

# Education of Daily Activities as Exercise in Preventing Metabolic Diseases Improves the Level of Knowledge in Keputih Urban Village, Surabaya

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**Abstract**— Metabolic syndrome is a global health problem characterized by visceral obesity, insulin resistance, hypertension, and hyperlipidemia. Physical activity and a healthy lifestyle can be effective prevention strategies. Continuous education can increase the knowledge and motivation of the community to adopt a healthy lifestyle. The community service program carried out by the Faculty of Medicine, Universitas Airlangga aims to form sustainable healthy living habits in the community, starting with education about healthy eating patterns and recommendations for regular exercise. Activities carried out include health screening, aerobic exercise, education on physical activity and nutrition to encourage people to care about their health conditions and implement a healthy lifestyle to avoid metabolic syndrome problems. Analysis of changes in participants' knowledge level before and after education showed an increase in knowledge level. This indicates a significant increase in knowledge ( $p = 0.01$ ). This educational program increases people's knowledge about a healthy lifestyle as a method of preventing metabolic disease. Through this educational activity, it can prevent the risk of increasing the incidence of metabolic syndrome and increase public awareness of healthy living through exercise.

**Keywords**— Healthy lifestyle, nutrition, exercise, metabolic syndrome.

## I. INTRODUCTION

Metabolic syndrome is a major public health problem worldwide characterized by the occurrence of *visceral obesity*, insulin resistance, hypertension, and hyperlipidemia (O'Neill & O'Driscoll, 2015). As many as 25% of the world's population is known to have metabolic syndrome, where the most common risk factors are type 2 diabetes and cardiovascular disease (Kirtika Madan et al., 2023; Xu et al., 2019). The prevalence of metabolic syndrome in Indonesia shows a figure of 21.66%, where the highest components of metabolic syndrome that are widely experienced in Indonesia are low HDL cholesterol (66.41%), hypertension (64.45%) and central obesity (43.21%) (Herningtyas & Ng, 2019). Based on data from the Indonesian Association for Obesity Studies (HISOBI), in East Java the prevalence of metabolic diseases is quite high, reaching 13.13%. In 2015, it is known that Surabaya has a number of

obesity cases which is one of the components of metabolic diseases reaching 57,987 cases.

Physical activity and a healthy lifestyle are effective preventive strategies in preventing metabolic diseases. Education about the importance of physical activity and a healthy lifestyle can increase awareness and encourage people to change their habits to be healthier (Shirvani et al., 2021). The results of previous studies have shown that interventions in the form of continuous education can reduce the risk of developing metabolic diseases by increasing knowledge and motivation to live a healthy life (Stephens et al., 2020). The importance of this education is an effort to make the public aware of risk factors for metabolic syndrome such as smoking, a high-fat diet and lack of consumption of vegetables and fruits, as well as a sedentary or sedentary lifestyle (Saklayen, 2018; Madan et al., 2023). Tackling this global epidemic requires a multifaceted approach, including urban planning to encourage active lifestyles, promote healthier food choices, and educate the public about healthy nutrition (Saklayen, 2018).

Based on the situation, it is important to prevent metabolic diseases and deaths due to complications from metabolic diseases. The Faculty of Medicine, Universitas Airlangga organized a Community Service Program (PKM) to form sustainable healthy living habits in the community initiated through education on healthy eating patterns and encouragement to exercise regularly.

## II. METHOD

Community service to form a sustainable fitness village is carried out in Keputih Urban Village, Sukolilo Subdistrict, Surabaya City. Keputih Urban Village has an area of 3400,000 hectares. Based on data from the Central Statistics Agency of Surabaya City in 2024, the number of residents of Keputih is 20,979 people, of which 10,432 are men and 10,547 are women.

As an effort to improve healthy living habits for the prevention of metabolic syndrome events, the Community Service team of the Faculty of Medicine, Universitas Airlangga which is driven by the Department of Physiology and Medical Biochemistry collaborated with the Keputih Health Center as the

implementing partner and Keputih Urban Village official as the target partner carried out an activity entitled “Reducing Sedentary Lifestyle and Preventing Metabolic Diseases through Enhancement of Daily Activities as Exercise to Initiate a Fit Village in Keputih Urban Village, Surabaya”.



Figure 1. The activities

The implementation of the activity consisted of *health screening*, including the examination of vital signs, namely systolic blood pressure, diastolic blood pressure, and pulse rate, blood glucose examination, uric acid, and anthropometry (Figure 1). In addition to conducting a health check, participants were asked to fill in personal data which includes age, disease history, and exercise habits. The core activity of Community Service was to do aerobic exercises led by instructors (Figure 1). The aerobic exercise videos instructed can be accessed online by participants and the wider community so that they can be practiced independently after the activity. Education and counseling about a healthy lifestyle were delivered through two materials, 1) “Daily activities can become exercise” and “Myths or Facts Behind Our Food”. Before and after the education, participants were asked to fill out a *pre-test* and *post-test* to evaluate the level of knowledge and understanding of the education provided.

