

# RELATIONSHIP BETWEEN OVERWEIGHT AND OBESITY WITH LOWER URINARY TRACT SYMPTOMS (LUTS) DUE TO BENIGN PROSTATIC HYPERPLASIA IN PRE-ELDERLY: A PRELIMINARY STUDY

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## ABSTRACT

**Objective:** The purpose of this study is to find the relation between overweight and obesity with lower urinary tract symptoms due to benign prostatic hyperplasia in pre-elderly. **Material & Methods:** This analytical study was conducted in a cross sectional manner to 113 respondents. LUTS assessment uses the International Prostate Symptoms Score questionnaire. Measurements for overweight and obesity, this study uses the BMI and waist circumference methods. Fisher's exact test with SPSS v.25 was used for data analysis. **Results:** Results from data analysis showed that there was no significant relationship between overweight and obesity based on the BMI method on LUTS,  $p = 0.122$ . The results also showed a significant relationship between central obesity and LUTS,  $p = 0.003$ . **Conclusion:** Central obesity can be identified as a risk factor for LUTS while overweight and obesity based on the BMI method cannot be considered as a risk factor. These results can be used as education for pre-elderly to reduce the risk of LUTS due to BPH.

**Keywords:** Overweight, obesity, lower urinary tract symptoms, benign prostatic hyperplasia, pre-elderly.

## ABSTRAK

**Tujuan:** Penelitian ini bertujuan untuk mengetahui hubungan antara overweight dan obesitas terhadap lower urinary tract symptoms akibat pembesaran prostat jinak pada pra-lansia. **Bahan & Cara:** Penelitian ini merupakan penelitian analitik yang dilakukan secara potong lintang terhadap 113 responden. Penilaian LUTS menggunakan kuesioner International Prostate Symptoms Score, pengukuran overweight dan obesitas menggunakan metode IMT dan lingkar pinggang. Analisis data menggunakan uji Fisher dengan SPSS v.25. **Hasil:** Penelitian ini diperoleh responden dengan IMT overweight dan obesitas sebesar 48.67% dan responden dengan obesitas sentral sebesar 55.75%. Hasil analisis data menunjukkan tidak ada hubungan yang signifikan antara overweight dan obesitas berdasarkan metode IMT terhadap LUTS,  $p = 0.122$ . Hasil penelitian juga menunjukkan adanya hubungan yang signifikan antara obesitas sentral terhadap LUTS,  $p = 0.003$ . **Simpulan:** Obesitas sentral dapat disebut sebagai faktor risiko dari LUTS sedangkan overweight dan obesitas berdasarkan metode IMT tidak dapat disebut sebagai faktor risiko. Hasil ini dapat digunakan sebagai edukasi terhadap pralansia untuk mengurangi risiko terjadinya LUTS akibat PPJ.

**Kata Kunci:** Overweight, obesitas, lower urinary tract symptoms, pembesaran prostat jinak, pralansia.

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## INTRODUCTION

Overweight and obesity are problems which incidence increase every year. World Health Organization (WHO) states that in 2016 around 13% of adults worldwide were obese, this figure increased 3 fold from 1975.<sup>1</sup> Based on data obtained by the Indonesian Ministry of Health (RISKESDAS) in 2018 prevalence of obesity in adults is increasing

2.1% from the past 5 years.<sup>2-3</sup> The problems of overweight and obesity are often ignored, but in reality, these problems cause a huge socio-economic and health burden moreover this problem keep increasing as the country develops. Obesity is also known for major risk factor for numerous non-communicable diseases.<sup>4-5</sup>

Lower urinary tract symptoms (LUTS) is a common symptom found in adult patients, with an

estimated 2.3 billion individuals worldwide or about 45.8% of the world's population in 2018.<sup>6</sup> LUTS adversely affect health and quality of life.<sup>7</sup> In clinical settings the severity of LUTS can be measured by the International Prostate Symptoms Score (IPSS) questionnaire published by WHO.<sup>8</sup> The most common cause of LUTS is benign prostate hyperplasia<sup>9</sup>, this condition is very common in older male. This disease is associated with age and metabolic conditions including overweight and obesity.<sup>10</sup>

Population growth in Indonesia started a long time ago, life expectancy in Indonesia often increases every year. This has an impact in the number of pre-elderly which reached more than 44 million people in 2018.<sup>11</sup> Along with this increasing number, numerous health problems arise and deteriorate their quality of life. To this date, there is no studies about LUTS and obesity that separates the age of the subject based on the age range of 45 to 59 or categorized as pre-elderly.

## OBJECTIVE

This study aims to determine the relationship between overweight and obesity with LUTS due to BPH in the pre-elderly.

## MATERIAL & METHODS

This research is an analytic study which was conducted cross-sectionally. The study was

conducted from July to August 2020 on 113 male members of the Canisius College Jakarta High School Alumni Association who met the inclusion and exclusion criteria. Exclusion criteria in this study were respondents with a history of type 2 diabetes mellitus, urinary tract infections, malignant prostate cancer, urinary tract stones, history of stroke, taking diuretic drugs and IPSS score = 0. LUTS assessment uses the International Prostate Symptoms Score questionnaire which is filled out by each respondent, the measurement of overweight and obesity uses the BMI and waist circumference methods. Numerical variables were analyzed using Fisher's exact test with SPSS v.25.

