

## PROFIL KEBUGARAN JASMANI PETUGAS KEBERSIHAN DI UNIVERSITAS: SERI KASUS

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### ABSTRAK

Salah satu profesi yang menuntut fisik dan profil kardiorespirasi yang baik adalah seorang petugas kebersihan, yang sangat dibutuhkan di sebagian besar sector, namun kesejahteraannya jarang mendapat perhatian. Tujuan dari penelitian ini adalah untuk memberikan gambaran profil kardiorespirasi petugas kebersihan di kalangan perguruan tinggi, khususnya Universitas Indonesia. Dalam program pengabdian masyarakat berjudul “Fakultas Kedokteran Universitas Indonesia Peduli 2019”, peneliti melakukan studi deskriptif dengan melibatkan 7 orang partisipan yang berprofesi sebagai petugas kebersihan. Wawancara singkat serta pemeriksaan fisik dan penilaian kardiorespirasi sederhana dengan metode uji jalan 6 menit dilakukan. Hasilnya, subjek perempuan menunjukkan hasil yang lebih baik pada uji jalan 6 menit, Kapasitas fungsional pernapasan untuk laki-laki dan perempuan mendapatkan skor lebih rendah dari normal (FEV1 58.00±18%; FVC 59.71±8.71%; FEV1/FVC87.29±10%). Simpulan, Petugas kebersihan berisiko pensiun dini, dan tidak dapat bekerja dengan baik tanpa pemberian intervensi komprehensif dan jangka panjang. Hal ini dapat menjadi sasaran bagi program Rehabilitasi bagi Pekerja.

**Kata kunci:** kardiorespirasi, petugas kebersihan, rehabilitasi bagi pekerja, obesitas, kebugaran jasmani

### ABSTRACT

*One of the professions that demands a good physical build and cardiorespiratory profile is cleaners, who are needed in most sectors, but rarely get attention on their well-being. It is our aim to give a picture of the cleaners' cardiorespiratory profile among universities, particularly Universitas Indonesia. During a community engagement program titled “Fakultas Kedokteran Universitas Indonesia Peduli 2019” we conduct a descriptive study using 7 cleaners as participants. A brief interview, physical examination, and simple cardiorespiratory assessment using the 6-minute walking test method were done. As the results, female subjects showed a better result in the 6-minute walking test. The functional capacity of respiratory for both genders scored lower than normal (FEV1 58.00±18%; FVC 59.71±8.71%; FEV1/FVC87.29±10%). Conclusion, the cleaners were in a risk of getting retired prematurely, and would not perform well when there is no comprehensive and long-term intervention given. This condition could be the target for Occupational Rehabilitation.*

**Keywords:** cardiorespiratory, cleaners, occupational rehabilitation, obesity, physical fitness

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**Introduction**

Healthy being of a person is not exclusively related to their own self, rather adhere to a place where they live within, throughout their daily life. It is lived and created in their individual/communal settings where they naturally work, learn, love, and play. This insight as stated by the Ottawa Charter for Health Promotion has already become a principle in perceiving one's health, to give more attention of their life activity setting.<sup>1</sup> A place to start a workplace health promotion was in a workplace, including efforts to improve the health and wellbeing of people at work by employers, employees, and society.<sup>2</sup>

Cleaning is a common job performed in all sectors and workplaces, indoors and outdoors, in private companies, and also in public places. This includes a broad range of cleaning activities, such as removing waste, sweeping, or cleaning toilets. Cleaning is physically demanding and labor-intensive work as the cleaners have to perform various types of tasks during one work shift. Cleaning tasks is one of the strenuous jobs and demands cardio-respiratory systems.<sup>3,4</sup>

Psychosocial stressors, occupational noises, and shift work are factors in the working environment that are related to cardiovascular diseases. Recently, the high demands of physical work have been shown to increase the risk of cardiovascular disease and mortality.<sup>5-7</sup> This may be explained by upper limb activity increasing heart rate and blood pressure at the same absolute intensity as during lower limb activity.<sup>8,9</sup> Cleaners are an occupational group with a high prevalence of cardiovascular disease, hypertension, and obesity, which corresponds with the high demands of physical work and low cardiorespiratory fitness.<sup>10-12</sup>

The objective of this paper is to describe the physical fitness profile of

cleaning service workers at University in Depok, which will be a reference in developing an Occupational Rehabilitation program, especially for physical fitness improvement among the cleaners.

