based on BMI the prevalence of overweight and obesity was 19.5% and (24.4%) respectively and total 43.9% were at risk of developing obesity. While with WC and waist to hip ratio, 58.6% and 81.2% of adults were at risk of developing central obesity. This is may be due the majority of participants were females (Table 4).

### Risk factors associated to central obesity

On binary analysis central obesity was associated with SBP, DBP, FBS, Triglycerides and DDS. On multivariate analysis, being raised TGs (P < 0.001); elevated DBP (P = 0.046) and high DDS were associated with central obesity, but DDS was not significant (P = 0.379) (Table 5).

## Discussion

Recently obesity was recognized as public health significance; still in west Ethiopia, central obesity is seen as beauty for neckties and wrongly perceived an indication of rich family; however it is a silent killer. Thus, this study aimed to investigate magnitude and association of overweight, central obesity and risk factors.

In this study, the prevalence of central obesity was 58.6% with waist circumference definition criteria. This finding is in line with studies done on Jimma university workers [28], China [29] US Asian adults [30]. Likewise,

**Table 2:** Twelve food groups consumed by participants in seven days, Ethiopia, 2019.

| | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|
| DDS | 0.00 | 12.00 | 5.4 | 1.9 |
| Cereals | 1.00 | 11.00 | 11.9738 | 0.0262 |
| Legumes, pulse & nuts | 1.00 | 4.00 | 2.0489 | 1.1822 |
| Tuber and roots | 1.00 | 4.00 | 2.6917 | 1.1567 |
| Vegetables | 1.00 | 4.00 | 1.4060 | 0.2196 |
| Fruits | 1.00 | 4.00 | 0.2256 | 0.5971 |
| Meat | 2.00 | 4.00 | 0.0902 | 0.3677 |
| Milk | 1.00 | 4.00 | 0.1729 | 0.6144 |
| Eggs | 1.00 | 4.00 | 0.2710 | 0.5972 |
| Fishes | 2.00 | 4.00 | 0.0075 | 0.1226 |
| Fats & oil | 1.00 | 4.00 | 0.7444 | 0.9764 |
| Sweets | 1.00 | 4.00 | 0.8872 | 0.1858 |
| Spices, etc. | 1.00 | 4.00 | 1.4474 | 0.9939 |

**Table 3:** Frequency of fat and oil consumption by urban residents, 2019.

| | | Low DDS | Medium DDS | High DDS |
|---|---|---|---|---|
| Overall | | 181(68.0%) | 76(28.6%) | 9(3.4%) |
| Animal fat | | 1(0.38%) | 2(0.78%) | 1(0.38%) |
| Clotted oil | | 71(26.69%) | 16(6.02%) | 2(0.78%) |
| Purified oil | | 2(0.78%) | 4(1.51%) | 2(0.78%) |
| Mixed | | 107(40.23%) | 54(20.30%) | 4(1.51%) |

Note: Consume ≤ 3, food groups = Low, four-six = Medium, ≥ 7 = high dietary diversity score, DDS = dietary diversity score.

**Table 4:** Frequency of five indices of anthropometric measures of participants, west Ethiopia, 2019.

| | Variables | | N = 266 | % |
|---|---|---|---|---|
| BMI | Normal | | 131 | 49.2 |
| | Overweight | | 52 | 19.5 |
| | Obesity | | 65 | 24.4 |
| | Chronic energy deficiency | | 18 | 6.8 |
| WC | High | | 156 | 58.6 |
| | Low/normal | | 110 | 41.4 |
| HC | High | | 192 | 72.2 |
| | Low | | 74 | 27.8 |
| WHipR | High | | 216 | 81.2 |
| | Low | | 50 | 18.8 |
| WHtR | High | | 165 | 62.0 |
| | Low | | 101 | 38.0 |

**Abbreviations:** BMI: Body Mass Index; WC: Waist Circumference; HC: Hip Circumference, Whipr: Waist to Hip Ratio; Whtr: Waist to Height Ration

