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The Relation of Obesity and Chronic Diseases among Home Health Care Patients

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ABSTRACT

Background: The prevalence of overweight and obesity among older adults is clearly increasing. The serious public health consequences (e.g., premature mortality, co-morbidities such as diabetes, hospitalization, and heart failures)

Aim: To find the relation between obesity and other chronic diseases among home health care patients.

Methodology: A file based comparative case control study among 200 of obese patients versus 200 non obese all under the umbrella of home health care at Armed Forces Hospitals Southern Region, Saudi Arabia, 2019.

Results: Regarding DM higher prevalence among obese, (P 0.004) with higher risk among obese, odds ratio 1.8[1.2:2.7].Hyper tension also showed significant difference with higher risk of incidence among obese OR 1.55[1.02:2.35], Although bronchial asthma showed no significant difference among both groups but higher risk OR 1.97 among obese. Hyperlipidemia also showed significant difference and higher risk among obese OR 2.02[1.83:2.2].

Conclusion: Obesity among elderly leads to increased risk of diseases as DM, Hypertension, thyroid disorders, Bronchial asthma, Arthritis, liver disease and hyperlipidemia while lower risk of osteoporosis, and prostatic enlargement and some neurological disorders like depression and dementia and parkinsonism.

KEYWORD: *Home Health Care, Chronic Diseases, Elderly, Co-morbidity*

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Literature Review

The prevalence of overweight and obesity among older adults is clearly increasing (Centers for Disease Control and Prevention, 2009). The serious public health consequences (e.g., premature mortality, co-morbidities such as diabetes, hospitalization, and heart failures) of this trend have led to the Centers for Medicare and Medicaid Services (2009) to include body mass index (BMI) in the 2009 Physician Quality Reporting Initiative (PQRI) measures list.[1]

Obesity is increasing among people residing in nursing homes, and resident obesity substantially affects services needed, equipment and facilities provided, and morbidity in this setting. The purpose of this article is to describe the scope and depth of evidence regarding the impact of obesity among nursing home residents in the United States.[2]

In 1985 Andres published a re-analysis of the Metropolitan Life Insurance Company data suggesting that the relationship between mortality and body mass index (BMI; kg=m2) appeared to be U-shaped, the BMI associated with minimum mortality appeared to increase with age throughout adulthood, and the optimal BMIs for older people were higher than conventionally believed. Since then, each of these issues has generated some controversy and debate.[3] Also other study found the relatively high BMI (27±30 for men, 30±35 for women) associated with minimum hazard in persons older than seventy years.[4]

The impact of chronic disease is staggering: 63%–67% of deaths in Canada and the USA are caused by cancer, diabetes mellitus(DM), cardiovascular diseases and chronic respiratory diseases.[5–7] Dementia, another chronic

disease, has become very relevant in caring for ageing populations as it is often responsible for older adults moving to nursing homes (NH).[8] NHs are especially impacted by chronic disease, as individuals often need care for several chronic diseases and symptoms, leading to complex care needs and clinical uncertainty and/or difficulty in addressing those needs.[9–11]

The alarming numbers of adults and children who are obese in KSA and generally in the world could be attributed to several factors. Diet, genetics and physical activity are the main factors that lead to overweight and obesity. The major challenge of obesity is that it predisposes an individual to other diseases while at the same time ruining their self-esteem. Obesity and overweight are major causes of co-morbidities such as cardiovascular disease, diabetes, musculoskeletal disorders and cancers. In KSA, higher rates of obesity and overweight have led to a corresponding increase in the prevalence of diseases like cardiovascular disease (CVD), diabetes type II and hyperlipidemia. The related health costs in the management of obesity and the diseases it causes are also substantial, making obesity a public concern that needs to be addressed (World Health Organization, 2017). The recent increase in the prevalence of obesity worldwide and more specifically in the Kingdom of Saudi Arabia has led to major health concerns raising the need for proper prevention and management measures to curb the epidemic of obesity. [12]

In KSA, higher rates of obesity have led to increased prevalence of diabetes and cardiovascular disease.[13] Saudi women are more susceptible to cardiovascular disease due to the high prevalence of hypercholesterolemia and the high rate of obesity among Saudi women and girls. This implies that there is a lot of fat accumulation among the women: the accumulated fat when deposited in the blood vessels in the vascular system leads to atherosclerosis which then leads to cardiovascular disease.[14]

Rational of study because the scare research among Home Health Care patients in our region.

The objectives of this study was to find the relation between obesity and other chronic diseases among home health care patients.

Methodology: A file based comparative case control study among 200 of obese patients versus 200 non obese all under the umbrella of home health care at Armed Forces Hospitals Southern Region, Saudi Arabia, 2019.

The Sample size and power were calculated by using G*power 3.1.3 program for comparing two groups using the previous study data for obesity prevalence and effect size 0.3 at power 90%.

