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Healthy Lifestyle Behaviors and Sociodemographic Characteristics Among Medical Students in Indonesia During the New Normal Era: A Cross-Sectional Study

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Abstract

This study aimed to identify medical students' healthy lifestyle behaviors during the new normal era and to determine its relationship with sociodemographic factors, bearing in mind that, as future physicians and health role models, medical students play an important role in adopting and promoting healthy lifestyle behaviors to reduce the risk of future health problems as well as optimize communities' health status. This cross-sectional study was conducted at the School of Medicine and Health Sciences of a university in North Jakarta, with 111 medical students selected through stratified random sampling. Data were collected using sociodemographic characteristics (sex, residence, year of study, and participation in health promotion training) and the Health-Promoting Lifestyle Profile-II (HPLP-II) questionnaire and analyzed using descriptive and bivariate analyses. The results showed a moderate total HPLP-II score (2.46 ± 0.37). Interpersonal relations had the highest mean score, and health responsibility had the lowest. A significant difference in the total HPLP-II scores was identified between students participating in health promotion training and those who did not (p-value = 0.049). Further study is needed to explore other factors influencing healthy lifestyle behaviors among medical students.

Keywords: healthy lifestyle behavior, health-promoting behavior, HPLP-II, medical student, sociodemographic factor

Introduction

Health is not exclusively defined by the absence of a disease, illness, or weakness. It encompasses a holistic state of well-being that includes physical, mental, and social aspects.[1] Pender's Health promotion Model, used in this study as the theoretical framework, states that this health-promoting behavior represents the desired outcome of health decision-making and preparatory actions involving actions that enhance well-being and improve overall health.[2] A way to achieve a healthy life is to adopt a healthy lifestyle behavior, which is described as activities or behaviors believed and practiced by individuals to be healthy, enabling them to maintain their well-being and prevent diseases.[3] Consistent with the definition of Pender's Health Promotion Model, health-promoting behavior comprises six health dimensions: health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management.[2] Components which collectively influence these health behaviors are individual characteristics and experiences, behavior-specific cognitions and affect, commitment to a plan of action, demands, and preferences.[2] Individual factors include biological, psychological, and sociocultural aspects, as well as prior related behaviors. The behavior-specific cognitions and affect component encompasses factors such as perceived benefits of action, perceived barriers to action, perceived self-efficacy, and interpersonal and situational influences.[2]

Studies show that adopting a healthy lifestyle can help sustain or enhance an individual's health and reduce morbidity and mortality rates.[4,5] Inversely, engaging in negative health behaviors raises the risks and likelihood of poor health outcomes.[6] Unhealthy lifestyles and risky behaviors, including unhealthy diet, inadequate physical activity, smoking, and harmful alcohol consumption, contribute to metabolic changes such as obesity, elevated blood pressure, and increased blood glucose and cholesterol levels.[6] At the same time, according to the World Health Organization, 60% of the morbidity and mortality associated with noncommunicable diseases (NCDs) are influenced by these behavioral and lifestyle factors.[6] Adopting healthy behaviors in adolescence and youth is

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crucial as these habits persist into later stages of life,[6] where if these conditions are not properly controlled, managed, or treated, they can eventually lead to the development of NCDs.[7] A healthier lifestyle change from an early age is expected to prevent health concerns, as well as the number of NCDs still a burden in Indonesia.

As future physicians and health role models, medical students play an important role in implementing and promoting healthy lifestyle behaviors to reduce the risk of future health problems,[6] as well as in optimizing society's overall health status, especially in situations such as the COVID-19 pandemic. A previous study revealed that medical students did not develop healthy lifestyle behaviors positively despite receiving health education,[8] and maintaining this healthy lifestyle behavior continues to pose a challenge for medical students. Multiple studies have shown relatively poor health behaviors among nursing students in Indonesia.[9,10] This failure to develop healthy lifestyles may be due to the mounting academic workload that students must face during their medical school studies. The COVID-19 pandemic has drastically changed various aspects of societies' daily lives, including lifestyle and health habits.[11] The lockdown measures implemented during the early stage of the pandemic, resulting in increased sedentary behavior, changes in sleep patterns, dietary habits, physical activity, and a decline in mental health, have thus also affected the health behaviors of students.[12] On the one hand, there is a lack of available data regarding Indonesian medical students in this particular context. Further findings on the health behaviors during the new normal phase remain scarce.