### III. RESULT AND DISCUSSION

The characteristics of participants are presented in table 1. It was known that the average participant who participated in the activity was 52 years old. Based on the results of anthropometric measurements, it was shown that the average body mass index (BMI) of participants was 26.66 kg/m<sup>2</sup> with a standard deviation of 4.54 kg/m<sup>2</sup>, with 20% of participants in the obesity category.

The mean systolic blood pressure was 130.38 mmHg with a standard deviation of 21.39 mmHg, and the average diastolic blood pressure was 79.52 mmHg with a standard deviation of 10.28 mmHg. Most of the participants had normal blood pressure, however, there were 31% who had high blood pressure. In addition, the average glucose level of the participants was 134.66 mg/dL with a standard deviation of 57.42 mg/dL, with 27.6% of the participants having high glucose levels. The average uric acid level was 5.66 mg/dL with a standard deviation of 1.45 mg/dL, with 31% of participants having high uric acid levels. The frequency of participants' exercise varied, with 41.4% of participants exercising more than three times a week. The most common disease history among participants was hypertension and high cholesterol, at

17.2% each. The degree of knowledge regarding health among participants also differed, with 62.1% of participants possessing an adequate level of knowledge.

TABLE 1. Participant Characteristics

Variable	Mean±SD	n (%)
Age (year)	52.24±9.94	
Weight (kg)	60.95±11.74	
Height (cm)	151.06±4.91	
BMI (kg/m <sup>2</sup> )	26.66±4.54	
Underweight		6 (20.7)
Overweight		3 (10.3)
Obese		20 (69)
Systole BP (mmHg)	130.38±21.39	
Normal		20 (69)
High		9 (31)
Diastole BP (mmHg)	79.52±10.28	
Normal		23 (79.3)
High		6 (20.7)
Blood glucose	134.66±57.42	
Normal		21 (72.4)
High		8 (27.6)
Blood uric acid	5.66±1.45	
Normal		20 (69)
High		9 (31)
Exercise frequency		
Never		5 (17.2)
Sporadic		4 (13.8)
< 3 x/week		8 (27.6)
> 3 x/week		12 (41.4)
Disease History		
Diabetes		5 (17.2)
Hypertensi		5 (17.2)
Osteoarthritis		9 (31)
Dislipidemia		4 (13.8)
Hyperuricemia		4 (13.8)

Note: BMI: Body mass index; BP: blood pressure.

Analysis of level changes in participants' knowledge before and after education showed an increase in knowledge. It showed a significant increase of knowledge (p = 0.01). Before exercise education, there was no good level of knowledge and the low level almost 50% of participants. After exercise education, the level of knowledge improved (Figure 1 and 2).

This study aims to evaluate the effectiveness of health education programs on increasing the knowledge of participants. The results of the statistical analysis showed that there was a significant difference in the level of knowledge before and after education. The traits of the respondents indicated that they had a low and moderate level of knowledge prior to the intervention. According to previous research, a high level of early knowledge may affect the outcome of educational interventions, as individuals with sufficient knowledge may not show significant improvement after education (Stephens et al., 2020).

Educational delivery methods were effective; however, it was still needed to be evaluated for higher improvement. Because in most conditions, if education is delivered passively, such as through lectures or pamphlet distribution, its effectiveness may be limited. Studies show that interactive methods, such as group discussions or simulations, are more effective at increasing knowledge and changing behavior (Yakovleva & Yakovlev, 2014). Therefore, this event was also

delivered not only in lectures methods, but also in interactive methods.

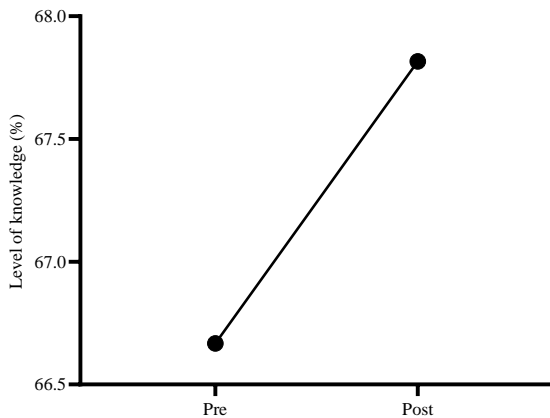


Figure 2. The improvement of knowledge

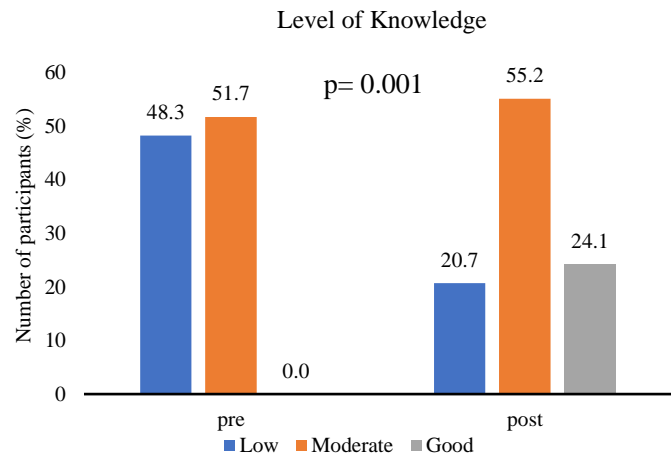


Figure 3. The Level of Knowledge of Participants before and after education. The statistical analysis used Wilcoxon Signed Ranks Test.

