Prevalence and Risk Factors of Obesity and Quality of Life of Elderly Patients Attending El-Mahsama Family Practice Center, Ismailia, Egypt.

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ABSTRACT

Background: **Obesity in the elderly is a major health problem since it can contribute to the beginning and exacerbation of a number of diseases, as well as functional impairment, frailty, and a lower quality of life, all of which can result in an early death.** ***Objectives:*** **To assess the prevalence and risk factors of obesity and the quality of life of elderly patients attending El-Mahsama Family Practice Center, in Ismailia, Egypt.** ***Subjects and Methods:*** **A cross-sectional study included 136 elderly patients attending El-Mahsama Family Practice Center. Data was collected from August 2022 to November 2022, using a semi-structured questionnaire administered through a direct interview by the researcher, which included demographic data, risk factors, the World Health Organization Quality of Life-BREF Questionnaire (WHOQOL-BREF), and anthropometric measurements, respectively.** ***Results:*** **136 adults over 60 years of age (mean ± SD: 65.61±5.89 years) were enrolled. Prevalence of obesity between elderly patients was about 70%. Obesity was statistically significantly correlated with female gender and physical inactivity. According to multiple linear regression analysis, low QOL scores were linked to older age, non-working, lower economic status, potential depression, chronic illness, and obesity. Elderly with obesity had significantly poor physical and psychological QOL domain scores compared to non-obese elderly.** ***Conclusion:*** **In order to improve quality of life for the elderly, family physicians must offer preventative and promotional methods to decrease obesity and chronic morbidity.**

Keywords: Elderly; Obesity; Prevalence; Quality of Life; Risk Factors.

Introduction and Rationale

Nowadays, the majority of people may anticipate living into their 60s and beyond. The number of Egyptians 60 and over exceeded 6.9 million in 2022, making up 6.6% of the entire population, according to the Central Agency for Public Mobilization and Statistics (CAPMAS), with predictions that this number will climb to 17.9% by 2052. [1] Obesity is a chronic illness and a serious issue that affects people of all ages, including the elderly. Because of its increasing prevalence, developed as well as developing nations face a serious international threat. [2] The World Health Organization (WHO) defines obesity as an abnormal or excessive fat buildup that poses a health concern, with a body mass index (BMI) of 30 or higher. [3]

According to the WHO, Egypt has the 18th-highest rate of obesity worldwide. According to a 2019 "100 million-health" survey carried out in Egypt, obesity is rising in older people, with 39.8% of Egyptian adults 18 and over being obese, compared to the 49.7 million persons who were examined. [4]

Obesity in the elderly is a major health problem because it contributes to the development and worsening of non-communicable diseases (NCDs), including

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diabetes, several malignancies, and cardiovascular illnesses (mainly heart disease and stroke). Additionally, it may be linked to functional restrictions brought on by a loss of muscle mass and strength, an increase in joint dysfunction, difficulties performing routine activities, frailty, chronic pain, and a poor quality of life that increases the risk of premature mortality. [5]

Due to a variety of health issues, including diminished physical and mental abilities, emotional difficulties brought on by loneliness, impaired sexual function, and chronic metabolic illnesses, elderly persons are more likely to experience a deterioration in their quality of life. [6]

Regarding the burden of obesity and its related problems in the elderly, and the limited studies on obesity and QOL among elderly in rural areas, we believe this study would help to assess them and could be used as a database tool for comparison with urban area and with those of geriatric homes. Aiming at maintaining elderly people health and improving their quality of life, this study was carried out to determine the prevalence and risk factors of obesity and to assess the quality of life of elderly patients attending El-Mahsama Family Practice Center, in Ismailia, Egypt.

Methods:

Design and setting: This cross-sectional study was carried out in EL-Mahsama Family Practice Center, a part of Suez Canal University's Faculty of Medicine. It is located at El-Mahsama village, in Ismailia governorate, Egypt. It was conducted from February 2022 to Mars 2023.