**Case Report**

A descriptive study was carried out on 7 cleaners of the Universitas Indonesia in "Fakultas Kedokteran Universitas Indonesia Peduli" event on November 2<sup>nd</sup>, 2019. The subjects were tested for cardiorespiratory endurance using 6 minutes walking test (6MWT) and lung function using Micro Lab Spirometer. In Indonesia, job applicants are usually asked to provide a health certificate containing a resume of a body examination of the structure and function of the body. These health standards refer to the clinical values of several basic body parameters, namely vital signs; blood pressure, temperature, respiratory rate, and heart rate. And also the general status of the heart, lungs, abdomen, and muscle strength. Meanwhile, physical fitness is rarely assessed. So in general, healthy applicant is not necessarily fit. Based on these considerations, we chose to use the 6MWT which can evaluate physical fitness. Physical fitness will reflect the performance of some body systems, especially cardiovascular and respiration. The spirometer is used to show the condition of the lungs by measuring the amount of air in one second and the total volume of air in one forced breath when a patient exhales<sup>13,14</sup>. The 6MWT was performed in the indoor arena, on a 15 meters track. The body weight and body height were measured before the test. The heart rate, blood pressure, oxygen saturation, and Borg Scale were assessed before and after the test. The walking distance in 6 minutes was recorded. There is no ethical issue considered in this study, therefore no ethical clearance is needed.

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There were 7 cleaners (4 women and 3 men) who participated in the study with an average age of  $27.29 \pm 9.86$  years old. The average Body Mass Index (BMI) was  $29.26 \pm 9.94$  which is categorized as obese. The systolic and diastolic blood pressure was normal ( $119.71 \pm 23.42$  mmHg and  $78.86 \pm 14.01$  mmHg). The average result from the six-minute walking distance was  $440 \pm 53.86$  meters in male subjects and  $462 \pm$

$54.00$  meters in female subjects. The lung function results from spirometry were all below normal (FEV1  $58.00 \pm 18\%$ ; FVC  $59.71 \pm 8.71\%$ ; FEV1/FVC  $87.29 \pm 10\%$ ). The subject characteristics and cardiac findings (including blood pressure and six minutes walking distance) are shown in Table 1, meanwhile, their respiratory profiles are shown in Table 2

**Table 1.** Subject Characteristic and Cardiac Profile

Characteristics	n or mean $\pm$ SD	Percentage
Age (years)	$27.29 \pm 9.86$	
Gender		
Man	4	57.1 %
Woman	3	42.9%
BMI (kg/m <sup>2</sup> )	$29.26 \pm 9.94$	
Blood Pressure (BP)		
Systolic BP (mmHg)	$119.71 \pm 23.42$	
Diastolic BP (mmHg)	$78.86 \pm 14.01$	
Six Minute Walking Distance (meters)		
Man	$440 \pm 53.86$	
Woman	$462 \pm 54.00$	

**Table 2.** Subject Respiratory Profile

Items	n or mean $\pm$ SD	Percentage
Spirometry Parameters		
FEV1	$58.00 \pm 18$	
FVC	$59.71 \pm 8.71$	
FEV1/FVC	$87.29 \pm 10$	
Smoking History		
Yes	4	57.1 %
No	3	42.9%
Past History of Lung Disease (Asthma, COPD, Tuberculosis)		
Yes	0	0%
No	7	100%
History of Air Pollution Exposure		
Yes	0	0%
No	7	100%

**Discussion**

This study shows that the average BMI among university cleaners was  $29.26 \pm 9.94$  kg/m<sup>2</sup> which was categorized as obesity on the Asia-

Pacific scale. This finding is also the same with the Finnish studies and Danish studies among cleaners. Their studies show that when compared to the general

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population, the BMI of cleaners is above average, which is a risk factor for musculoskeletal diseases, metabolic disorders, cardiovascular diseases, and diabetes. In several cases, tension and stress caused by work were very high, causing the cleaners cannot be fully recovered after work, which in the long term could lead to permanent fatigue. In this study, it was found that less physical discomfort was experienced with the increased physical capacity, and that poor physical fitness is one of the predictors for early retirement of cleaners.<sup>3,4,15</sup>

The six-minute walking test result showed that the functional capacity of the subjects is poor for male subjects and normal for female subjects. This is probably due to two main things; first is a higher normal value of 6mwt distance for males than females, second is poor lung function of the male subject.

