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The relationship between Obesity and Health Status among Community dwelling Older Adults

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Abstract
Back ground: *Overweight and obesity rates have been increasedrecently in allcountries overall the world. In old age, obesity may cause severehealth problems and impairs quality of life. However, there is actually relatively little data directly addressing the correlation between obesity and health status among older people.*
The aim of the study:*determine the relationship between obesity and health status among community dwelling older adults.*
Subjects & method:
Research design:*A descriptive correlational research design was followed.*
Setting: *Farouk hospital outpatient clinics whichaffiliated to the ministry of health, Alexandria, Egypt.*
Subjects: *180 older adults were recruited.*
Tools: *two tools were used for data collection: 1) Socio-demographic and clinical data structured interviewschedule of community dwelling older adults, 2) Euro Quality 5 Dimensions (EQ-5D) Version 3.0.*
Results*: Overweight and obesity prevail among the majority of the study subjects which negatively impact all domains of health status among them.*
Conclusion:*Obesity is significantlyassociated with poor healthstatus, such asgreater functional limitations, higher levels of pain and emotional disturbances, and poorer self-rating health among the study subjects.*
Recommendations: *Gerontological nursesshouldidentify older adults with obesity and determine the possible consequences of it on their health status. Appropriate and specific nursing interventions should be directed to help older adults who are obese to lower their weight to limit the negative impacts of obesity on their health status.*

Keywords:*Obesity; older adults; health status; body weight; gerontological nurse, community dwelling.*

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I. Introduction

The number of older adults and the percentage of those who suffer from obesity among them have been increased markedlyin the recent decades. As a result, the rate of obesity is generally increased worldwide [(1-3)]. Despite the prevalence of obesity is higher in females older adults than males [(4)], obesity has negative consequences on health status of both men and women. Obesity accelerates the agerelated decline of physical performance and induces frailty or sarcopenia [(5, 6)].

Obesity in old age is known as a harmful accumulation of body fat in certain body areas such as, abdominal subcutaneous tissues, muscles, and liver thatelevates the risk of illnesses and death [(7, 8)]. However, it is hard to exactly quantify body muscle to fat ratio in most different clinical situations, because this evaluation needs the utilization of complex instruments and procedures that are not accessible. Therefore, body mass index, BMI, estimated as body weight (in kg) divided by the square of height (in m), has been broadly utilized and approved as an easy approach to categorize morbidity risk throughmeasuringweight [(9, 10)].

Obesity is increasing progressively particularly with aging due to age related changes in body composition shifting to greater fat and a smaller size of muscle[(11)]. Additionally, with aging, the disproportion between calories intake and expenditure of energy increases the total fat mass which supported by several studies [(12-14)]. Moreover, hormonal changes that happen throughout the aging process such as decreasedproduction of growth hormone, reduced sensitivity to thyroid hormone, lower serum testosterone level, and increased resistance to leptin lead to more fat accumulation [(15, 16)].

Obesity influences the older adults' level of wellness, health care expenditures, productivity level and social stigmatization. Obesity is connected with increased morbidity, and greater risk for development of chronic illnesses in old age such as cardiovascular diseases, hypertension, stroke, type II diabetes mellitus, and osteoarthritis[(17)]. In addition, poor quality of life, and premature mortality are always reported among obese

older adults [18]. Moreover, the rate of nursing homesadmission is higher among obese more than those who are not obese [19].

Gerontological nurses are responsible to identify obese older adults and assist them in adopting healthier lifestyle behaviors to limit the negative consequences of obesity. The first gerontological nurses' goal should be to overcome the barriers of lifestyle modifications through therapeutic diet, safe exercise program, and the usage of available community services[13].

The relationship between obesity and the risk for serious chronic illnesses raised the need to study the link between obesity and general health status outcomes among older adults. However, scarce researches have examinedthe complications of obesity in this age group [18].

Aim of the study

Determine the relationship between obesity and health status among community dwelling older adults

Research question:

What is the relationship between obesity and health status among community dwelling older adults?

II. Materials And Method

Materials:

Design: The study followed a descriptive correlational research design.

