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THE RELATIONSHIP BETWEEN SITTING DURATION AND OBESITY OF ADMINISTRATIVE EMPLOYEES AT SULTAN AGENG TIRTAYASA UNIVERSITY

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ABSTRACT

Obesity in Indonesia has a prevalence of 31% according to 2018 Riskesdas data, while in the city of Serang the prevalence of obesity is 31.3%. Obesity can be influenced by several factors such as age, gender, physical activity and others. Administrative workers spend a lot of time sitting in front of computers, so they are at risk of obesity. This study aims to determine the prevalence of obesity and the relationship between sitting duration and obesity. This research uses a cross sectional study design. The respondents studied were administrative employees at Sultan Ageng Tirtyasa University. The sample was taken using stratified random sampling as many as 90 respondents who were divided into 9 faculties and 10 employees were taken per faculty. Data collection was carried out using digital scales, microtoises, questionnaire sheets and informed consent sheets and will be analyzed using the Chi-square test. The prevalence of obesity among Untirta administrative employees was 57.8% with the majority of respondents sitting for > 4 hours (84.4%). The relationship between sitting duration and obesity showed an OR of 1.4 (95% CI 0.4 - 4.5) and a p value of 0.5. Therefore, it was concluded that there was no statistically significant relationship between sitting duration and obesity in Untirta administrative employees.

Keywords: *Obesity, Sitting Duration, Administrative Employees.*

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INTRODUCTION

Obesity is a malnutrition problem that is still a major burden in various countries because it can affect economic, social, and next-generation development. According to data from the World Health Organization (WHO) in 2021, there were 1.9 billion cases of overweight and obesity, while the death rate due to overweight and obesity each year reached 2.8 million.[1-2] Based on basic health research data

(Riskesdas), the incidence of obesity in Indonesia, Banten Province, and Serang City continues to increase. The prevalence of obesity in Indonesia in 2018 was 31%, in Banten Province in 2018 it was 30.57%, and in Serang City in 2018 it was 31.30%.[3-6]

Obesity can be influenced by various factors including genetics, age, gender, hormones, diet, insufficient sleep, excessive stress, medical history, lack of physical activity, and sedentary behavior. In general, administrative workers work ± 8.5 hours per day with a sitting duration of around 5 - 6 hours per day. Sitting for more than 4 hours in administrative workers is included in sedentary behavior that can trigger obesity. Obesity can cause various things, such as hypertension, type 2 diabetes, dyslipidemia, cardiovascular disease, non-alcoholic fatty liver disease, Obstructive sleep apnea (OSA), osteoarthritis, cancer, psychosocial problems, and economic problems.[7-17]

Obesity assessment in adults can be measured by anthropometric status. Anthropometric status can be measured using several indicators, namely Body Mass Index (BMI), waist circumference, and skin folds.[10,12] Indonesia measures BMI using the Asia Pacific guidelines. BMI is measured by dividing body mass in kilograms (kg) by the square of height in meters (m^2). A person will be said to be obese if they have a BMI score> 25 kg / m^2.[7] The inconsistent results in previous studies made researchers interested in conducting research on the relationship between sitting duration and obesity in administrative employees at Sultan Ageng Tirtayasa University and finding out the sitting duration that affects obesity.

METHODS

This study is an observational analytical study to determine the Relationship between Sitting Duration and Obesity of Administrative Employees at Sultan Ageng Tirtayasa University. This study uses a cross-sectional study design. In this study, the independent variable is sitting duration, while the dependent variable is obesity. The population studied were administrative employees of the Rectorate, Faculty of Law, Faculty of Teacher Training and Education, Faculty of Engineering, Faculty of Agriculture, Faculty of Economics and Business, Faculty of Social Sciences, Faculty of Medicine and Postgraduate at Sultan Ageng Tirtayasa University. The sample was taken using stratified random sampling with a sample size of 90 employees so that each faculty and rectorate building would select 10 employee representatives. Data were taken using digital scales, microtoise, and questionnaire sheets. Data collected from the examination of anthropometric status, namely BMI and the results of the answers on the questionnaire sheets were checked for completeness and then processed using the SPSS version 27.0 application by editing, coding, and tabulating.