The walking distances in this study were  $440 \pm 53.86$  meters in male subjects (normal value for Indonesian male subjects is  $\geq 483$  meters) and  $462 \pm 54.00$  meters in female subjects (normal value for Indonesian female subjects is  $\geq 442$  meters)<sup>16</sup>. The females walked significantly shorter distances than the males. The difference of 6MWT distance in men and women is related to fundamental anthropometric differences such as age, height, and body mass index. Possibly because the males were taller and had higher levels of physical activity and a greater muscle mass. Hence, the normal value of 6mwt distance is greater in males than females.<sup>17</sup>

The lung function of all the subjects showed a poor result for FEV1, FVC, and FEV1/FVC. This is in accordance with several previous studies which stated that the increase in BMI was in line with the restrictive effect on breathing<sup>18</sup>, in relation to the average weight of the subject which categorized

as obese. And based on the anamnesis, all-male subjects have smoking habits without a history of lung disease or air pollution exposure from home and work environment. A thorough physical and supportive examination, as well as comprehensive physical activity assessments, are suggested for further study.

The results were similar to a prior study among cleaners in the Faculty of Medicine Universitas Padjadjaran. This study showed that 50% of the 30 cleaners have poor physical fitness. All the subjects rarely did exercise and have a sedentary lifestyle.<sup>19</sup>

Cleaning activity is not an intensive physical activity that might improve cardio-respiratory fitness, so it is strongly recommended that cleaners should engage in sport and exercise with at least moderate intensity. On the other hand, a moderate to a high degree of cardiovascular fitness and a physically-active lifestyle were associated with reduced risk factors for coronary artery disease, cerebrovascular disease, metabolic syndromes (e.g., obesity, hypertension, hyperglycemia, and hyperlipidemia), and overall morbidity and mortality.<sup>20-22</sup>

The workplace is an excellent location to promote health, especially because employees spend more time at their workplaces than at any other location. The starting point for health-related interventions is behavioral prevention by encouraging people to have healthier lifestyles through increased physical activity, healthier nutrition, or improved stress management training. On the other hand, there are starting points applied in the environment which is relational prevention. In the workplace, the combination of physical activity and nutrition interventions shows the greatest effects in preventing overweight-induced morbidity and

mortality, as well as reducing absenteeism and increasing job satisfaction.<sup>23-25</sup>

### Conclusion

It can be concluded that the physical fitness of the cleaners in Universitas Indonesia was poor, and there are some recommendations needed in order to increase physical fitness. One of the recommendations is the Community-Based Rehabilitation (CBR) program that focused on physical fitness improvement. However, the study using more subjects from different work environments, such as industries, offices, schools, shops, hospitals, and homes, may be needed.

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### References

1. Potvin L dan Jones CM. 2011. Twenty-five years after the Ottawa charter: The critical role of health promotion for public health. *Canadian Journal of Public Health*. 102(4):244–248. <https://doi.org/10.1007/bf03404041>
2. Strandmark KM. 2016. The Concept of Health and Workplace Health Promotion by Empowerment and Parallel Pracks. *Health Systems and Policy Research*. 03(04):1–5. <https://doi.org/10.21767/2254-9137.100057>
3. Brooks C et al. 2020. Respiratory health in professional cleaners: Symptoms, lung function, and risk factors. *Clinical and Experimental Allergy*. 50(5):567–576. <https://doi.org/10.1111/cea.13597>
4. European Agency for Safety and Health at Work. 2009. *The occupational safety and health of cleaning workers*. In E. Brun (Ed.). Publications Office. <https://doi.org/10.2802/21855>
5. Clays E et al. 2013. The association between leisure time physical activity and coronary heart disease among men with different physical work demands: A prospective cohort study. *European Journal of Epidemiology*. 28(3):241–247. <https://doi.org/10.1007/s10654-013-9764-4>
6. Holtermann A, Marott L, Gyntelberg. 2012. Occupational and leisure time physical activity: Risk of all-cause mortality and myocardial infarction in the Copenhagen City Heart Study. A prospective cohort study. *BMJ Open*. 2(1). <https://doi.org/10.1136/bmjopen-2011-000556>
7. Torquati L, Mielke GI, Brown WJ, Kolbe-Alexander T. 2018. Shift work and the risk of cardiovascular disease. A systematic review and meta-analysis including dose-response relationship. *Scandinavian Journal of Work, Environment and Health*: 44(3):229–238.