Setting: The study was done at Farouk hospital outpatient clinics whichaffiliated to the ministry of health, Alexandria, Egypt. The hospital contains different outpatient clinics for different specialties which include; ophthalmology, dentition, and diabetic clinics. These clinics work from Saturday to Thursday from 9 am to 12pm. The researchers used to attend to the outpatient clinics for three days per week from 9 am to 12pm.

Subjects: The study included 180 older adults who aged 60 years and more, able to communicate effectively, accept to participate in the study, and available at the selected setting during the period of data collection. The sample size was estimated using the EPI info 7.0 program based on these parameters; population size: 400, possible error 5 %, confidence coefficient 95%, and minimal sample size 180.

Tools: Two tools were used in the study to collect the necessary data as follows;

Tool I: Sociodemographic and clinical data structured interview schedule of community dwelling older adults:

Researchers developedthis tool based on review of relevant literature to assess the sociodemographic and clinical data of the study subjects as follows;

- Sociodemographic data such as sex, age, marital status and level of education.
- Clinical data such as presence of health problems, body mass index (BMI), and the study subjects' perception oftheir body weight and their satisfaction about it.

Tool II: Euro Quality 5 Dimensions (EQ-5D) version 3.0:

EQ-5D was developed by the European quality of life, EuroQOL, Group to provide a simple measuring tool of health for clinical appraisal[20].EQ-5D essentially consists of two parts - the EQ-5D descriptive part, and the EQ visual analogue scale (EQ VAS). The EQ-5D descriptive partcontains fivedomains of health assessing functional abilities, pain, and emotional status as follows;1- mobility,2- self-care activities such as bathing and dressing, 3- usualactivities such as house work, leisure time, andfamily activities, 4- pain/discomfort, and 5- depression/anxiety. Each domain has 3 levels as follows; no problems (1), some problems (2), and severe problems (3). The numbers 1-3 have no arithmetic properties and cannot be considered as a cardinal score.The higher the score,the poorer health status.

The EQ VAS assesses the self-rated health of the study subjects today on a vertical, visual analogue scale. The endpoints of it are labelled ‘better possible health condition (100)’ and ‘worst possible health condition (zero)’.

Method

1. Permission to carry out the study from the responsible authorities from the Faculty of Nursing, Alexandria University was obtained.
2. Permission to gather the required data from the head of the study settingwas obtained, after being informed about the purpose of the study, the date and time of data collection.
3. Tool I was developed by the researchers through reviewing of relevant literature to assess the sociodemographic and clinical data of the study subjects.
4. Tool II was translated into Arabic version and tested for its content validity by three experts in the related field of the study and the required modifications were done accordingly.
5. Tool II was tested for its reliability and the Cronbach's Coefficient alpha was 0.89 for it.
6. A pilot study was conducted on 25 older adults who selected from the study setting and were not involved in the study sample. The pilot study aimed to assess the tools for their clarityand applicability and essential modifications were done accordingly.

7. Older adults who fulfill the inclusion criteria were interviewed individually by the researchers in the waiting area in the outpatient clinics to collect the necessary data after explaining of the study purpose.
8. The researchers measured the study subjects' weight using weight measuring scale and measured their height using a measuring tape. Then, the BMIwas calculated as body weight (in kg) divided by the square of height (in meter). The study subjects were classified according to their BMI using the World health organization's guide for BMI categories [(9)] as follows;

- Non overweight: BMI scoreequalsor less than 24.9
- Overweight: BMI score is from 25 to 29.9
- First class obesity: BMIscore is from 30 to 34.9
- Second class obesity: BMIscore is from 35 to 39.9
-Third class obesity: BMI score equals or more than 40

9. Statistically, self-rating health of the study subjects, measured by the EQ VAS of tool II,was classified into 3 different levels as follows;
- Poor level of health (score<50)
- Moderate level of health (score 50- <75)
- Excellent level of health (score≥75)

Ethical considerations:

Informed witness consent was obtained from each study subject included in this study after explaining of the study purpose. Anonymity and privacy of the study subjects, confidentiality of the collected data and the subject's right to withdraw at any time were assured.