Medical schools generally provide training, activities, and experiences that enable students to participate in health promotion. Through these sessions, medical students will be able to enhance their knowledge and abilities to promote healthy behavior, positively influencing and enabling society to be more self-reliant in achieving a healthy lifestyle. By doing so, it can eventually raise students' self-awareness to implement healthy behaviors in themselves.[13] Despite the importance of knowledge and abilities in promoting healthy behavior, studies exploring how this specific factor is related to healthy behavior have not yet emerged. Therefore, the primary focus of this study was to identify healthy lifestyle behaviors among medical students in Indonesia during the new normal era and to investigate the relationship between individual sociodemographic factors, including sex, residence, year of study, participation in health promotion training, and health behaviors.

Method

This descriptive cross-sectional study was conducted from February to June 2023 among medical students at the School of Medicine and Health Sciences of a university in North Jakarta, Indonesia. Samples were selected using proportionate stratified random sampling. The inclusion criteria were preclinical medical students in their first, second, and third-years who agreed to participate in the study, excluding students taking a temporary break or period of absence from their studies and those who did not complete the questionnaire.

Data were obtained using a self-administered questionnaire consisting of two sections. The first part of the questionnaire contained questions about respondents' sociodemographic characteristics (sex, residence, year of study, and participation in health promotion training) as independent variables. The second section used the Indonesian version of the Health-Promoting Lifestyle Profile-II (HPLP-II) questionnaire that has been validated (Cronbach $\alpha = 0.934$) to measure respondents' healthy lifestyle behavior as the dependent variable in this study.

The HPLP-II questionnaire, developed by Walker, *et al.*,[14], consisted of 52 items under six subscales (health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management). Each subscale's score was measured by the frequency of behavior using a Likert scale, ranging from never (1) to regularly (4). The total HPLP-II score was determined by calculating the mean score of the responses to all 52 items. It was further classified into four categories: poor (1–1.73), moderate (1.74–2.48), good (2.49–3.23), and excellent (3.24–4).[15] Data were analyzed using the STATA statistical software (under license of the School of Medicine and Health Sciences of Atma Jaya Catholic University), utilizing parametric tests (independent t-test and one-way ANOVA) for normally distributed data and non-parametric tests (Mann–Whitney and Kruskall–Wallis) for non-normally distributed data to determine the differences and compare the total HPLP-II along with each of the subscales' scores among respondent's sociodemographic factors.

Results

This study included 111 of the 617 medical students. Figure 1 illustrates the distribution of the respondents' sociodemographic characteristics. Regarding sex, most students were female (65.8%). The proportion of students living with their families (49.5%) was nearly equal to that of students who did not live with their families (50.5%). This study comprised 39.5% of first-year students, 29.7% of second-year students, and the remaining were third-year students. Most students participated in health promotion training (71.2%).

Table 1 shows that most students in this study had moderate to good levels of healthy lifestyle behaviors (46.8% and 48.6%, respectively). According to Table 2, the mean±SD score of the students' total HPLP-II was 2.46±0.37, indicating a moderate level of healthy lifestyle

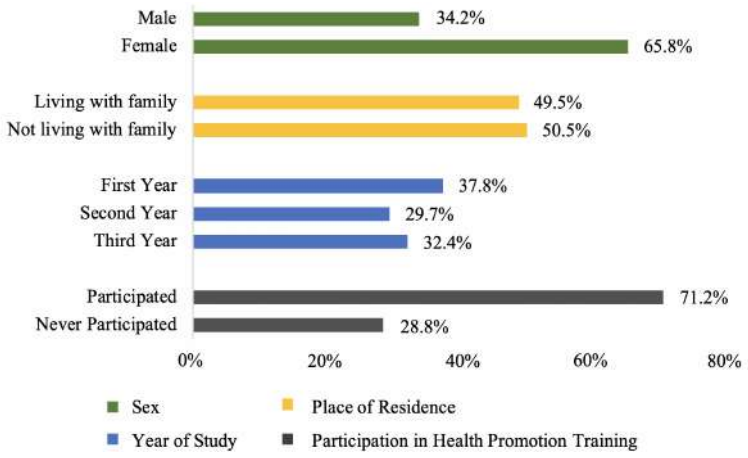

Figure 1. Distribution of Respondents' Sociodemographic Characteristics (n = 111)