- <https://doi.org/10.5271/sjweh.3700>
8. Astrand I, Guharay A, & Wahren J. 1968. Circulatory responses to arm exercise with different arm positions. *Journal of Applied Physiology*. 25(5):528–532. <https://doi.org/10.1152/jappl.1968.25.5.528>
  9. Boushel R. 2010. Muscle metaboreflex control of the circulation during exercise. *Acta Physiologica*: 199(4):367–383. <https://doi.org/10.1111/j.1748-1716.2010.02133.x>
  10. Korshøj M, Krstrup P, Jørgensen MB, Prescott E. 2012. Cardiorespiratory fitness, cardiovascular workload and risk factors among cleaners; A cluster randomized worksite intervention. *BMC Public Health*. 12(1):1–9. <https://doi.org/10.1186/1471-2458-12-645>
  11. Sjögren B, Fredlund P, Lundberg I, Weiner J. 2003. Ischemic heart disease in female cleaners. *International Journal of Occupational and Environmental Health*. 9(2):134–137. <https://doi.org/10.1179/oeh.2003.9.2.134>
  12. Zock JP. 2005. World at work: Cleaners. *Occupational and Environmental Medicine*. 62(8):581–584. <https://doi.org/10.1136/oem.2004.015032>
  13. American Thoracic Society. 2002. ATS Statement: Guideline for the Six-Minute Walk Test. *American Journal of Respiratory and Critical Care Medicine*. 166(1). <https://doi.org/10.1164/ajrccm.166.1.at1102>
  14. NHS England. (online) 18 August 2021 at <https://www.nhs.uk/conditions/spirometry/#:~:text=A%20spirometer%20measures%20the%20amount,lungs%20aren%27t%20working%20properly>. [accessed on 18<sup>th</sup> march 2022]
  15. Jensen, L. D., Bonde, J. P. E., Christensen, M. V., & Maribo, T. (2016). Early retirement among Danish female cleaners and shop assistants according to work environment characteristics and upper extremity complaints: An 11-year follow-up study. *BMC Musculoskeletal Disorders*, 17(1),1–8. <https://doi.org/10.1186/s12891-016-1053-4>
  16. Nurdwinungtyas N. 2018. Six Minute Walking Distance Cut-off Point in Indonesian (Mongoloid) Population. *Medical Journal of Indonesia*. 68(9):389–394.
  17. Zou H, Zhu X, Zhang J, Wang Y, Wu X, Liu F, et al. 2017. Reference equations for the six-minute walk distance in the healthy Chinese population aged 18–59 years. *PLoS ONE* 12(9): e0184669. <https://doi.org/10.1371/journal.pone.0184669>
  18. Zakaria R, Harif N, Al-Rahbi B, Aziz C, Ahmad AH. 2019. Gender Differences and Obesity Influence on Pulmonary Function Parameters. *Oman Medical Journal*. 34(1):44–48. <https://doi.org/10.5001/omj.2019.07>
  19. Sulistijo AW, Purba A, Pandji TD. 2015. Physical Fitness of Cleaners in Faculty of Medicine Universitas Padjadjaran, November 2012. *Althea Medical Journal*. 2(November 2012): 382–386

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20. Aune D, Norat T, Leitzmann M, Tonstad S, Vatten LJ. 2015. Physical activity and the risk of type 2 diabetes: A systematic review and dose-response meta-analysis. *European Journal of Epidemiology*. 30(7):529–542. <https://doi.org/10.1007/s10654-015-0056-z>
21. Samitz G, Egger M, Zwahlen M. 2011. Domains of physical activity and all-cause mortality: Systematic review and dose-response meta-analysis of cohort studies. *International Journal of Epidemiology*. 40(5):1382–1400. <https://doi.org/10.1093/ije/dyr112>
22. Swift DL, Lavie CJ, Johannsen NM, Arena R. 2013. Physical activity, cardiorespiratory fitness, and exercise training in primary and secondary coronary prevention. *Circulation Journal*. 77(2):281–292. <https://doi.org/10.1253/circj.CJ-13-0007>
23. Conn VS, Hafdahl AR, Cooper PS. 2010. Meta-Analysis of Workplace Physical Activity Interventions. *American Journal of Preventive Medicine*. 37(4):330–339. <https://doi.org/10.1016/j.amepre.2009.06.008>. Meta-Analysis
24. Grimani A, Aboagye E, Kwak L. 2019. The effectiveness of workplace nutrition and physical activity interventions in improving productivity, work performance and workability: a systematic review. *BMC Public Health*. 19(1):1676. <https://doi.org/10.1186/s12889-019-8033-1>
25. Katz DL, O’Connell M, Yeh MC, Nawaz H. 2005. Public health strategies for preventing and controlling overweight and obesity in school and worksite settings: a report on recommendations of the Task Force on Community Preventive Services. *MMWR. Recommendations and Reports: Morbidity and Mortality Weekly Report. Recommendations and Reports/Centers for Disease Control*. 54(RR-10):1–12.