Statistical Analysis:

Data collected were analyzed by computer using the Statistical Package for Social Sciences (SPSS) software version 20. Reliability of the tools was determined by Cronbach Coefficient alpha. Data were presented by descriptive statistics in the form of frequencies and percentages for qualitative variables, and arithmetic mean and standard deviation for quantitative variables. Comparison of means was done by Student's t test and One Way Analysis of Variance (ANOVA). Spearman Correlation Coefficient was used for testing relationship between variables. Significant difference was considered if $p \leq 0.05$.

III. Results

Table (1): Shows that 65.6% of the study subjects are females, 89.4% aged from 60 to less than 75 years old with a mean age of 65.63 ± 6.06, and 61.1% are married. Illiteracy prevails among 62.2% of the study subjects and 57.2% are house wives. Also, the table indicates that 92.2% of the study subjects are not current workers and 82.8% have inadequate monthly income. Regarding living conditions of the study subjects, 61.1% of them live in urban area, and 84.4% live with their families.

Table (2): Illustrates that osteoarthritis is the main chronic illness that the study subjects suffer from 60.0%, followed by hypertension 50.6%, diabetes mellitus 48.9%, and then respiratory disorders such as bronchial asthma 38.3%. Moreover, 30.6% of the study subjects reported sleep related problems.

Table (3):indicates that 12.8%, 26.7% of the study subjects are either non overweight or over weight respectively. While, first, second, and third class of obesity are represented by 28.3%, 14.4%, and 17.8% of the study subjects respectively. The mean score of body mass index, BMI, is 32.70 ± 7.08.Moreover, 56.1% of the study subjects perceive that they have normal body weight and 56.7% are satisfied with their body weight and accept it.

Table (4):indicates thatthe higher percentages of the study subjects 81.7%, 51.1%, 53.3%, 43.3% have some mobility limitations, some usual activities limitations, moderate degrees of pain, and moderate levels of depression or anxiety respectively. In contrast, self-care activities are the least activities which affected among the study subjects, where 63.9% of them reported no limitations in these activities. The mean score of these five domains of health is 9.87 ± 2.11

Table (5): shows that 47.2% of the study subjects rate their health as moderate, while, 32.2%, 20.6% of them rate their health as either poor or excellent respectively. The mean score of self-rating health is 54.08 ± 23.93.

Table (6): indicates that study subjects who arefemales or house wives reported higher mean scores of BMI 34.9 ± 6.8, 35.0 ± 6.63 respectivelyand the differencesare statistically significant P< 0.001. Furthermore, living alone is associated with higher mean score of BMI 35.4 ± 7.2 among the study subjects and the difference is statistically significant T = 2.20, p = 0.028.

Table (7): indicates that the higher mean scores of BMI, 35.24 ± 7.7, 34.8 ± 8.1, 34.24 ± 6.6, 34.35 ± 6.99, 34.34 ± 6.9 are reported by study subjects who suffer from sleep related problems, respiratory diseases, diabetes

mellitus, hypertension, and osteoarthritis respectively, but the difference did not reach to a statistically significant level, f = 1.18, p = 298.

Table (8): shows thatthere arestatistically significant positive relations between BMI and the health statusfive domains $p \leq 0.05$. This means that as the BMI increased, the study subjects' functional limitations in mobility, self-care activities andusual activities are increased.Also, higher BMI of the study subjects are associated withhigher levels of pain and depression oranxiety.Moreover, there is a statistically significant positive relation between total health statusscore and BMI of the study subjects. This means thatasthe BMI of the study subjectsincreased, their total health statusscore is increased indicating poor general health status,rs=0.416, P<0.001.At the same time, the table shows that the self-rating health of the study subjects is decreased as their BMI increased, but the relation did not reach to statistically significant level, rs = -0.119, p = 0.111.

IV. Discussion

Obesity is regularly discussed by today's physicians, families, and mass media. The accelerating prevalence of obesity establishes the need for exploration of its reasons, effects, and ways to restrain its growth among general population. However, scarce studies have concentrated on the effects of obesityon health status among older adults [(21, 22)]. So, this study aimed to determine the relationship between obesity and health status among the community dwelling older adults.