Sampling technique and sample size: A Systematic Random Sampling Technique was used to collect data. Using a sample frame of elderly patients -above 60 years- who had active files at El-Mahsama Center as evident by medical record. The first elderly patient was taken, then every 5th patient from them -who matched the inclusion criteria- attending El-Mahsama Family Practice Center was participated till reaching the sample size.

The sample size was calculated regarding prevalence and risk factors of obesity and all domains of QOL. The largest sample was achieved by calculating the prevalence of obesity in the elderly people using the following formula:

$n = [Z\alpha/2/E]^2 * P (1-P)$ [7], n = sample size, $Z\alpha/2 = 1.96$ (The critical value that divides the central 95% of the Z distribution from the 5% in the tail), P = Prevalence/proportion of Obesity in the study group = 8.8%. [8] E = Margin of error/Width of confidence interval = 5%. Therefore, by calculation, the sample size was equal to **136** subjects after the addition of the 10% drop out proportion.

Inclusion criteria: the study compromised elderly who were 60 years of age and more of both sexes. **Exclusion criteria**: Elderly with dementia which was assessed using the Mini-Cog score, scores of <3 on the Mini-Cog score was considered to have some grade of dementia and had not be selected for the study. [9]

Study tools: The researcher conducted a direct interview with each participant using a semi-structured questionnaire with three sections to evaluate each participant's responses:

Part 1: Socio-demographic data, medical history and risk factors questionnaire.

It was developed by the researcher following a review of the literature and consisted of

1. Socio demographic variables of the elderly such as age, gender, marital status,

level of education, occupation before retirement and income.

2. Medical History and Risk Factors such as smoking status, chronic illnesses, medications used and physical activity status. Psychological health that was assessed by Arabic version of 5 items Geriatric Depression Scale (5 item GDS), a valid, reliable, and effective questionnaire for the assessment of depression in older people who are cognitively intact. It consists of 5 questions, each valued 1 point, for a total of 5 points. Scores of 0 to 1 indicated that the patient is not depressed; scores of 2 or higher revealed possible depression. [10-12] The diet was evaluated using the Rapid Eating Assessment for Participant shortened version, a valid and reliable questionnaire for evaluating the quality of the diet for the previous week's intake. The results were calculated by adding the answers to the first 16 items. Responses that included • Usually/often, received 1 point • Sometimes, received 2 points • Rarely/never or does not apply to me, received 3 points. A score between 16 to 48 is possible; a higher score denotes a higher quality diet. [13-14].

Part 2: World Health Organization Quality-of-Life Scale (WHOQOL-BREF).

The WHOQOL-BREF questionnaire was created by WHO as a valid and reliable tool for measuring QOL. [15] Physical health (7 items), psychological health (6 items), social relationships (3 items), and environmental health (8 items) make up its four (26-item) domains. It also includes QOL and general health parts. Each item on the WHOQOL-BREF was given a score between 1 and 5 on a response scale that was specified as a five-point ordinal scale. The domain score was calculated using the mean score of items within each domain and was then multiplied by 4 to make it comparable to the scores used in the WHOQOL-100. [16] The WHOQOL-BREF measure has no cutoff point, but higher values indicate a higher quality of life. [17] The Arabic version of the WHOQOL-BREF has an internal consistency Cronbach's alpha coefficient of ≥0.7. [18]

Part 3: Anthropometric measurements including Body Mass Index (BMI), Waist Circumference (WC) and Waist-Hip Ratio (WHR), which was done by the researcher.

1. Body mass index (BMI): weight in kilograms divided by the square of height in meters. According to WHO guidelines, obesity is defined as a BMI of 30 or more. [19]

2. Waist Circumference (WC): [20] was measured at the midpoint between the top of the iliac crest and the lower margin of the last palpable rib in the mid-axillary line, at the end of several successive natural breaths, using a stretch-resistant tape. According to WHO recommendations, cut-off values were used to identify central obesity as • Men > 40 inches (102 cm) • Women > 35 inches (88 cm).