Table 1. Distribution of Respondents' Profile-II and Each Subscale's Category During the New Normal Era (n = 111)

Students' HPLP-II	n	%
Poor	3	2.7
Moderate	52	46.8
Good	54	48.6
Excellent	2	1.8

Note: HPLP-II = Health-Promoting Lifestyle Profile-II

Table 2. Distribution of Respondents' Total Health-Promoting Lifestyle Profile-II and Each Subscale's Mean Score (n = 111)

HPLP-II Subscale	Mean±SD
Health responsibility	2.04±0.55
Physical activity	2.23±0.56
Nutrition	2.39±0.41
Spiritual growth	2.79±0.54
Interpersonal relation	2.87±0.47
Stress management	2.40±0.41
Overall/total HPLP-II	2.46±0.37

Notes: HPLP-II = Health-Promoting Lifestyle Profile-II, SD = Standard Deviation

Table 3. Sociodemographic Factors Differences in Overall Health-Promoting Lifestyle Profile-II

Variable	Category	Students' HPLP-II				p-value
		Poor	Moderate	Good	Excellent	
		n (%)	n (%)	n (%)	n (%)	
Sex	Male	0 (0.0)	20 (52.6)	18 (47.4)	0 (0.0)	0.710
	Female	3 (4.1)	32 (43.8)	36 (49.3)	2 (2.7)	
Residence	Living with family	1 (1.8)	25 (45.5)	28 (50.9)	1 (1.8)	0.594
	Not living with family	2 (3.6)	27 (48.2)	26 (46.4)	1 (1.8)	
Year of study	First-year	1 (2.4)	23 (54.8)	16 (38.1)	2 (4.8)	0.114
	Second-year	1 (3.0)	18 (54.5)	14 (42.4)	0 (0.0)	
	Third-year	1 (2.8)	11 (30.6)	24 (66.7)	0 (0.0)	
Participation in health promotion training	Participated	1 (1.3)	34 (43.0)	42 (37.8)	2 (53.2)	0.049*
	Never participated	2 (6.3)	18 (56.3)	12 (37.5)	0 (0.0)	

Notes: HPLP-II = Health-Promoting Lifestyle Profile-II, *Correlation is significant at the 0.05 level

behaviors. This study assessed six subscales of the HPLP-II. All the subscales of the students' HPLP-II fell within the moderate and good categories. Among the HPLP-II subscale, interpersonal relations had the highest mean score (Mean = 2.87, SD = 0.47), followed by spiritual growth subscale (Mean = 2.79, SD = 0.54). At the same time, health responsibility appeared the lowest (Mean = 2.04, SD = 0.55).

Table 4. Sociodemographic Factors Differences in Health-Promoting Lifestyle Profile-II Subscales

Variable	Category	Health-Promoting Lifestyle Profile-II Subscale (Mean±SD)					
		Health Responsibility	Physical Activity	Nutrition	Spiritual Growth	Interpersonal Relation	Stress Management
Sex	Male	1.85±0.50	2.40±0.54	2.38±0.37	2.82±0.58	2.81±0.50	2.39±0.41
	Female	2.14±0.54	2.14±0.55	2.39±0.43	2.76±0.51	2.91±0.46	2.41±0.41
	p-value	0.015*	0.019*	0.810	0.614	0.501	0.675
Residence	Living with family	2.01±0.53	2.23±0.56	2.46±0.44	2.78±0.48	2.86±0.45	2.41±0.34
	Not living with family	2.08±0.57	2.23±0.57	2.32±0.37	2.79±0.59	2.88±0.50	2.39±0.47
	p-value	0.420	0.927	0.046*	0.939	0.731	0.432
Year of study	First-year	2.10±0.65	2.20±0.56	2.35±0.42	2.76±0.64	2.92±0.53	2.39±0.49
	Second-year	1.86±0.37	2.16±0.53	2.34±0.40	2.69±0.42	2.71±0.45	2.32±0.36
	Third-year	2.15±0.53	2.33±0.60	2.48±0.40	2.91±0.50	2.97±0.39	2.49±0.34
	p-value	0.033*	0.471	0.258	0.205	0.042*	0.103
Participation in health promotion	Participated	2.12±0.56	2.25±0.55	2.44±0.40	2.84±0.52	2.90±0.49	2.46±0.41
	Never participated	1.86±0.47	2.19±0.59	2.25±0.41	2.66±0.56	2.80±0.44	2.25±0.39
	p-value	0.049*	0.526	0.055	0.116	0.307	0.022*

