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Excessive Daytime Sleepiness among Obese People at Obesity Unit, Al-Kindy College of Medicine, 2018

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ABSTRACT

Background: *Excessive daytime sleepiness (EDS) is characterized by persistent sleepiness and often a general lack of energy during the day after apparently adequate or even prolonged nighttime sleep. EDS affects 12% of the normal population and reduces individual's performance capability and the accuracy of their short-term memory, additionally, it causes learning problems and hazardous events, such as car accidents.* ***Aim of the study:*** *The aim of our study was to find the relationship between EDS and obesity, differences between gender with EDS, and differences between age groups and EDS.* ***Sample and methods****: The study was done at the obesity unit, Al-Kindy Medical College. Total 200 people were interviewed, 100 with body mass index equal and more than 30 were considered as an obese group, and the others with body mass index less than 25 was considered as the control group, that are similar to an obese group in the age and gender. We were based on Body mass index (BMI) for assessment of obesity. And sleepiness assessment was based on (Epworth Sleepiness Scale) questionnaire.* ***Results:*** *Obese people with BMI ≥ 30 recorded (54%) of EDS and normal weight people with BMI<25 recorded 33% of EDS. The males group reported 43%, while females reported 44% of EDS. And people with age group younger than 35 years reported a higher percentage of EDS than people equal and older than 35 years.* ***Conclusion:*** *Our study suggests a strong relationship between EDS and obesity, and more increase in BMI; there is a higher risk of EDS that badly affect the daily life activities and productivity in work so we need to be more familiar with these conditions.*

Keywords: Excessive daytime sleepiness and obesity, Obese people, BMI

INTRODUCTION

Obesity is an abnormal or excessive fat accumulation that presents a risk to health. A simple population measure of obesity is the body mass index (BMI) (i.e. mean of a person's weight (in kilograms) divided by the square of his or her height (in meters)). A person with BMI below 18.5 kg/m^2 was considered as underweight, 18.5-24.9 kg/m^2 was considered as normal, 25-29.9 kg/m^2 was overweight, and 30 kg/m^2 and above was considered as obese [1]. According to (GHO) 2016 data in Iraq, 14.4% of children and adolescents aged (5-19 years) were obese, and 30.4% of the adult were obese.

Obesity has been found to be a predisposing factor for an increased risk for more than 30 chronic health conditions, which include: type 2 diabetes, high cholesterol, hypertension, gallstones, heart disease, fatty liver disease, sleep apnea, GERD, stress incontinence, heart failure, degenerative joint disease, and numerous cancers. In addition to the medical problem, obesity is also associated with numerous psychiatric problems, such as mood disorders, eating disorders and sleeping disorders [2].

Sleep, its physiological phenomena is characterized by unconsciousness from which the person can be aroused by sensory or other stimuli. It is to be distinguished from a coma, which is unconsciousness from which the person cannot be aroused. There are multiple stages of sleep, from very light sleep to very deep sleep. And sleep has many functions including, neural maturation, facilitation of learning or memory, cognition, clearance of metabolic waste products generated by neural activity in the awake brain, and conservation of metabolic energy. And the principal value of sleep is to restore natural balances among the neuronal centers [3].

Most people have a natural tendency to be more alert in the morning (morning people, early birds) or in the evening (evening people, night owls). So what is about the people that feel doze off at morning? It is the condition called Excessive daytime sleepiness (EDS) it is characterized by persistent sleepiness and often a general lack of energy, even during the day after apparently adequate or even prolonged nighttime sleep. EDS can be considered as a broad condition encompassing several sleep disorders where increased sleep is a symptom, or as a symptom of another underlying disorder like narcolepsy, sleep apnea or a circadian rhythm sleep disorder [4]. Excessive sleepiness is not a disorder itself; it is a serious symptom that can have many different causes. EDS affects 12% of the normal population and reduces individual's performance capability and the accuracy of their short-term memory [2]. Additionally, it causes learning problems and hazardous events, such as car accidents [5,6].

Objectives

The aim of our study was to find the relationship between EDS and obesity, and the differences between age and gender with EDS.