3. Waist-Hip Ratio (WHR): [20] Using a stretch-resistant tape, Waist Circumference was measured as mentioned above and hip circumference was measured at the maximum circumference of the buttocks at a level parallel to the floor. Waist to hip ratio (WHR) was computed as follows: waist circumference divided by hip circumference. The WHO guidelines was used to define obesity by a WHR as • >0.9 in men • >0.85 in women.

Data Management and Statistical analysis:

The SPSS version 25 program was used to tabulate and analyze the gathered data. Quantitative data was displayed as mean

and standard deviation, whilst categorical data was shown as numbers and percentages. As tests of significance, the chi square test (x2), fisher's exact test, and analysis of variance (f) test were applied. Quantitative factors were tested using the independent t test. Logistic regression was performed to examine the predictors of obesity and predictors of quality of life among elderly people. For all tests, a probability value of less than 0.05 was considered statistically significant.

Ethical consideration:

The Suez Canal University Faculty of Medicine's Research Ethics Committee gave their approval to the study (Ref. No. 1347/2022, dated 12-6-2022). All participants gave their informed consent.

Results

The current study included 136 participants. As shown in **Table (1)**

Table 1. Socio-demographic characteristics of the studied sample (N=136)

Variables	N=136 (%)
Age, mean ± SD	65.61±5.89
Gender	
• Male	64 (47)
• Female	72 (53)
Marital status	
• Married	94 (69.1)
• Widow/ divorced	42 (30.9)
Education	
• Illiterate/ Read and write	55 (40.4)
• School education	7 (5.1)
• Intermediate	46 (33.8)
• University	28 (20.6)
Occupation before retirement	
• Non/House wife	66 (48.5)
• Farmer	9 (6.6)
• Skilled manual worker	5 (3.7)
• Employer	56 (41.2)
Number of family members	
• ≤ 5 person	107 (78.7)
• > 5 person	29(21.3)
Earning from all practice	
• In debt	30 (22.1)
• Just meet routine expenses	70 (51.5)
• meet routine expenses and emergencies	25 (18.4)
• Able to save/invest money	11 (8.1)

The socio-demographic characteristics of the studied sample, mean age of the participants was 65.61±5.89 years. About 53% of the participants were female, 69.1% were married, and about 40% were either illiterate or could only read and write.

Nearly half of the participants were not working or housewives, and about 51.5% of the sample was just able to meet their routine expenses.

Regarding the clinical characteristics of the studied sample as shown in **table (2);** 20% of the participants were smokers, 6% were ex-smokers, and about 77.2% of them were physically inactive. Moreover, more than two-thirds of the sample had a chronic illness (71.3%), where the top three diseases were hypertension (41.9%), diabetes mellitus (27.2%), and osteoarthritis (25.7%). The mean Geriatric Depression Scale was 1.90±1.32 whereas the mean Rapid Eating Assessment for Participants was 32.20±3.54.

Table 2. Clinical characteristics of the studied sample (N=136)

Variables	N=136 (%)
Smoking	
• Absent	101 (74.2)
• Present	27 (19.9)
• Ex-smoker	8 (5.9)
Physical activity	
• Inactive	105 (77.2)
• Active	31 (22.8)
chronic illness	
• Absent	39 (28.7)
• Present	97 (71.3)
Depression (5 item-Geriatric Depression Scale)	
• mean ± SD	1.90±1.32
• median (min – max)	2 (0 - 5)
Diet (Rapid Eating Assessment for Participants)	
• mean ± SD	32.20±3.54
• median (min – max)	32 (23 - 39)

The overall prevalence of obesity was 70%, where 37.5% had grade I obesity, 21.3% had grade II obesity and 11% had grade III obesity. In addition, their mean waist circumference was 110.57±14.73 cm and their mean waist hip ratio was 0.972 ±0.08 as demonstrated in **table (3).**

As shown in table (4) the association of baseline characteristics of patients with BMI categories. It was found that there was a strong link between obesity and female gender (p=0.041).