**Table 5:** Multivariate analysis for central obesity among Nekemte residents, Ethiopia, 2019.

| Variables | Central Obesity by Waist circumference | | | |
|---|---|---|---|---|
| (Yes) | C COR (95% CI) | P-value | AOR (95% CI) | P-value |
| High SBP | 1.75(1.31,2.29) | 0.034 | 0.94(0.48, 1.87) | 0.868 |
| High DBP | 1.04(1.53,2.04) | 0.090 | 1.59 (1.37, 3.21) | 0.046 |
| High FBS | 6.61(1.50,29.21) | 0.013 | 0.20(0.04,0.98) | 0.047 |
| low HDL | 0.59(0.31,1.13) | 0.110 | 0.62(0.27,1.43) | 0.261 |
| Raised Triglycerides | 0.11(0.04,0.27) | 0.001 | 11.19(3.84,32.58) | 0.001 |
| High DDS | 1.81(1.48,6.90) | 0.038 | 1.52(1.12, 2.25) | 0.379 |

**Abbreviations:** FBS: Fasting Blood Sugar; HDL: High Density Lipoprotein, SBP: Systolic Blood Pressure, DBP: Diastolic Blood Pressure. COR: Crude Odd Ratio, AOR: Adjusted Odd Ratio

study conducted in Namibia among a San groups show 87.5% of the participants consumed food items from only 2 or 3 different food groups, the most frequently eaten food type being maize meal [31]. Similarly, in Addis Ababa reported that 60.4% of them had low DDS [32], 39.7% of people ≥ 40 years had non-diversified diet in Jimma town [33] and in Mirab Abaya wereda Southern Ethiopia had low ( 65.7%) and 34.3% high DDS [34].

Similar to study on Sri lankan adults [35], nearly all participants consumed cereal based monotonous food, most frequently teff and this prevalence was higher than cereal contribution (75%) in Ethiopian diet [6,20]. Also study in Addis Ababa (11%) and 3.4% of urban residents in south west Ethiopia had high DDs meaning majority of them practicing poor diet [20]. It is known that the prevalence of metabolic syndrome was high among population consume highly dense carbohydrate and saturated lipids.

Mean of (7days) finding of dietary diversity score was slightly less than study in Terhan (6.157 ± 1.02) [36]. The same scenario to our finding, socioeconomic is associated with dietary diversity [37-41] and lower socio-economic status associated to poorer diets in Australia [6]. Dietary diversity was found to be associated with general obesity and abdominal obesity in Asian and Arabic countries [42]. Regarding urban agriculture, Home garden access was positively associated to high dietary diversity [38]; in this study only 7.5% had urban farming mean have poor dietary practices.

Regarding lipids, most (62.0%) of the participants consumed mixture of oil and fat, mostly palm olein. Palm olein with a high content of the SFA (palmitic acid ~50%), 40% oleic acid and a low (10%) content of unsaturated fatty acids has been proved to increase the serum cholesterol concentrations in humans [43,44]. The recommended fat intake for healthy adults on SFA is less than 10% [4], but not practiced by study population.

Based on Ethiopian optimal cut off point for Mets [28], WC measure results showed that women (37.22%) and men (21.43%) were at risk of obesity. Similarly the study conducted in Verulam, South Africa showed 68.4% of women and 25% of men were having central obesity [45]. The finding of our study was higher than the pooled prevalence of DHS data of 32 sub-Saharan African countries yielding 15.9% [46]; 28.1% in Malawi and in Tanzania the prevalence of overweight and obesity among adults were 24.1% and 19.2% [47]. In

this study, being female was found to be associated with central obesity. This finding is consistent with the studies done in Brazil [48], Oman [49] Eastern Sudan [50] Northern Iran [51] and Southern China [52].

This study confirms that overweight and central obesity was high prevalent. However, the study limited with evaluating cause-and-effect associations, chronological relations could not be established between measures of variables. Despite limitations, this study may strengthen the existing knowledge and fulfill the gaps in the already limited data on modifiable risks factors of metabolic syndrome in Ethiopia.

## Conclusion

More than one fourth of study participants were found general obese and majority of them with centrally obese, it is comparably high prevalence to respective studies. And all most all respondents consume cereal based energy dense and saturated oil. It implies that not only behavioral change intervention but also doses for preparation of dishes and age focused community based nutrition education boldly need venture to generalize at country level.

## Ethical Review

Permission was sought from the Institutional Review Board (IRB), Jimma University (Approval No. IHRPGY/596/2019) and official letter was taken from Nekemte health Bureau.

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## Disclosure

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