The present study result reveals that osteoarthritis is the main chronic illness which the study subjects suffer from (table2). This may be justified by that obesity and overweight are prevailing among high percentages of the study subjects. For illustration, obesity means more weight being put on the joints' cartilages which induce rapid degeneration of these cartilages even with mild levels of activities. Normal physiological changes in the musculoskeletal system in old age may accelerate this deterioration. So, the study subjects may be at risk for osteoarthritis. This result supported by Griffin etal 2012, who reported that obesity is a significant predictor for osteoarthritis where adipose tissues act as a local source of pro-inflammatory mediators which increase cartilage degeneration [(23)].

Regarding the study subjects' perception of their body weight and satisfaction about it, more than one half of them view their body weight as normal and accept itdespitethe higher percentages of the study subjects are either overweight or obese (table 3). The study subjects may perceive their body weight as normal due to the prevalence of illiteracy among them and lack of scientific base to judge or evaluate their body weight. For example, they usually do not use a measuring scale to estimate their body weight, while they may depend on their body appearance as they reported. Also, they may do not know the different categories of body weight. Furthermore, the study subjects' satisfaction about their body weight may be due to their cultural back ground which consider obesity as a sign of health, having better eating habits, or having high economic conditions. In contrast, Schiemanetal, 2007 reported that among older adults with low socioeconomic conditions, white women tend todescribe themselves as obese more than men and black women although they have normal values of BMI [(24)].

Females study subjects and housewives are found to have significant higher BMI according to the present study finding (table 6).These results may be related to the age related deficiency of estrogen level among femalesolder adults which alter fat metabolism and consequently increase fat mass accumulation. This result is supported by other studieswhich indicated that obesity is commonly occurring among older women than older men[(25, 26)].

With reference to the present study finding, living alone is associated significantly with higher body mass index (table 6). This can be clarified by the fact that, older adults who live alone may be less energetic or motivated to cook or prepare food which suit their health conditions. So, they may ask for food delivery or fast food if they have enough money to do so. These kinds of food are characterized by a large amount of fat added to it which means more calories intake. On the other hand, study subjects who live alone and have low income may take easily prepared meals with the main element is carbohydrate with low fruits and vegetables which consider a poor dietary intake. These unhealthy types of food with limited levels of physical activities of those study subjects will result in more weight gain. The study done by Hughesetal 2004 revealed that older adults who are living and eating alone have poor dietary habits including consumption of less fruits and vegetables and are less motivated to cook a meal [(27)].

Sleep related problems are found in the present study to be associated with higher mean score of BMI (table 7). This can be interpreted by that abnormal distribution of fat with old age especially in the abdominal area may act as a pressure to the chest especially during sleep in recumbent position inducing sleep apnea or nocturnal dyspnea. As a result, the study subjects may suffer from poor sleep quality. This result is supported by Hofmanetal, andPatel etal2008who reported that severe sleep disturbance is correlated with higher BMI [(28, 29)].

The present study finding shows that the higher percentages of the study subjects suffer from either moderate or severe limitations in mobility and usual activities (table 4). At the same time, as BMI increased, these limitations are increased (table 8). This may be justified by that the majority of the study subjects are either overweight or obese. Moreover, study subjects who are obese may find difficulties in their flexible movement, have slow rate of task management, feel tired and exhausted easily, and may need more time to complete and achieve their duties. In addition, obesity has several negative impacts on the older adults' general health such as increased the risk for disabling chronic illnesses such as osteoarthritis which increases their functional limitations. This result is supported byRollandetal2009 who reported that obesity contributes to physical dysfunction[30].

Concerning the current study result, it was found that as the study subjects' BMI increased, their complaints of pain and discomfort is increased significantly (table 8). This can be clarified by that study subjects who are obese may be easily exhausted, and being tired with little effort due to the feeling of heaviness on their joints. Also, obesity is considered an important risk factor for osteoarthritic changes among older adults as mentioned before which responsible for several degrees of pain. This result is supported by Lucas 2004etal,Patterson etal 2004 that revealed that greater BMI is significantly associated with chronic pain [31, 32].