Table (5) shows the association of clinical characteristics of patients with BMI categories. There was a statistically significant association between physical inactivity and obesity (p<0.001).

Table 3. Anthropometric characteristics of study sample (n = 136).	
Variables	N=136 (%)
BMI categories, n (%)	
• Normal	15 (11)
• Overweight	26 (19.1)
• Obese: 1. Grade I	51 (37.5)
Grade II	29 (21.3)
Grade III	15 (11)
Anthropometric measures, mean ± SD	
• Waist circumference (cm)	110.57±14.73
• Body mass index (Kg/m2)	32.74 ±6.51
• Waist-Hip ratio (WHR)	0.972 ±0.08

Table 4. Association of baseline characteristics of patients with BMI categories.					
Variables	BMI categories			test value	p-value
	Normal (n= 15)	Overweight (n= 26)	Obese (n= 95)		
Gender					
• Male	10 (66.7)	16 (61.5)	38 (40)	6.40	0.041*[a]
• Female	5 (33.3)	10 (38.5)	57 (60)		
Marital status, n (%)					
• Married	11 (73.3)	15 (57.7)	68 (71.6)	1.98	0.371 [b]
• Widow/ Divorced	4 (26.7)	11 (42.3)	27 (28.4)		
Education					
• Illiterate/ Read & write	5 (33.3)	11 (42.3)	39 (41.1)	3.22	0.781 [b]
• School education	1 (6.7)	2 (7.7)	4 (4.2)		
• Intermediate	4 (26.7)	7 (26.9)	35 (36.8)		
• University	5 (33.3)	6 (23.1)	17 (17.9)		
Occupation before retirement					
• Non/House wife	6 (40)	15 (57.7)	45 (47.4)	5.70	0.457 [b]
• Farmer	1 (6.7)	0 (0)	8 (8.4)		
• Skilled manual worker	0 (0)	0 (0)	5 (5.3)		
• Employer	8 (53.3)	11 (42.3)	37 (38.9)		
family members					
• ≤ 5 persons	13 (86.7)	24 (92.3)	70 (73.7)	4.86	0.088 [b]
• > 5 person	2 (13.3)	2 (7.7)	25 (26.3)		
Earning					
• In debt	2 (13.3)	5 (19.2)	23 (24.2)	2.69	0.847[b]
• Just meet expenses	9 (60)	15 (57.7)	46 (48.4)		
• meet expenses and emergencies	3 (20)	3 (11.5)	19 (20)		
• Able to save/invest	1 (6.7)	3 (11.5)	7 (7.4)		

[a] values are based on chi-square test. Statistical significance at P <0.05.
[b] values are based on Fisher exact test. Statistical significance at P <0.05

Table 5. Association of clinical characteristics of patients with BMI categories.					
Variables	BMI categories			test value	p-value
	Normal (n= 15)	Overweight (n= 26)	Obese (n= 95)		
Smoking					
• Absent	10 (66.7)	17 (65.4)	74 (77.9)	6.17	0.187 [b]
• Present	5 (33.3)	8 (30.8)	14 (14.7)		
• Ex-smoker	0 (0)	1 (3.8)	7 (7.4)		
Physical activity					
• Inactive	3 (20)	7 (26.9)	74 (77.9)	0.334	<0.001* [b]
• Active	12 (80)	19 (73.1)	21 (22.1)		
Chronic illness					
• Absent	6 (40)	8 (30.8)	25 (26.3)	1.25	0.534 [b]
• Present	9 (60)	18 (69.2)	70 (73.7)		
Depression (5 item - Geriatric Depression Scale)	2.26± 1.38	2.23± 1.14	1.75 ± 1.34	1.968	0.144 [a]
Diet (REAP-S score)	31.40 ± 3.83	32.92 ± 2.81	32.13 ± 3.67	0.936	0.395[a]

[a] *values are based on One way ANOVA test. Statistical significance at P <0.05.*
[b] *values are based on Fisher exact test. Statistical significance at P <0.05*

Logistic regression analysis of predictors of obesity among the studied sample obesity showed that it was significantly associated with being female patient (OR=2.713, p=0.017). On the other hand, obesity was negatively associated with total QOL score (OR=0.935, p=0.037) as shown in Table (6).

