

Relation between Obesity and Erectile Dysfunction among Adult Men in a Clinic in Denpasar

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Abstract: Erectile dysfunction (ED) is defined as the persistent inability to achieve or maintain an erection adequate for satisfactory sexual activity. ED can be included as one of the causes for low quality in life of adult men. There are many etiologies and risk factors of ED, one of them is obesity. The purpose of this research is to find the relation between obesity and erectile dysfunction among adult men in Denpasar. This research has been done at Poly Sexology in SMC Sudirman Medical Center, Denpasar, Bali from the month of May till November 2019. Type of research design used is analytical with cross sectional method from the primary data. Samples for this research is adult men in Denpasar within the age of 25-49 years old is calculated by using consecutive sampling and has been decided to take 55 samples according to inclusion and exclusion criteria. Result from this research is done by using chi square and the p values = 0.005 and 95%CI (1,167-4,373) which shows there is significant correlation between obesity and erectile dysfunction.

Keywords: Erectile dysfunction (ED), overweight, obesity, adult men.

1. INTRODUCTION

According to World Health Organization (WHO), overweight or obesity is defined as “abnormal or excessive fat accumulation that presents a risk to health”.^[1] The standard definition of obesity is based on body mass index (BMI), a simple index of weight-per-height. People are considered obese when their BMI exceeds 30 kg m⁻² and overweight when it is below this value, but equal to or higher than 25 kg m⁻². It is becoming an epidemic problem in both developed and developing country.^[2] Indonesia is undergoing a nutrition transition as one-third of adults are now overweight or obese. A study shows between 1993 and 2014, the prevalence of overweight among adults doubled from 17.1% to 33.0%.^[3] Obesity causes major concerns because of the associated health problem that comes from being overweight or obese. Some of these health risks are major adverse cardiovascular events (MACE), type 2 diabetes mellitus, osteoarthritis, sleep apnoea, and certain types of cancer. Erectile dysfunction is considered as a complication of obesity.^[1]

Erectile dysfunction (ED) is defined as ‘the persistent inability to achieve or maintain an erection adequate for satisfactory sexual activity’.^[4] According to a study published in The Journal of Sexual Medicine, a total of 2,345 Italian male patients required treatment for sexual dysfunction between year 2001 and 2007. Among them, 41.5% were normal weight, 42.4% were overweight, 12.1% were obese, and 4% were severely obese.^[5] In another cross-sectional Massachusetts Male Aging Study and Health Professionals Follow-up Study cohorts showed that obesity doubles the risk of having ED.^[1] Obesity is also becoming a medical concern worldwide. Although many are aware of how obesity carries risks of developing diseases such as cardiovascular disease, diabetes and more, not many are aware of the relation between obesity and ED. Although many researches had done prior have proven some association between these two conditions, there is always room for more.^[6]

2. METHODOLOGY

This research was done using analytic research with cross sectional method to find the relation between obesity and erectile dysfunction among adult men in a clinic in Denpasar. Total samples taken were 55 samples by using consecutive sampling. This research was done among adult men with range of age within 25 to 49 years old. The samples were taken according to inclusion and exclusion criteria. The inclusion criteria in this research were respondents who are willing to

participate, who signed informed consent, adult men within the age from 25 to 49 years old, married, who lives in Denpasar, and respondent who are overweight and obese with a BMI value from 25 to 40. The exclusion criteria were respondent who didn't fill complete data. The data taken was primary data which is with personal data and a set of questionnaire. The obesity was measured by taking body weight and height of the respondent while the erectile functioning was measure using International Index Erectile Dysfunction (IIEF-5). Univariate variables are presented in the form of a frequency distribution table while bivariate variables are statistically tested using Chi Square test to see the relation between the variables. Statistical analysis for bivariate and univariate analysis was done using SPSS (Statistic Program for Social Science).

3. RESULTS

3.1 Distribution of Age

Distribution of age has been categories into 5 groups with an interval of 5 years as shown in the table 1. It shows that group with age between 45-49 years old with the total number of 16 respondents (29, 1%) is the largest number of samples.

TABLE 1: Distribution Samples Based on Age

Age	Frequency (n)	Percentage (%)
25-29	5	9,1
30-34	11	20,0
35-39	10	18,2
40-44	13	23,6
45-49	16	29,1
Total	55	100

3.2 Distribution of Obesity

Distribution of obesity has been categories by two groups which is respondent who are obese and non obese as shown in table 2. Based on table 2, it shows that research samples group which is obese is higher than the non obese group which is 58, 2%.

TABLE 2: Distribution Samples Based on Obesity

Obesity	Frequency (n)	Percentage (%)
Obese	32	58,2
Non Obese	23	41,8
Total	55	100

3.3 Distribution of Erectile Dysfunction

Erectile dysfunction has been categories into two groups which is ED and Non ED. The samples have been categories according to the score of IIEF-5. Based on the table 3, it shows that the proportion incidence of ED is higher than the non ED which is 52, 7%.