Notes: *correlation is significant at the 0.05 level, SD = Standard Deviation

Table 5. Post Hoc Comparisons with Mann–Whitney U-Test

Health-Promoting Lifestyle Profile-II Subscale	Year of Study	Mann–Whitney U		
		U	Z	Asymp Sig.
Health responsibility	First-year Second-year	526.0	–1.788	0.074
	First-year Third-year	691.0	–0.653	0.514
	Second-year Third-year	375.0	–2.639	0.008*
Interpersonal relation	First-year Second-year	531.5	–1.730	0.084
	First-year Third-year	703.0	–0.534	0.594
	Second-year	380.0	–2.577	0.010*

Notes: Asymp Sig. = Asymptotic Significance, *Correlation is significant at the 0.05 level

The analyses of sociodemographic factors (sex, place of residence, year of study, and participation in health promotion training) on the total HPLP-II and its subscales are presented in Tables 3, 4, and 5. Among medical students, there was a significant difference in the total HPLP-II scores between individuals who participated in health promotion training and those who did not (p-value = 0.049). Notably, students who participated in health promotion training displayed significantly higher total HPLP-II scores. In contrast, no significant differences were observed between sociodemographic factors, including sex, residence, and year of study, concerning the total HPLP-II (p-value>0.05). Regarding the HPLP-II subscale comparison, health responsibility scores were significantly higher in female students than in male students (p-value = 0.015).

In contrast, physical activity scores were significantly higher among male and female students (p-value = 0.019). Students living with their families scored significantly higher on the nutrition subscale (p-value = 0.046) than those who not living with their families. Significant differences were also identified between students' health responsibility (p-value = 0.033) and interpersonal relations (p-value = 0.042) based on their year of study. The pairwise comparison between the second and third-years revealed a statistically significant difference (p-value<0.05), where further analysis showed that second-year students had significantly higher scores in health responsibility (p-value = 0.008) and interpersonal relations (p-value = 0.010) compared to the third-year students. In addition, health responsibility (p-value = 0.049) and stress management (p-value = 0.022) scores were significantly higher in students who did participate in health promotion training than in those who did not.

Discussion

In this study, medical students demonstrated a moderate level of healthy lifestyle behaviors according to their

total HPLP-II average score. Healthy lifestyle behaviors were specifically examined by assessing the subscales of the HPLP-II, with similar results to those found in studies of medical students in Turkey,[8] and dental medicine students in Indonesia.[16] The spiritual development and interpersonal relations among the students were classified in a good category; while, the other four subscales, including health responsibility, physical activity, nutrition, and stress management, were categorized as moderate. Consistent with this study's findings, previous studies also indicated interpersonal relations and spiritual development as two subscales that showed higher scores than other subscales among medical students.[16,17] With interpersonal relations being taught to medical students during their education to ensure effective and efficient communication with their patients,[18] these skills play a crucial role in their ability to communicate and build rapport. This skill teaching is likely a contributing factor to the high score in interpersonal relations among medical students.

Moreover, spiritual development was also a prominent component among the medical students in this study, which may be due to the nurturing of religious and spiritual values within the university environment. Because of the high academic workload in medical education,[17] there is a tendency for medical students to spend more time on academic activities compared to non-academic activities such as physical activity, health responsibility, and physical activity, which were reported as two of the lowest HPLP-II subscale scores in this study. Additionally, academic workload is associated with low awareness of maintaining health and decreasing health responsibility.[19] Nevertheless, the health responsibility subscale in the HPLP-II emphasizes the need for health consultation with medical professionals. While the total HPLP-II scores did not show a significant difference between sex, health responsibility was reported to be significantly higher in female students, whereas, since respondents were medical students, they may perceive themselves as part of the healthcare personnel and therefore felt less inclined to seek consultation regarding their health.