Data will be analyzed univariately and bivariately. The variables studied univariately are

presented in the form of frequency distribution and percentage for categorical variables, namely sitting duration, obesity in administrative employees, age, gender, diet, sleep patterns, physical activity, and length of service. Meanwhile, for the variables studied bivariately, namely the relationship between sitting duration and obesity in administrative employees of Sultan Ageng Tirtayasa University, the Chi-square test was used. This study uses individuals as respondents, so it requires ethical permission from the Ethics Committee of the Faculty of Medicine and Health Sciences, Sultan Ageng Tirtayasa University. This study has met ethical eligibility with letter number 11 /UN43.20/KEPK/2024.

RESULTS

This study was conducted in 9 locations consisting of 8 faculties (Faculty of Medicine and Health Sciences, Postgraduate, Faculty of Agriculture, Faculty of Teacher Training and Education, Faculty of Social and Political Sciences, Faculty of Law, Faculty of Economics and Business, Faculty of Engineering and 1 rectorate building at Sultan Ageng Tirtayasa University. Respondents in this study were 90 administrative employees of Sultan Ageng Tirtayasa University from various faculties and rectorates.

Based on table 1, it was found that most of the respondents were female (65.6%) with the largest age group in the ≥ 40 years group (52.2%) which was dominated by respondents who did not have a history of obesity in their parents (76.7%). As many as 57.8% of respondents are obese with the majority of respondents sitting for > 4 hours (84.4%), working period ≥ 7 years (77.8%), sufficient sleep duration (57.8%), excessive eating patterns (51.1%), and moderate to heavy physical activity (82.2%). For more details, see table 1 below:

Table 1. Univariate analysis on administrative staff of Sultan Ageng Tirtayasa University

Variables	Frequency (n)	Percentage (%)
Sitting Duration		
> 4 hours	76	84,4%
≤ 4 hours	14	15,6%
Obesity in Administrative Employees		
Obese	52	57,8%
Not Obese	38	42,2%
Genetic		
Both Parents	3	3,3%
One of the parents	18	20%

No history	69	76,7%
Age		
≥40 years old	47	52,2%
<40 years old	43	47,8%
Gender		
Male	31	34,4%
Female	59	65,6%
Dietary Habit		
Excessive	46	51,1%
Poor	44	48,9%
Sleep Pattern		
<7 hours	38	42,2%
≥7 hours	52	57,8%
Physical Activity		
Light	16	17,8%
Moderate – Vigorous	74	82,2%
Years of service		
≥ 7 years	70	77,8%
< 7 years	20	22,2%

Source: Raihana Fitri, 2024

The relationship between sitting duration and obesity was assessed by bivariate analysis using the Chi-square test. Based on Table 2, using the Chi-square analysis, the results of a statistically insignificant relationship between sitting duration and obesity in Untirta administrative employees were obtained with an OR value of 1.4 (95% CI 0.4 - 4.5) (p = 0.5). Complete data can be seen in table 2 below:

Table 2. Relationship Between Sitting Duration and Obesity in Administrative Employees of Sultan Ageng Tirtayasa University

Sitting Duration	**Obesity in Administrative Employees**				**Total**		***p value***	**OR (95% CI)**
	Obese		**Not Obese**					
	n	**%**	**n**	**%**	**N**	**%**		
> 4 hours	45	59,2%	31	40,8%	76	84,4%	0,5	1,4 (0,4 – 4,5)
≤ 4 hours	7	50%	7	50%	14	15,6%		

Total	**52**	**57,8%**	**38**	**42,2%**	**90**	**100%**

Source: Raihana Fitri, 2024

DISCUSSION

In this study, it was found that most administrative employees of Sultan Ageng Tirtayasa University were obese, as many as 57.8%. The results of this study were higher than previous studies conducted by Zubery, et al[19], which stated that there were 37.8% of workers who were obese. This could be due to differences in respondent characteristics where in Zubery's study the respondents consisted of hospital employees, school employees and bank employees. In another study conducted by Djohan[20], it was stated that there were 50.2% of employees who were obese. Obesity can be influenced by several things, namely genetics, age, gender, environmental influences, diet, sleep patterns, physical activity, sedentary behavior, stress, and medical history.[8]