Inclusion criteria: Acceptance to participate& Age >18 years.

Exclusion criteria: refusal to participate & Age < 18 years.

All eligible patients were enlisted and both groups were randomly selected and allocated in their group till reach the required sample size.

The data collection tool included patients' characteristics, anthropometric measures and chronic diseases.

Statistical analysis: The description of data was in form of mean ±standard deviation for quantitative data and Frequency & proportion for qualitative data. Comparison of data was done using independent t- test for quantitative data and Chi- Square or fisher exact test when appropriate for qualitative data. Odds ratio and 95% Confidence Interval were used to test association between parameters. P was considered significant if ≤ 0.05.

Results: The mean age of studied group was 74.81±15.03 years, weight 71.59± 18.91 and BMI 31.04 ± 15.27, half of the sample were obese > 30 kg/m2 and half were non obese. Males constituted 154(38.5%) of the sample and females were 246(61.5%) table 1. N B both groups were matched in age and gender.

In table 2 by comparing of obese versus non obese regarding prevalence of chronic diseases, regarding DM higher prevalence among obese, (P 0.004) with higher risk among obese, odds ratio 1.8[1.2:2.7].

Hyper tension also showed significant difference with higher risk of incidence among obese OR 1.55[1.02:2.35]. Enlarged prostate showed lower risk among obese OR 0.52[0.28: 0.98]. Although bronchial asthma showed no significant difference among both groups but higher risk OR 1.97 among obese. Hyperlipidemia also showed significant difference and higher risk among obese OR 2.02[1.83:2.2]. Interestingly neurological diseases like Parkinsonism, Dementia, Depression were lower among obese groups with lower risk see table 2.

Discussion: This study was done among home health care patients in Armed Forces Hospitals Southern region, Saudi Arabia. 2019. Sample of 400 patients were selected randomly divided into two groups 200 obese, 200 non obese, the study was done to compare both groups and showed the link to chronic diseases to explore the effect of obesity among those vulnerable group.

Both groups selected randomly from all registered patients at home health care services and allocated into each group, they were matched in age and gender, they were divided regarding BMI either ≥ 30 they considered obese or below non obese.

By comparing both groups regarding DM obese showed significantly higher prevalence of DM with higher Odds ratio this is matched with similar study at Saudi Arabia [14]who found "higher rates of obesity have led to increased prevalence of diabetes and cardiovascular disease. Saudi women are more susceptible to cardiovascular disease due to the high prevalence of hypercholesterolemia and the high rate of obesity among Saudi women and girls, and Obesity increases the likelihood of type 2 diabetes mellitus, obstructive sleep apnea, cardiovascular diseases, depression, osteoarthritis and certain cancers".

Also Burton et al, 1985[15] found that Excess weight associated with increased incidence of DM, cardiovascular disease and hypertension.

There is also increase risk of hypertension among obese elderly due to several mechanism and this is in agreement with Baig et al, 2015[16] who explained this In obese people by cholesterol deposition in the vascular system leading to atherosclerosis, which is a major precursor for cardiovascular diseases such as hypertension, stroke, myocardial infarction and aortic aneurysm.

In this study the risk of asthma is nearly twice among obese group this is in agreement with Camargo et al, 1999[17] who said that "Obesity is a major risk factor for the development of asthma" and this may explained that Obesity is associated with increased markers of inflammation in serum and adipose tissue, and yet decreased airway inflammation in obese people with asthma; these patterns reverse with bariatric surgery. Leptin and other adipokines may be important mediators of airway disease in obesity through direct effects on the airway rather than by enhancing airway inflammation. [18]

In this study obesity shows lower risk of prostatic enlargement in contrary to several mechanisms including increased intra-abdominal pressure [19], altered endocrine status, increased sympathetic nervous activity, increased inflammation process, and oxidative stress, all of which are favorable in the development of Benign Prostatic hyperplasia, this may explained by lower testosterone hormone among obese which slower the development of Benign Prostatic hyperplasia.

The results of this study finds increased risk of increased risk of chronic liver disease and this explained that Obesity is associated with a spectrum of liver abnormalities, known as nonalcoholic fatty liver disease (NAFLD), characterized by an increase in intrahepatic triglyceride (IHTG) content (i.e. steatosis) with or without inflammation and fibrosis (i.e. steatohepatitis). NAFLD has become an important public health problem because of its high prevalence, potential progression to severe liver disease, and association with serious cardiometabolic abnormalities, including type 2 diabetes mellitus (T2DM), the metabolic syndrome and coronary heart disease (CHD).In addition, the presence of NAFLD is associated with a high risk of developing T2DM, dyslipidemia (high plasma TG and/or low plasma HDL-cholesterol concentrations), and hypertension.[20]