PATIENTS AND METHODS

The study design was a comparative cross-sectional study conducted at Obesity unit, Al-Kindy Medical College in 2018. Total 200 people were interviewed from 12, March 2017 to 5, March 2018. Total 100 persons with BMI equal and more than 30 kg/m^2 were included as the obese group and the others with BMI less than 25 kg/m^2 were included as the control group; that is similar to the obese group in age and gender. The assessment of obesity was based on Body mass index (BMI). The people whose BMI was between (25-29.9 kg/m^2) were excluded from the study, due to this stage it was considered as an unstable stage between obesity and normal weight, and our study was based on the obese group and healthy weight group. Also, the people who take sleep induction treatments were excluded. Sleepiness assessment was based on the Epworth sleepiness scale questionnaire which has been designed to determine the doze off in 8-different situations. Response to each item is ranged from (0-3) according to probability of dozing, (0=never doze), (1=slight chance of doze), (2=moderate chance of dozing), (3=high chance of dozing). Which resulted in total scores of 24 for questionnaire; a score of (0-5 was categorized as lower normal), (6-10=higher normal), (11-12=mild EDS), (13-15=moderate EDS), (16-24=severe EDS) [5].

Statistical Analysis

Statistical analysis was performed with SPSS version 17 for the window. Chi-square test was used to compare the qualitative data. Odds ratio (ORs) were also calculated to find the type of relationship between the quantitative data. The quantitative data were expressed as mean frequencies and qualitative data frequencies were calculated.

RESULTS AND DISCUSSION

The prevalence of EDS in our study recorded 54% in the obese group, while in the control group the prevalence was 33%, according to OR. There was a significant assosiation between BMI and EDS (OR=2.383), our records were in parrallel with the study done by Mokhber, S [7] (Table 1). The sleepiness prevalence was 29 (52.7%) in the obese group and 17 (30.9%) in the control group, while in other studies the prevalence of EDS among obese people were ranged from 4-31% [2,6]. Dixon's study showed that an average weight loss of 48% after bariatric surgery reduced the prevalence of daytime sleepiness from (39% preoperation to 4% post-operation) [8]. Our study reported there are gender differences in daytime sleepiness in relation to obesity, obese males group reported 58%, while obese females were 50%, but when we estimate EDS in general for gender we recorded there was no significant differences between gender in EDS, 43% for males and 44% for females, while in another study conducted by Doi, et al., prevalence of EDS in females was 13.3% and in males was 7.2% [9]. Differences in lifestyle situations play an important role in the result of our study and other studies, some people have habits which differ from others even if they are obese, when the data was collected it showed that some obese people were more active than non-obese and do not like to spend their time torpid, while other people told that their lifestyle situation changed after they become obese, they become more sleepy and feel sleepiness in every thing they do. In addition, several studies, including a cross-sectional survey by Kachikis, et al., have reported several socio-economic factors including, age, education, marital status and employment status associated with sleep characteristics such as short sleep and inadequate sleep [10].

Table 1 Distribution of frequencies and percentage of EDS among obese and non-obese, and it is a relation to age and gender

Parameters	EDS (+)	EDS (-)	Total
BMI ≥ 30 kg/m^2 (obese)	54 (54.0%)	46 (46.0%)	100 (100%)
BMI <25 kg/m^2 (control)	33 (33.0%)	67 (67.0%)	100 (100%)
Male (obese)	29 (58.0%)	21 (42.0%)	50 (100%)
Male (control)	14 (28.0%)	36 (72.0%)	50 (100%)
Female (obese)	25 (50.0%)	25 (50.0%)	50 (100%)
Female (control)	19 (38.0%)	31 (62.0%)	50 (100%)
Age <35years (obese)	33 (53.2%)	29 (46.8%)	62 (100%)
Age <35years (control)	22 (35.4%)	40 (64.5%)	62 (100%)
Age ≥ 35years (obese)	21 (55.3%)	17 (44.7%)	38 (100%)
Age ≥ 35years (control)	11 (29.0%)	27 (71.7%)	38 (100%)
**Odd Ratio (OR)=2.383,There is a significant association between BMI and EDS; *58% of obese male reported EDS, while (50%) of obese female reported EDS, regarding the control group, males reported (28%) in EDS, while the females reported (38%) in EDS			

According to Table 2, there was a statistically significant relationship between body mass index and daytime sleepiness (p=0.013), this means with increase in BMI there was higher risk for increase in EDS, as in the study done by Mokhber, S, while there was no significant relationship between age and gender with EDS (p>0.05).