The present study finding reveals that greater BMI is significantly correlated with higher levels of anxiety or depression (table 8). This can be clarified by that, obese older adults may find difficulties in wearing or even buying suitable clothes, in attending certain social activities, or in their attempts to live independentlywhich will dramatically affect the study subjects' psychological wellbeing.Moreover, many of the chronic illnesses which predisposed by obesity areassociated with depressed mood[33].This result is supported by other studies which reported that higher BMI is correlatedwith increased risk of depression [33, 34].

With reference to self-rating health of the study subjects, higher BMI is found to be associatedwith lower levels of self-rating health (table 8). This may be justified by that obese study subjects actually experience limited performance of daily activities, higher levels of pain, and higher level of anxietyor depression according to the current study results. So, their self-evaluation of health may be always negative. This result is supported by Okosunetal who reportedthat obesity has a negative impact on self-rated health even in the absence of chronic disease conditions [35].

V. Conclusion

Based on the present study results, it can be concluded that the majority of the study subjects suffer from overweight and different classes of obesity which is significantlyassociated with poor general health status andimpaired health domains such as, greater functional limitations in mobility, self - care, and usual activities. Also, higher levels of pains and emotional disturbances, and poorer self-rating health among the study subjects are significantly related to higher values of body mass index.

VI. Recommendations

Based on the findings of the present study, the following recommendations are suggested:

1. Gerontological nurses should carry out thorough history and physical examination of older adults to determine those who are obese and to identify the impact of their body weight on their current health status.
2. Suitable nursing interventions should be provided by the gerontological nurses to older adults with obesity to manage their complaints of pain, emotional disturbance, and functional limitations due to their body weight.
3. Encourageobese older adults to participate in weight control program. The gerontological nurses should insure that the older adults' benefits formtheir participation in this programare more than the potential risks of it.
4. Gerontological nurses should encourage the older adults who are obese to comply with healthy life style behaviors as safe dietary changes and physical activity to promote their health status.

The Future Research In This Field Could Include:

Experimental studies are needed to determine the effect of weight control directed nursing interventions on health status of older adults with obesity.

Table (1): Distribution of the study subjects according to their socio-demographic characteristics

Socio-demographic characteristics	No=180	%
Sex		
Male	62	34.4
Female	118	65.6
Age		
60 –	161	89.4
75 –	17	9.4
85 years and more	2	1.2
Mean ± SD.	65.63 ± 6.06	
Marital status		
Married	110	61.1
Widow	63	35.0
Divorced	7	3.9
Level of education		
Illiterate	112	62.2
Read and write	19	10.6
Basic education	37	20.6
Secondary education	12	6.6
Occupation prior to retirement		
Employee	15	8.3
House wife	103	57.2
Skilled worker	46	25.6
Unskilled worker	16	8.9
Current work status		
Yes	14	7.8
No	166	92.2
Monthly income		
Enough	31	17.2
Not enough	149	82.8
Place of residence		
Urban	110	61.1
Rural	70	38.9
Living style		
With family	152	84.4
Alone	28	15.6

Table (2): Distribution of the study subjects according to their health problems

Health problems	No=180	%
Current health problems #		
Osteoarthritis	108	60.0
Hypertension	91	50.6
Diabetes mellitus	88	48.9
Respiratory disorders	69	38.3
Sleep problems	55	30.6
Gastrointestinal disorders	48	26.7
Cardiovascular disease	39	21.7
Anemia	25	13.9
Ophthalmological disorders	22	12.2
Renal disorders	17	9.4
Hyperthyroidism	12	6.7
Stroke	6	3.3

More than one answer was given

Table (3): Distribution of the study subjects according to their body mass index (BMI)

Body mass index (BMI)	**No=180**	**%**
BMI categories		
Non overweight	23	12.8
Overweight	48	26.7
First class obesity	51	28.3
Second class obesity	26	14.4
Third class obesity	32	17.8
BMI		
Min. – Max.	18.59 – 52.51	
Mean ± SD.	32.70 ± 7.08	
Perception of body weight		
Obese	68	37.8
Normal	101	56.1
Thin	11	6.1
Acceptance of one's own body weight		
Yes	102	56.7
No	78	43.3