## RESULTS

A total of 113 subjects were recruited for this study. Based on analysis it was found that the age group of subjects between 45–49 were 25 subjects (22.12%), 51 subjects (45.13%) were 50–54, and subjects between 55–59 were 37 (32.75%). The median value of the subject's age is 53 years old with the minimum age of 45 years old and a maximum age of 59 years old.

Data analysis shows that subject with underweight and normal nutritional status tend to have milder symptoms rather than subject with overweight and obesity nutritional status, they tend to have more severe symptoms. However, results from the analysis show that there were no significant relationship between overweight and obesity based on the BMI method with LUTS with  $p = 0.122$   $p > \alpha$ ).

**Table 1.** Characteristics of the subjects

Characteristic	n	%
Age (years), median (min-max)	53 (45–59)	
Age Group		
45–49	25	22.12
50–54	51	45.13
55–59	37	32.75
BMI, median (min-max)	24.9 (16.9–38.8)	
Underweight (<18.5)	2	1.78
Normal (18.5–24.9)	56	49.55
Overweight (25–29.9)	23	20.35
Obesity (>30)	32	28.32
Waist Circumference, median (min-max)	90 (60–129)	
< 90 cm	50	44.25
≥ 90 cm	63	55.75
IPSS, median (min-max)	4 (1–34)	
Mild (1–7)	91	80.53
Moderate (8–19)	16	14.16
Severe (20 – 35)	6	5.31
Total	113	100

**Table 2.** The Relationship Between Overweight and Obesity with LUTS.

		LUTS			<i>p</i>
		Mild	Moderate	Severe	
Body Mass Index	Underweight and Normal	51	5	2	0.122
	Overweight and Obesity	40	11	4	
	Total	91	16	6	
	< 90 cm	47	3	0	
Waist Circumference	≥ 90 cm	44	13	6	0.003
	Total	91	16	6	

Data analysis also shows that subjects with waist circumferences below 90 cm or without central obesity tend to have milder symptoms, in contrary subjects with waist circumferences that were greater than or equal to 90 cm tend to have more severe symptoms that can be classified as moderate and severe symptoms. The results of the analysis showed that waist circumference was related to LUTS with  $p = 0.003$  ( $p < \alpha$ ).

## DISCUSSION

According to the Centres for Diseases Control and Prevention (CDC), BMI is an indicator that can be used to classify weight based on several categories. This indicator can be associated to various diseases, but BMI itself cannot be used as a diagnostic tool to determine a person's body fat. In a study conducted by Li, et al. on 788 subjects, the results were in line with this study, that there is no correlation between obesity and LUTS. This research was conducted in September 2016 and lasted for 2 years. The difference with this study, Li did not classify subjects based on age group, by including all adult males over 53 years old to 93 years old, while in this study the focus was on the pre-elderly male. Then Bing Li also discussed the shortcomings that can cause bias in the assessment of overweight and obesity because it only uses the BMI method while other methods can be used to determine a person's overweight and obesity status.

Research by Sarma, et. al. obtained results that are not in line with this study. The study, which was conducted on 364 adult men, did not limit the age of the respondents as was done in this study, as well as the research conducted in Michigan, the United States, which had 100% of respondents with black race.<sup>12</sup> As for the study conducted in Asia by Lee, et al. also in line with this study where only

central obesity or obesity with the waist circumference method had a significant relationship with prostate volume, while BMI did not have a significant relationship with prostate volume with  $p = 0.687$ .<sup>13</sup>

The absence of a significant relationship between overweight and obesity based on the BMI method with LUTS could be caused by the inability of the BMI method in distinguishing a person's excess weight caused by muscle mass or fat mass. In addition, this can also occur because the accumulation of visceral fat has a worse effect on health than the accumulation of subcutaneous fat.<sup>14</sup>

According to the WHO waist circumference is a measurement method that can be used as a determinant of central obesity. With the principle of measuring abdominal fat, this method provide information on whether there is obesity. This method is known to reduce the bias in the determination of obesity by the BMI method. Lee, et al. studied 146 men over the age of 40 who had no history of comorbidities such as diabetes mellitus, hypertension, and dyslipidemia. The study found that men with high BMI ( $>25 \text{ kg/m}^2$ ) and normal waist circumference did not have a significant relationship with BPH, while men with high BMI and high waist circumference or abdominal obesity had a significant relationship with BPH. Thus, the study concluded that waist circumference is an independent risk factor for BPH.<sup>15</sup> The results of the study conducted by Lee, et al. is in line with this study.