Table 2 Chi-square tests for analyzing the relationship between BMI, gender and age groups with EDS

Parameter	Pearson chi-square (Asymp.sign.2-sided)
BMI2 and EDS	0.013
Gender and EDS	0.201
Age^2 and EDS	0.703
*P-value=0.013 this mean there is a statistically significant relationship between BMI2 and EDS; *there is no statistically significant relationship between age and gender with EDS; *BMI2:A categorical variable that divides BMI values into 2 values obese (with BMI ≥ 35 kg/m^2) and non-obese (with BMI<25 kg/m^2); *Age2: A categorical variable that divides age values into 2 values age group <35 years and age group ≥ 35 years	

In Table 3 we interpret the percentage of EDS in obese and control group, so the distribution of EDS among the obese group was 27 (27%) with mild EDS, 20 (20%) with moderate EDS, and 7 (7%) with severe excessive daytime sleepiness.

Table 3 Frequencies and percentage of the stages of daytime sleepiness of obese and non-obese people

BMI		Frequency	Percent
Obese (BMI ≥ 30 kg/m^2)	Lower normal	8	0.08%
	Higher normal	38	0.38%
	Mild EDS	27	0.27%
	Moderate EDS	20	0.20%
	Severe EDS	7	0.07%
	Total	100	1.00%
Non-obese (BMI <25 kg/m^2)	Lower normal	20	0.20%
	Higher normal	47	0.47%
	Mild EDS	15	0.15%
	Moderate EDS	16	0.16%
	Severe EDS	2	0.02%
	Total	100	1.00%
*Obese scored high percentage in the severity of EDS; *Mild scored recorded high percentage in obese (27%) while non-obese recorded high percentage (16%) in moderate EDS			

In Table 4, the prevalence of EDS in the age group younger than 35 years, in general, was 44.9%, while in the age group equal and older than 35 years the prevalence was 40.7%. In our study, we found male <35 years reported a high percentage of EDS (49.95%) than females (40%), while females with age group ≥ 35 years there was a high

prevalence (46.65%) more than males (34.75). Our study was in contrast with another study conducted by Hayley, AC, that reported high EDS percentage in older males (16%) than females (13%) [11].

Table 4 Distribution of frequencies and percentage of EDS in relation to age, gender, and BMI

Variables	EDS (+)	EDS (-)	Total
Age <35 (obese)Male	18 (66.6%)	9 (33.3%)	27 (100%)
Age <35 (obese) Female	15 (42.8%)	20 (57.1%)	35 (100%)
Age <35 (control) Male	9 (33.3%)	18 (66.6%)	27 (100%)
Age <35 (control) Female	13 (37.2%)	22 (62.9%)	35 (100%)
Age ≥ 35 (obese) Male	11 (47.8%)	12 (52.2%)	23 (100%)
Age ≥ 35 (obese) Female	8 (53.3%)	7 (46.6%)	15 (100%)
Age ≥ 35 (control) Male	5 (21.7%)	18 (78.2%)	23 (100%)
Age ≥ 35 (control) Female	6 (40.0%)	9 (60.0%)	15 (100%)
*Age group <35 years in general reported (44.9%) of EDS, while age group ≥ 35 reported (40.7%); *prevalence of EDS in males with age group <35 is 49.95% higher than females 40%; *prevalence of EDS in the age group ≥ 35 is higher in the female 46.65% than males 34.75%			

CONCLUSION

Our study suggests a strong relationship between EDS and obesity, more increase in BMI, there is a higher risk of EDS that badly affect productivity in work and daily life activities, therefore people and physicians need to be more familiar with obesity and EDS for careful assessment and specific treatment planning.

Recommendation

- Clinicians should offer or refer patients with a body mass index (BMI) of 30 kg/m^2 or higher to intensive, multicomponent behavioral interventions
- Also recommend that weight-loss and weight-maintenance therapies should include a reduced-calorie diet, increased physical activity, and behavioral therapy
- For researcher that wants to study this subject, taking a large sample size to reach the best result is advised

DECLARATIONS

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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