Also there is increased risk of arthritis with obesity and this is due to excessive mechanical loading," The relationship between excess weight and OA is well-established, As obesity appears to be the top modifiable factor that influences OA risk, with one study reporting that individuals whose body mass index (BMI) was higher than 30 kg/m2 having a nearly 7-fold increased risk of developing knee OA.[21]

Osteoporosis is lower among obese and this is explained by Increasing fat mass may not have a beneficial effect on bone mass.[22]

Also thyroid disorders increases among obese group As shown in, meta-analysis of the 22 studies indicated that obesity was significantly associated with the increased risk of hypothyroidism and thyroid dysfunction (OR = 1.86; 95% CI 1.63–2.11, P < 0.001).[23]

This study shows doubled risk of hyperlipidemia among obese group and this is logically explained by increased triglycerides (TG) and FFA, decreased HDL-C with HDL dysfunction and normal or slightly increased LDL-C with increased small dense LDL. The concentrations of plasma apolipoprotein (apo) B are also often increased, partly due to the hepatic overproduction of apo B containing lipoproteins. [24]

Surprisingly lowered risk of neurological disordered like parkinsonism, dementia and depression is found among obese group in contrast to many previous studies which showed Accumulating evidence demonstrates that the CNS and cognitive function are adversely affected by obesity. For example, a meta-analysis has shown a strong association between obesity and neurological disorders such as dementia and Alzheimer's disease (AD).Studies indicate that obesity doubles the risk of AD when compared to individuals of normal weight [25], but this may explained by deficiency of important nutrient among non obese especially in presence of other co-morbidities like DM.

Conclusion:

Obesity among elderly leads to increased risk of diseases as DM, Hypertension, thyroid disorders, Bronchial asthma, Arthritis, liver disease and hyperlipidemia while lower risk of osteoporosis, prostatic enlargement and some neurological disorders like depression and dementia and parkinsonism.

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Table 1: Descriptive data of the studied group

Variable	mean	Standard deviation
Age	74.81	15.03
Height	153.70	11.09
Weight	71.59	18.91
BMI	31.04	15.27
Waist circumference	106.15	19.33
Arm circumference	28.65	5.54
Calf circumference	31.78	7.10
		Number(percentage)
Gender	Male	154(38.5%)
	Female	246(61.5%)

Table 2: Health condition of the studied group and its relation to obesity

Disease		Obese(200) No.	%	Non Obese(200) No.	%	X^2	P	OR[95%CI]
DM 244(61%)	Yes	136	68	108	54	8.2	0.004	1.8[1.2-2.7]
	No	64	32	92	46			
Hypertension 260(65%)	Yes	140	70	120	60	4.3	0.036	1.55[1.02-2.35]
	No	60	30	80	40			
CKD 63(15.7%)	Yes	29	14.5	43	21.5	0.41	0.49	0.82[0.48-1.4]
	No	171	85.5	157	78.5			
IHD 88(22%)	Yes	45	22.2	43	21.5	0.05	0.81	1.06[0.66-1.7]
	No	155	77.5	157	78.5			
Heart Failure 37(9.3%)	Yes	20	10	17	8.5	0.26	0.6	1.19[0.6-2.3]
	No	180	90	183	91.5			
Cerebrovascular Diseases 90(22.5%)	Yes	39	19.5	51	25.5	2.05	0.15	0.7[0.44-1.13]
	No	161	80.5	149	74.5			
Enlarged Prostate 47(11.8%)	Yes	17	8.5	30	15	4.04	0.04	0.52[0.28-0.98]
	No	183	91.5	170	85			
Bronchial Asthma 26(6.5%)	Yes	17	8.5	9	4.5	2.6	0.1	1.97[0.85-4.5]
	No	183	91.8	191	95.5			
Arthritis 85(21.3%)	Yes	49	24.5	36	18	2.52	0.11	1.47[0.91-2.39]
	No	151	75.5	164	82			
Osteoporosis 59(14.8%)	Yes	31	15.5	28	14	0.17	0.67	1.12[0.64-1.96]
	No	169	84.5	172	86			
Chronic liver Disease 7(1.8%)	Yes	4	2	3	1.5	0.14	0.7	1.34[0.29-6.1]
	No	196	98	197	98.5			
Hyperlipidemia 5(1.3%)	Yes	5	2.5	0	0	5	0.02	2.02[1.83-2.2]
	No	195	97.5	200	100			
Thyroid disease 27(6.8%)	Yes	17	8.5	10	5	1.9	0.16	1.76[0.78-3.9]
	No	183	91.5	190	95			
Parkinsonism 15(3.8%)	Yes	3	1.5	12	6	5.6	0.018	0.23[0.66-8.5]
	No	197	98.5	188	94			
Dementia 47(11.8%)	Yes	12	6	35	17.5	12.7	<0.001	0.3[0.15-6]
	No	188	94	165	82.5			
Depression 10(2.5%)	Yes	2	1	8	4	3.6	0.05	0.24[0.05-1.15]
	No	198	99	192	96			