Research conducted by Wang, et al. stated that there was a significant relationship between waist circumference of more than 90 cm and PPJ with  $p = 0.036$ . This study, which was conducted on 486 Taiwanese men, confirmed that a waist circumference of more than 90 cm is a risk factor for the occurrence of BPH and is estimated to increase

the risk of BPH up to 2 times more than men with a normal waist circumference.<sup>16</sup> In a study conducted by Kim, et al. The results were similar to this study and emphasized that waist circumference or central obesity alone had a relationship with prostate volume in PPJ while BMI had no relationship with prostate volume, this could be due to the BMI scale which could cause bias.<sup>17</sup>

The relationship between central obesity and LUTS is in accordance with the theory of low grade inflammation, which begins with excessive metabolism that continuous until it can't be compensated, which ultimately cause chronic inflammation throughout the body, including the prostate organ. This is also supported by the waist circumference measurement method that can detect the accumulation of visceral fat properly. As we know, excess fat accumulation in the body can cause insulin resistance which will have an impact on increasing IGF-1. IGF-1 is believed to initiate the growth process of hormone-related tumors such as prostate cancer.<sup>18</sup>

## CONCLUSION

Central obesity had a significant relationship with the severity of LUTS symptoms ( $p = 0.003$ ) while overweight and obesity based on the BMI method did not have a significant relationship ( $p = 0.122$ ). Further studies are required to confirm BPH diagnosis such as prostate volume from imaging studies, uroflowmetry, and PSA levels.

## REFERENCES

1. [WHO] World Health Organization. Obesity and overweight. Who International. 2019.
2. Kementerian Kesehatan. Riset Kesehatan Dasar 2013. Badan Penelitian dan Pengembangan Kesehatan Kementerian RI. 2013.
3. [Depkes RI] Departemen Kesehatan Republik Indonesia. Riset Kesehatan Dasar 2018. Badan Penelitian dan Pengembangan Kementerian Kesehatan RI. 2018.
4. Hadi H. Beban Ganda Masalah Gizi dan Implikasinya Terhadap Kebijakan Pembangunan Kesehatan Nasional. Universitas Gajah Mada. 2005.
5. Barasi ME. At a Glance Ilmu Gizi. Jakarta: Erlangga. 2007.
6. Zhang YA, Xu X. Prevalence, Burden, and Treatment of Lower Urinary Tract Symptoms in Men Aged 50 and Older: A Systematic Review of the Literature. SAGE Open Nursing. 2018.
7. Abrams, Paul, Kelleher CJ, Kerr LA, Rogers RG. Overactive Bladder Significantly Affects Quality of Life. The American Journal of Managed Care. 2000; 6(11): S80-90.
8. [AUA] American Urological Association International Prostate Symptoms Score. Urological Science Research Foundation.
9. Chapple C, Mcvay K, Roehrborn C. Male Lower Urinary Tract Symptoms (LUTS) An International Consultation on Male LUTS. Société Internationale D'Urologie. 2012.
10. Corona G, Vignozzi L, Rastrelli G, Lotti F, Cipriani S, Maggi M. Benign prostatic hyperplasia: a new metabolic disease of the aging male and its correlation with sexual dysfunctions. Int J Endocrinol. 2014; 2014: 329456.
11. [Depkes RI] Departemen Kesehatan Republik Indonesia. Riset Kesehatan Dasar 2013. Badan Penelitian dan Pengembangan Kementerian Kesehatan RI. 2013.
12. Sarma AV, Jaffe CA, Schottenfeld D, Dunn R, Montie JE, Cooney KA, et al. Insulin-like Growth Factor-1, Insulin-like Growth Factor Binding Protein-3, and Body Mass Index: Clinical Correlates of Prostate Volume Among Black Men. Departement of Urology, University of Michigan. 2002; 3: p. 362-7.
13. Lee SH, Kim JC, Lee JY, Kim JH, Oh CY, Lee SW, et al. Effects of Obesity on Lower Urinary Tract Symptoms in Korean BPH Patients. Asian Journal of Andrology. 2009; 6: 663-668.
14. Gopinath S, Ganesh BA, Manoj K, Rubiya. Comparision Between Body Mass Index and Abdominal Obesity for the Screening for Diabetes in Healthy Individuals. Indian Journal of Endocrinology and Metabolism 2012; 16: 441-442.
15. Lee S, Min HG, Choi SH, Kim YJ, Oh SW, Kim YJ, et al. Central Obesity as a Risk Factor for Prostatic Hyperplasia. Family Medicine Division, Pusan National University Hospital 2006; 1: 172-9.
16. Wang HH, Hsieh CJ, Lin KJ, Chu SH, Chuang CK, Chen HW, et al. Waist Circumference is an Independent Risk Factor for Prostatic Hyperplasia in Taiwanese Males. Asian Journal of Surgery 2012; 4: 163-7.
17. Kim GW, Doo SW, Yang WJ, Song YS. Effects of Obesity on Protate Volume and Lower Urinary Tract Symptoms in Korean Men. Korean Journal of Urology 2010; 5: 344-347.
18. Jung JH, Ahn SV, Song JM, Chang SJ, Kim KJ, Kwon SW, et al. Obesity as a Risk Factor for Prostatic Enlargement: A Retrospective Cohort Study in Korea. International Neurourology Journal 2016; 20: 321-328.