Table (4): Distribution of the study subjects according to their health status (EQ- 5D)

Health status	**No=180**	**%**
Five domains of health status		
1-Mobility (walking)		
No limitations	33	18.3
Some limitations	147	81.7
Bedridden	0	0.0
2-Self-care (bathing and dressing)		
No limitations	115	63.9
Some limitations	54	30.0
Severe limitations	11	6.1
3-Usual activities (social and household)		
No limitations	24	13.3
Some limitations	92	51.1
Severe limitations	64	35.6
4-Pain or discomfort		
No pain	15	8.3
Moderate pain	96	53.3
Severe pain	69	38.4
5-Anxiety or depression		
No depression or anxiety	41	22.8
Moderate depression or anxiety	78	43.3
Severe depression or anxiety	61	33.9
Total health status score		
Min. – Max.	5.0 - 14.0	
Mean ± SD.	9.87 ± 2.11	

Table (5): Distribution of the study subjects according to their self-rating health (EQ VAS)

Self- rating health	**No=180**	**%**
Self -rating health		
<50 Poor level of health	58	32.2
50- <75 Moderate level of health	85	47.2
≥75 Excellent level of health	37	20.6
Min. – Max.	0.0 – 100.0	
Mean ± SD.	54.08 ± 23.93	

Table (6): The relation between sociodemographic characteristics and BMI of the study subjects

Sociodemographic characteristic	BMI Mean ± SD.	Test of sig.	P
Age (years)			
60 –	32.9 ± 7.2	F=0.693	0.502
75 –	31.9 ± 6.4		
85 years and more	27.5 ± 7.1		
Sex			
Male	28.5 ± 5.71	t=6.643*	<0.001*
Female	34.9 ± 6.8		
Level of education			
Illiterate	33.37 ± 7.67	F= 1.249	0.293
Read and write	30.48 ± 5.53		
Basic education	32.42 ± 6.32		
Secondary education	30.85 ± 5.06		
Occupation prior to retirement			
Employee	31.49 ± 6.39	F=13.409*	<0.001*
House wife	35.0 ± 6.63		
Skilled worker	27.81 ± 5.61		
Unskilled worker	33.11 ± 7.47		
Current work status			
Yes	29.61 ± 6.91	t=1.710	0.089
No	32.96 ± 7.06		
Monthly income			
Enough	30.65 ± 6.31	t=1.785	0.076
Not enough	33.13 ± 7.18		
Place of residence			
Urban	32.88 ± 7.43	t=0.420	0.675
Rural	32.42 ± 6.56		
Living style			
With family	32.2 ± 6.98	t= 2.209*	0.028*
Alone	35.4 ± 7.2		

F: F value for ANOVA test
t, p: t and p values for Student t-test
*: Statistically significant at $p \leq 0.05$

Table (7): The relation between health problems and BMI of the study subjects

Health problems	BMI Mean ± SD.	Test (F)	P
Sleep problems	35.24 ± 7.7	1.180	0.298
Respiratory disorders	34.80 ± 8.1		
Hypertension	34.35 ± 6.99		
Osteoarthritis	34.34 ± 6.9		
Diabetes mellitus	34.24 ± 6.6		
Anemia	33.9 ± 8.58		
Hyperthyroidism	33.44 ± 7.97		
Cardiovascular disorders	32.2 ± 6.44		
Gastrointestinal disorders	32.1 ± 7.5		
Renal disorders	32.1 ± 5.88		
Ophthalmological disorders	31.6 ± 6.02		

F: F value for ANOVA test
*: Statistically significant at $p \leq 0.05$

Table (8): The relation between health status and BMI of the study subjects

Health status	BMI	
	r_s	P
5 Domains of health status		
1- Mobility	0.230*	0.002*
2- Self-care	0.180*	0.016*
3- Usual activities	0.316*	<0.001*
4- Pain or discomfort	0.355*	<0.001*
5- Depression or anxiety	0.316*	<0.001*
Totalhealth status score	0.416*	<0.001*
Self -rating health (EQ VAS)	-0.119	0.111

rs: Spearman coefficient
*: Statistically significant at $p \leq 0.05$

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