The high number of employees who sit for more than 4 hours is because administrative employees of Sultan Ageng Tirtayasa University spend most of their working time sitting in front of a computer. These results are in line with the results of previous research conducted by Wibowo, et al[21] which stated that the duration of sitting in office workers is mostly more than 4 hours. Another study conducted by Bailey[22] stated that the duration of sitting by office workers at the university averaged 6.4 hours/day. The duration of sitting is influenced by several factors, namely age, gender, individual factors (mental demands), length of service and work time, type of work, workload, and work facilities.[22-25]

In this study, it was found that sitting duration of more than 4 hours did not affect the occurrence of obesity. These results are in line with previous research conducted by Walukouw, et al[26] which stated that there was no relationship between sedentary behavior and body mass index in structural and administrative employees. However, the results of this study are inversely proportional to previous research conducted by Al Rahmad[27] which stated that sedentary behavior has a 4.6-fold risk of experiencing obesity. Sitting duration is not related to obesity due to many factors such as genetics, age, gender, environmental influences, diet, sleep patterns, physical activity, stress, and medical history.[8,26-27]

Most respondents in this study did not have a history of obesity in their parents (76.7%), but there were 3 workers who were obese and had both obese parents (100%) and 14 workers who had one obese parent (77.8%). These results are in line with previous research conducted by Lubis, et al[28] which stated that 83.3% of people who are obese have a hereditary factor of obese parents. According to the

Ministry of Health of the Republic of Indonesia, the risk of obesity in someone with both obese parents is 70 - 80%, while if only one parent is obese, the risk of someone experiencing obesity is 40 - 50%.[7]

In this study, it was found that most employees were aged ≥ 40 years (52.2%). This result is different from previous research conducted by Wibowo, et al[21], in which the majority of employees were aged 30 - 39 years. Based on data on the number of workers from the Banten provincial central statistics agency in 2022, the largest number was in the 40 - 44 year age range, as many as 20,173 workers.[29]

Most of the administrative staff of Sultan Ageng Tirtayasa University are female (65.6%). These results are in line with previous research conducted by Wibowo[21] which found that 59.4% of employees are female. Based on the 2023 Indonesian health survey, the prevalence of obesity in women was 31.2%, much higher than the prevalence of obesity in men, which was 15.7%. The higher prevalence of obesity in women may be caused by differences in the growth hormone (GH) axis and insulin-like growth factor-1 (IGF-1) in women, which makes women more susceptible to obesity than men. In addition to hormonal differences, women will experience menopause, which in this condition will result in a decrease in estrogen levels, increasing the incidence of obesity.[30-32]

The eating patterns of administrative employees at Untirta are in the over category, which is 51.1%. These results are in line with previous research conducted by Sary, et al[33] in 2021 on secretariat employees and it was found that there were 56.9% of employees who had the habit of consuming excessive food. Eating patterns can affect the relationship between sitting duration and obesity where workers with excessive eating patterns can increase the risk of obesity. This is because excessive food consumption will cause excessive calorie intake, increased sugar intake, and increased fat intake.[8]

The sleep patterns of Untirta administrative employees mostly lasted ≥7 hours per night (57.8%). The results of this study are in line with the results of previous research conducted by Fadlina[34] which stated that 61.4% of adults in Indonesia have a sleep duration of ≥ 7 hours. This is different from previous research conducted by Prakoso[35] which stated that 65.9% of education personnel have poor sleep quality. According to Shim[36], sleep duration can be influenced by age, comorbid diseases, and depression. The age group <40 years has a longer sleep duration, the more comorbid diseases and depression a person has, the shorter their sleep duration. In addition, sleep patterns can affect the relationship between sitting duration and obesity in Untirta administrative employees because people who sleep less than 7 hours will have an increased risk of obesity due to disruption of the hormones ghrelin and leptin which have an impact on increasing excessive hunger. So, people who sleep less than 7 hours will feel hungry when they wake up and will overeat.[7-8,36]

In this study, 82.2% of employees had moderate-heavy physical activity. These results are in accordance with previous research conducted by Ekawati, et al[37] which stated that the majority of

university employees had moderate physical activity of (72.73%) and high physical activity of (20.45%). This is due to the many activities outside of working hours, such as on holidays where workers tend to clean the house, walk, and do physical exercise. Every week a person must do repeated physical activity (aerobics) for at least 60 minutes to reduce the risk of obesity.[7-8]