TABLE 3: Distribution Sample Based on Incidence of Erectile Dysfunction

Incidence	Frequency (n)	Percentage (%)
ED	29	52,7
Non ED	26	47,3
Total	55	100

3.4 Bivariate Analysis

Bivariate analysis has been done to find the relation between the variables in this research which is the relation between obesity and erectile dysfunction. The analysis is done by using chi-square test with 95% confidence interval (CI). Based on the table 4, we can conclude that obese samples have higher percentage of ED (68, 8%). Results of statistics test shows p values = 0,005 ($\alpha < 0.05$) which shows that there is significant relation between obesity and ED. Value of PR (Prevalence Risk) 2,259 (> 1) and value of 95% CI (1,167-4,373) is more than 1. This shows the risk of ED in obese is 2,259 greater than non obese samples.

TABLE 4: Relation between Obesity and Erectile Dysfunction

Characteristics	ED		No ED		Total		P	PR	95%CI
	N	(%)	N	(%)	N	(%)			
Obese	22	68,8	10	31,3	32	100	0,005	2,259	1,167-4,373
Non Obese	7	30,4	16	69,9	23	100			
Total	29	52,7	26	47,3	55	100			

n=frequency; PR =prevalence risk; 95% CI= confidence interval

4. DISCUSSION

This is because obesity causes elevated fatty acids which induce lipotoxicity and oxidative stress in peripheral tissues and inflammatory response in hypothalamus which is a control center of metabolism and reproduction. When there is inflammatory response in the hypothalamus, it disturbs the neuroendocrine regulation and maintenance of leptin sensitivity. Due to this disturbance in the hypothalamus, it decreases the secretion of gonadotropin-releasing hormone (GnRH) which reduces testosterone release causing erectile dysfunction.^[7]

Leptin resistance which is a characteristic of obesity can also affect the reproduction system. The mechanism responsible for the leptin resistance induced GnRH suppression is overexpression of agouti-related peptide and neuropeptide Y, which results from a lack of inhibition by leptin and leads to the suppression of GnRH secretion. Leptin has a stimulatory effect on GnRH and an inhibitory effect on testicular testosterone. When obese men have leptin resistance, there is no stimulatory effect of leptin on GnRH and there is inhibitory effect of leptin on testicular testosterone release. Besides that, another mechanism shows that elevated aromatase by hypertrophied adipose tissue increases the conversion of testosterone to estradiol and elevated estradiol suppresses GnRH in the hypothalamus via a negative feedback mechanism. This shows that obesity is negatively associated with testosterone level and erectile function.^[8]

Based on the research done by Ki Hak Moon, there is a connection between obesity and ED which is endothelial dysfunction. This is because of the obesity associated derangements such as inflammation, adipokines and oxidative stress.^[8]

Endothelial dysfunction is caused by decreased nitric oxide (NO). Decreased NO will cause difficulties in the dilation and constriction of smooth vessels in the endothelium. Elevated free fatty acids in obese men can induce reactive oxygen species (ROS) and suppress nitric oxide synthesis (NOS) through downregulation of 5'-adenosine monophosphate-activated protein kinase (AMPK)-phosphatidylinositol 3-kinase (PI3K)-eNOS pathway in the endothelium that results in decreased NO generation.^[8]

Free fatty acids in obese men can also induce inflammation by activating toll like receptors and triggering intracellular signaling molecules producing more proinflammatory cytokines in the blood. These proinflammatory cytokines can suppresses NOS/ NO pathway causing endothelial dysfunction.^[8]

Adipokines are adipose tissue-driven cytokines. When adipokine is dysregulated, it can result in the generation of ROS and induce endothelial dysfunction. Hypertrophied adipocytes can produce pro-inflammatory cytokines such as tumor necrosis factor-alpha (TNF- α) and interleukin-6. These cytokines cause inflammatory gene transcript in endothelial cells and suppresses eNOS expression causing endothelial dysfunction.^[8]

Adiponectin is abundantly found in adipocytes and the concentration is decreased in an obese state. Adiponectin has an anti-inflammatory effect on vascular endothelium. Adiponectin can reduce ROS induced by palmitate in endothelial cells. Thus decreased levels of adiponectin in obese men can induce proinflammatory cytokines causing endothelial dysfunction.^[8]

Therefore, obesity is a state of chronic oxidative stress and inflammation. This is because there will be increased oxidative stress in men who are obese which causes the free radical formation. This may cause the deactivation of nitric oxide (NO) resulting in negative impact on smooth muscles of the penis. This causes vasoconstriction and less blood supply to the penis inducing erectile dysfunction. This was also proven in a previous study where obese men who participated in a weight loss program with dietary modifications and increased physical activity experienced reduced oxidative stress associated with improved nitric oxide availability as nitric oxide can affect the pathogenesis of erectile dysfunction.^[7]

5. CONCLUSION

This research investigates the relation between obesity and erectile dysfunction among adult men in a clinic in Denpasar. Based on the research done it can be concluded that there is a significant relation between obesity and erectile dysfunction as the value of p value is 0.005 (95% CI =1,167-4,373). Further research has to be done to find the other risk factors of erectile dysfunction such as age and testosterone deficiency. Replication of this study in a large population-based sample is recommended to assess the stability of the findings.

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