Table 6. Logistic regression analysis of predictors of obesity.						
Variables	B	S.E.	OR	95% C.I.		p-value
				Lower	Upper	
(Constant)	4.499	1.950	89.971			0.021*
Gender (Female)	0.998	0.418	2.713	1.196	6.155	0.017*
Physical activity (inactive)	0.494	0.500	1.639	0.615	4.366	0.323
Total QOL score	-0.067	0.032	0.935	0.879	0.996	0.037*
R^2=0.471 ANOVA<0.001 * Statistical significance < 0.05.						

Table **(7)** shows that the total WHO Quality-of-Life BREF scores was 55.82 ± 6.45 with range between 41 to 69. Of the four domains, the environment domain's average score was (69.40 ± 12.46), followed by physical health (57.48± 15.33), psychological health (56.61 ± 9.73), and social relationships (35.70 ± 6.799).

Multivariable linear regression analysis of predictors of total quality of life among elderly participants shows that quality of life score was positively associated with

participants with high earnings (β= 0.159, p=0.033). On the other hand, that quality of life score was negatively associated with participants with chronic illness (β= -0.251, p<0.001), obese patients (β=-0.252, p<0.001) and age as it decreased with increasing age (β=-0.513, p<0.001) as shown in Table (8).

Table 7. Descriptive statistics of WHO Quality-of-Life BREF Scale and it domains among the studied participants

Variables	N= 136
Total WHO Quality-of-Life Scale • mean ± SD • median (min – max)	55.82 ± 6.45 56 (41 – 69)
Physical domain • mean ± SD • median (min – max)	57.48± 15.33 56.25 (31.3 – 100)
Psychological domain • mean ± SD • median (min – max)	56.61 ± 9.73 56.25 (37.5 - 87.5)
Social domain • mean ± SD • median (min – max)	35.70 ± 6.799 37.5 (18.8 – 50)
Environmental domain • mean ± SD • median (min – max)	69.40 ± 12.46 68.7 (37.5 – 93.8)

Table 8. Multivariable linear regression of predictors of total QOL score

	total QOL score			
Predictors	Unstandardized Coefficients		Standardized Coefficients	p-value
	B	SE	Beta	
(Constant)	95.373	6.036		<0.001*
Marital status	-0.802	1.060	-0.058	0.451
Occupation (farmer)	2.064	1.882	0.080	0.275
Occupation (skilled manual worker)	3.110	2.190	0.099	0.158
Occupation (employer)	1.619	0.970	0.124	0.098
Earning (Just meet routine expenses)	2.616	1.077	0.203	0.017*
Earning (meet routine expenses & emergencies)	0.654	1.369	0.039	0.634
Earning (able to save/ invest money)	3.749	1.734	0.159	0.033*
Physical activity	0.911	1.108	0.059	0.412
Chronic illness (yes)	-3.630	0.951	-0.251	<0.001*
BMI (obese)	-3.526	0.935	-0.252	<0.001*
Age	-0.561	0.081	-0.513	<0.001*
	R^2 = 0.504 , F = 11.434 , p <0.001*			

R^2: Coefficient of determination SE: Estimates Standard error
F, p: F and p values for the model
***: Statistically significant at p ≤ 0.05*

Discussion

The current study revealed that senior adults had a significant prevalence of obesity and poor QOL. About 70% of elderly patients were obese, their mean waist circumference was 110.57±14.73 cm. Female gender and physical inactivity had statistically significant links to obesity. The surprising high prevalence in this study may be related to the economic and social status change, sedentary lifestyles and the concomitant co morbidities in elderly patients.