The length of service of administrative employees of Sultan Ageng Tirtayasa University is mostly ≥ 7 years (77.8%). These results are in accordance with previous research conducted by Kurniawati[38], which found that 60% of administrative employees have a working period of 6-15 years. The relationship between sitting duration and obesity can be influenced by the length of service of administrative employees of Untirta because employees with a working period of ≥ 7 years will increase the risk of obesity because they will sit for a long time compared to workers with a working period of <7 years.[39]

CONCLUSION

In this study, the prevalence of obesity in administrative employees of Sultan Ageng Tirtayasa University was 57.8%. The proportion of administrative employees at Sultan Ageng Tirtayasa University who had a sitting duration of > 4 hours was 76 out of 90 employees with a prevalence of 84.4%. The results of this study showed an insignificant relationship (p = 0.5) between sitting duration and obesity in administrative employees of Sultan Ageng Tirtayasa University so that sitting duration of more than 4 hours did not affect the occurrence of obesity in administrative employees at Sultan Ageng Tirtayasa University.

REFERENCE

1. Malnutrition [Internet]. WHO; 2021 [2021 Jun 9, cited 2023 Nov 21]. Available from: https://www.who.int/news-room/fact-sheets/detail/malnutrition
2. Obesity and overweight. WHO; 2021 [updated 2021 Jun 9, cited 2023 Nov 18]. Available from: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
3. Kemenkes RI. Hasil riset kesehatan dasar tahun 2018. Kementerian Kesehat RI. 2018;53(9):1689–99.
4. Departemen Kesehatan RI. Laporan hasil riset kesehatan dasar (riskesdas) provinsi banten tahun 2007. Badan Penelit dan Pengemb Kesehat RI. 2009;
5. Kementerian Kesehatan RI Banten. Riskesdas dalam angka provinsi banten 2013. 2013;320.
6. Kementerian Kesehatan Republik Indonesia. Laporan provinsi banten riset kesehatan dasar 2018. Badan Penelit dan Pengemb Kesehat. 2019;575.
7. Kementerian Kesehatan Republik Indonesia. Fact sheet obesitas. Epidemi obesitas. Kementerian Kesehatan Republik Indonesia; 2021. p. 1–8.
8. Overweight and obesity [Internet]. NHLBI; 2022 [updated 2022 Mar 24, cited 2023 Nov 22]. Available from: https://www.nhlbi.nih.gov/health/overweight-and-obesity

9. Sugandhi A, Widianti I, Muliani, Yuliana. Hubungan perilaku sedentary terhadap indeks massa tubuh dan lingkar pinggang pada mahasiswa program studi sarjana kedokteran universitas udayana angkatan 2019-2020. 2022;11(4).
10. Hall JE, Hall ME. Guyton and Hall: textbook of medical physiology. 14th ed. Elsevier. 2021. 241 p.
11. Feingold KR. Obesity and dyslipidemia. [Updated 2023 Jun 19, cited 2023 Nov 26]. In: Feingold KR, Anawalt B, Blackman MR, et al., editors. Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000-.
12. CDC. Anthropometry procedures manual. Natl Heal Nutr examinatory Surv. 2007;(January):102:Accessed:January 2017.
13. Powell-Wiley TM, Poirier P, Burke LE, Després JP, Gordon-Larsen P, Lavie CJ, et al. Obesity and cardiovascular disease a scientific statement from the american heart association. Vol. 143, Circulation. 2021
14. Godoy-Matos AF, Silva Júnior WS, Valerio CM. NAFLD as a continuum: From obesity to metabolic syndrome and diabetes. Diabetol Metab Syndr. 2020;12(1):1–20.
15. Maratos-Flier E. Obesity. In: Melmed S, Auchus R, Goldfine A, Koenig R, Rosen C, editors. Williams textbook of endocrinology. 14th ed. Elsevier; 2020. 1567 p.
16. Nedunchezhiyan U, Varughese I, Sun ARJ, Wu X, Crawford R, Prasadam I. Obesity, inflammation, and immune system in osteoarthritis. Front Immunol. 2022;13(July):1–19.
17. Friedenreich CM, Ryder-Burbidge C, McNeil J. Physical activity, obesity and sedentary behavior in cancer etiology: epidemiologic evidence and biologic mechanisms. Mol Oncol. 2021;15(3):790–800
18. Overweight and obesity [Internet]. CDC; 2022 [updated 2022 Jul 15, 2023 Nov 22]. Available from: https://www.cdc.gov/obesity/index.html
19. Zubery D, Kimiywe J, Martin HD. Prevalence of overweight and obesity, and its associated factors among health-care workers, teachers, and bankers in Arusha City, Tanzania. Diabetes, Metab Syndr Obes. 2021;14:455–65.
20. Djohan WH. Hubungan antara perilaku sedentari dan asupan makan dengan kejadian obesitas pada karyawan di universitas lampung. 2018
21. Wibowo H, Rahmanto S, Lubis ZI. Hubungan durasi duduk dengan fleksibilitas otot hamstring pada pegawai di rsud ngimbang. 2023
22. Bailey DP. Sedentary behaviour in the workplace: Prevalence, health implications and interventions. Br Med Bull. 2021;137(1):42–50.
23. Mackenzie K. “Sit Less at Work”: exploring contextual factors which influence intervention development, implementation and evaluation. The University of Sheffield; 2021.
24. Niklasson J, Fagerström C, Bergman P, Lindberg T, Backåberg S. The meaning of sedentary behavior among older adults: a phenomenological hermeneutic study. BMC Public Health. 2023;23(1):1–9.
25. Rachman SBP. Faktor determinan terhadap stres kerja pada pekerja bagian produksi di PT Indogravure tahun 2017. Universitas Islam Negeri Syarif Hidayatullah; 2017.
26. Walukouw CSJ, Lampah C, Gessal J. Hubungan perilaku sedentary dengan indeks massa tubuh dan tekanan darah serta denyut jantung pada pegawai struktural dan administratif RSUD Provinsi Sulawesi Utara. e-CliniC. 2019;8(1):132–6.
27. Al Rahmad AH. Sedentari sebagai faktor kelebihan berat badan remaja. J Vokasi Kesehat. 2019;5(1):16–21.