Sometimes, if educational programs are infrequent, it may not provide enough time for participants to absorb information and change their behavior. Research by Johnson, (2016) showed that continuous and repeated education programs were more effective in improving health knowledge and behavior. Even though this program was infrequent, it was proved to increase the level of knowledge. However, it cannot be measured the behaviors changes. Recommendations for further activities are increasing the duration and frequency of programs and adapting to the local cultural context. Further research is also needed to explore other factors that affect the effectiveness of health education.

#### IV. CONCLUSION

This community service activity concluded that education on daily activities as exercise and nutrition can increase community level of knowledge. This can encourage people to care about their health conditions and adopt a healthy lifestyle to avoid metabolic syndrome problems. Recommendations for future activities increasing the duration and frequency of the program and adjusting to the local cultural context.

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#### REFERENCES

[1]. Hemingtyas, E. H., & Ng, T. S. (2019). Prevalence and distribution of metabolic syndrome and its components among provinces and ethnic groups in Indonesia. *BMC Public Health*, 19(1). <https://doi.org/10.1186/s12889-019-6711-7>

[2]. Johnson, D. W., & Johnson, R. T. (2016). Cooperative Learning: The Foundation for Active Learning. [www.intechopen.com](http://www.intechopen.com)

[3]. Madan, K., Paliwal, S., Sharma, S., Kesar, S., Chauhan, N., & Madan, M. (2023). Metabolic Syndrome: The Constellation of Co-morbidities, A Global Threat. *Endocrine, Metabolic & Immune Disorders Drug Targets*, 23. <https://doi.org/10.2174/1871530323666230309144825>

[4]. O'Neill, S., & O'Driscoll, L. (2015). Metabolic syndrome: A closer look at the growing epidemic and its associated pathologies. *Obesity Reviews*, 16(1), 1–12. <https://doi.org/10.1111/obr.12229>

[5]. Saklayen, M. G. (2018). The Global Epidemic of the Metabolic Syndrome. In *Current Hypertension Reports* (Vol. 20, Issue 2). Current Medicine Group LLC 1. <https://doi.org/10.1007/s11906-018-0812-z>

[6]. Sayuti, S., Sari, P., Kesehatan Kementerian Kesehatan Republik Indonesia Jambi, P., Kesehatan Masyarakat, J., & Studi Ilmu Kesehatan Masyarakat Fakultas Kedokteran dan Ilmu Kesehatan Universitas Jambi, P. (2022). Efektivitas Edukasi Kesehatan Melalui Media Video Terhadap Tingkat Pengetahuan Siswa dalam Penerapan Protokol Kesehatan di SMPN 19 Kota Jambi The Effectiveness of Health Education Through Video Media on Students' Knowledge Levels in the Application of Health Protocols at SMPN 19 Jambi City. *Jurnal Kesmas Jambi*, 6(2).

[7]. Shirvani, T., Javadivala, Z., Azimi, S., Shaghghi, A., Fathifar, Z., Devender Bhalla, H. D. R., Abdekhoda, M., & Nadrian, H. (2021). Community-based educational interventions for prevention of type II diabetes: a global systematic review and meta-analysis. In *Systematic Reviews* (Vol. 10, Issue 1). BioMed Central Ltd. <https://doi.org/10.1186/s13643-021-01619-3>

[8]. Stephens, C. R., Easton, J. F., Robles-Cabrera, A., Fossion, R., de la Cruz, L., Martínez-Tapia, R., Barajas-Martínez, A., Hernández-Chávez, A., López-Rivera, J. A., & Rivera, A. L. (2020). The Impact of Education and Age on Metabolic Disorders. *Frontiers in Public Health*, 8. <https://doi.org/10.3389/fpubh.2020.00180>

[9]. Xu, H., Li, X., Adams, H., Kubena, K., & Guo, S. (2019). Etiology of metabolic syndrome and dietary intervention. In *International Journal of Molecular Sciences* (Vol. 20, Issue 1). MDPI AG. <https://doi.org/10.3390/ijms20010128>

[10]. Yakovleva, N. O., & Yakovlev, E. V. (2014). Interactive teaching methods in contemporary higher education. *Pacific Science Review*, 16(2), 75–80. <https://doi.org/10.1016/j.pscr.2014.08.016>