This finding was similar to previous studies conducted on obesity among elderly; authors revealed that the prevalence estimates were 81% and 62.3% respectively. [21,22] In contrast to other studies, the present study's finding is higher than previous studies, as shown in a previous Egyptian study that showed a 33.3% prevalence. [23] The difference may be due to the difference in the study period. As it was done in 2015, there has been a change in economic and social status, increased urbanization, and sedentary behavior related to the social media effect. In addition, this may be due to the study setting, as it contained both urban and rural residences, while this study was done in a rural area only. The change in physical activity status, as the percentage of physically active participants was 46.8%, while in this study it was 22.8%.

In the present study, obesity was associated with being female, about 60% of obese elderly patients were females. The majority of studies conducted in various nations agreed with the current study that females were more likely than males to be overweight and obese. [21,23-27] This may be because women experience weight gain associated with menopause as well as an accumulation of visceral fat and adiposity, which increases their chance of being overweight and obese compared to male elderly adults. [28] Females in Egypt are more likely to be obese than males (about 50% versus 30%, respectively), [4] which may be due to cultural norms as females in Egypt are more likely to be housewives, lead sedentary lifestyles, and participate in fewer physical activities.

In the present study, physical inactivity was statistically significantly associated with obesity ($p<0.001$). In agreement with the current study, according to a Malaysian study [27] obesity and physical inactivity are statistically significantly linked. Additionally, a Greek study [29] found that older adults who were sedentary had a twofold the risk of obesity compared to those who were active (OR: 2.074, 95% CI: 0.765–5.622). Contrary to our findings, research from Brazil [30] and India [25] demonstrated that there was no connection between obesity and inactivity. This contrast may be attributed to active lifestyle of their geriatric subjects.

The WHO Quality-of-Life BREF Scale and its domains were used in this study, and results indicated that among the participants, the social domain had the lowest mean score (35.70 ± 6.799). A similar pattern was seen in the Indian studies [31, 32] where the least score was noticed for the social domain (mean ± SD 43.20±12.73 and 11.33±1.3, respectively). In contrast to our study, Indian [33] and Palestinian [34] studies revealed that the social relationship domain received the highest score (52.79 ± 22.91 and 65.4 ± 15.3, respectively). Social QOL scores depend on associated factors, such as marital status, family structure, and function, social engagement with others, social events, and decision-making authorities in their

families, which may account for the discrepancies in QOL scores between our study and other studies.

With a mean score of (69.40 ± 12.46), the environment domain received the highest score in this study. Similar results were observed in Indian research [31, 32], where the environment domain had the highest mean QOL domain scores (52.20±6.10 and 27.8±2.2, respectively). In contrast, the Palestinian study [34] revealed that the environment domain had the lowest score (mean ± SD 60.5 ± 12.5). The difference may be attributed to the fact that rural elderly are more satisfied with their environment due to the less polluted, less stressful, and more environmentally friendly nature of rural locations. In addition, the Israeli-Palestinian conflict may affect the environment and make it unsafe.

Study Limitations: The study is limited by the recall bias that older persons tend to have; this bias may have emerged while recording the specifics of the frequency and quantity of food. There are a number of reasons why self-reported histories of physical activity and chronic illnesses may be inaccurate, including confusion and low educational achievement.

Conclusion:

The overall prevalence of obesity among elderly is increasing, which affect elderly people health. According to the study, elderly had a low health QOL, which was associated with being single, unemployment, low earning, the presence of chronic illness or possible depression, and a higher BMI. Obesity was negatively associated with the QOL. The family physicians shall provide educational programs on obesity and promotion of a healthy lifestyle to lessen the burden of obesity and chronic morbidity, which enhance community QOL.

Declarations

Authors' contributions: All authors were equally contributing to this work.

Competing interest: The authors affirm that they do not have any competing interests.

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Informed Consent: All individuals taking part in the study gave their informed consent.

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