28. Lubis MY, Hermawan D, Febriani U, Farich A. Hubungan antara faktor keturunan, jenis kelamin dan tingkat sosial ekonomi orang tua dengan kejadian obesitas pada mahasiswa di universitas malahayati tahun 2020. 2020
29. Penduduk usia 15 tahun ke atas yang bekerja menurut golongan umur dan lapangan pekerjaan utama (jiwa), 2022. Badan Pusat Statistik Provinsi Banten; 2022
30. Kapoor N, Arora S, Kalra S. Gender disparities in people living with obesity-An unchartered territory. J Midlife Health. 2021;12(2):103–7.
31. Asgharihanjani N, Vafa M. The role of IGF-1 in obesity , cardiovascular disease , and cancer. 2019;2019:1–4.
32. Kementrian Kesehatan Republik Indonesia. Survei Kesehatan Indonesia (SKI). 2023;
33. Sary NL, Rahmawati S, Husnah, Saminan. Hubungan kebiasaan konsumsi makanan dengan status gizi pegawai sekretariat daerah kabupaten Aceh Barat. J Kedokt Syiah Kuala. 2021;21(1):21–8.
34. Fadlina A, Anwar K. Association between Sleep Quality with Overweight / Obesity and Other Factors among Adults in Indonesia Post-COVID-19 Pandemic. 2024;9(1):29–37.
35. Prakoso D, Setyaningsih Y, Kurniawan B. Hubungan karakteristik individu, beban kerja, dan kualitas tidur dengan kelelahan kerja pada tenaga kependidikan di institusi kependidikan x. J Kesehat Masy. 2018;6(2):2356–3346.
36. Shim J, Kang SW. Behavioral Factors Related to Sleep Quality and Duration in Adults. J Lifestyle Med. 2017 Jan;7(1):18-26.
37. Ekawati FF, Rahayu TW, Prasetyo HJ. Level aktivitas fisik dan faktor risiko penyakit kardiovaskuler pada karyawan kantor di universitas. J Keolahragaan. 2020;8(2):166–73.
38. Kurniawati T. Pengaruh Masa Kerja Dan Tingkat Pendidikan Terhadap Kinerja Karyawan Di Lingkungan Yayasan Pendidikan Galuh Ciamis. J Manag Rev. 2020;4(3):543
39. Lustig RH, Collier D, Kassotis C, Roepke TA, Ji Kim M, Blanc E, et al. Obesity I: Overview and molecular and biochemical mechanisms. Biochem Pharmacol. 2022;199:1–61.