In contrast, male students demonstrated higher scores in physical activity, with females tending to have higher curiosity and motivation regarding health information and self-care than males.[21,22] Similar to the findings of these studies, previous studies presented the same result.[8,20] The higher physical activity observed in males was related to their self-efficacy. Moreover, males commonly spend more time participating in sports activities, a characteristic of the masculine domain; while, females tend to spend time with family and are more likely to have a sedentary lifestyle.[4,24,25] With this in mind, males tend to have higher motivation and confidence in their ability to engage in physical activity consistently.[23]

This study, which compared students' residences, was similar to previous studies conducted by Tapare, *et al*.,[20] and Ardıç, *et al*.,[26], who reported that students living with their families had significantly better nutrition scores. Intensive learning systems in medical schools may disrupt students' eating patterns. However, the nutritional needs of students living with their families could be better fulfilled by family supervision. Living independently puts students at a higher risk of developing poor eating habits, such as relying on unhealthy or fast-food options for time efficiency, which can negatively impact their nutritional status.[27] This study's findings demonstrated slight differences from other studies. While, differences in respondents' characteristics and family factors, such as backgrounds, cultures, parenting styles, and any other such factors may contribute to different health behavior outcomes among students, a study by Tampubolon, *et al*.[16] reported that students not living with their families tended to take responsibility for their health even without parental supervision, as they believed that their declining health would affect their academic progress.

Based on the students' years of study, significant differences were identified between the students' health responsibility and interpersonal relations subscales, although the total HPLP-II did not differ significantly. Unlike what was expected, first-year students who were initially presumed to have lesser knowledge regarding healthy lifestyle behaviors obtained higher HPLP-II scores across all subscales compared to second-year students, where it was shown that the analysis revealed statistically significant differences between the second- and third-year students. However, as time progresses, the increasing academic workload could lead to a decline in healthy lifestyle behaviors, especially among second-year students; similar results were found in a study by Tapare, *et al*.[20]

One potential explanation was that students recently entering university would still carry healthy behaviors or habits instilled by their families since childhood and continue to be supervised by their families to maintain those behaviors. For instance, a decline in supervision due to living away from their families may contribute to a change in this lifestyle, particularly in nutrition. Subsequently, upon entering the third year of education, they may raise their self-awareness to maintain a healthy lifestyle as their knowledge of health increases. This condition could account for improving HPLP-II scores across various subscales upon entering the third year of education.[20] Nonetheless, further study is needed to explore the reasons behind the fluctuations in healthy living habits observed in the findings of this study.

A significant difference was observed in the total HPLP-II scores between medical students participating

in health promotion training and those who did not (p-value = 0.049), where higher total HPLP-II scores were observed in students participating in health promotion training. This study was the first to determine the relationship between participation in health promotion training and healthy lifestyle behaviors based on HPLP-II scores among medical students in Indonesia. The findings of this study provided evidence that participation in health promotion training played an important role in enhancing healthy lifestyle behaviors among medical students. Throughout their studies, medical students generally have received early exposure to health promotion training aimed at preventive and promotive healthcare practices, in addition to curative and rehabilitative strategies.[28] This condition portrayed that they have acquired more relevant health information or knowledge for health promotion activities. Consequently, students with this experience are more likely to possess better health-related information and understanding.[13]

This situation may eventually increase students' self-awareness in maintaining their personal health, as evidenced by the results presented in Table 4, which highlighted significantly higher scores on the health responsibility subscale among students who had participated in health promotion training than those who had not. In addition, regarding the HPLP-II subscales, stress management scores were significantly higher among the group of students who received health promotion training. Additionally, the ability to analyze problem causes of stress was also a contributing factor toward coping abilities in individuals, where it was seen that stress management was related to coping mechanisms.[29-30]

Referring to the findings of this study, better stress management in students with a history of health promotion training could be associated with the health information received through the training, which would lead them to be more aware of the negative impacts of unmanaged stress. In line with similar studies, Askarian, *et al.*,[31] reported a significant positive correlation between health knowledge and healthy lifestyle behaviors among medical students. Tunc, *et al.*,[32] also identified a significant relationship between healthy lifestyle behavior based on the HPLP-II and students' perception of health, encompassing self-awareness of health's importance. These findings showed the importance of targeting the knowledge and attitudes of medical students to adopt healthy lifestyle behaviors and implementing related intervention programs to enhance those behaviors and well-being.[31]

This study had several limitations, including its cross-sectional design, which restricted the ability to determine causality and the long-term effects of the relationships between variables. This study was conducted at only one university in Indonesia. At the same time, it is important to note that the data collected relied on self-administered questionnaires, which introduced the possibility of response bias. Therefore, these results do not represent the entire population of medical students in the country. Despite these limitations, this study provided valuable insights into the relationship between participation in health promotion training and healthy behaviors among medical students. Further assessment and study on the association between these variables are needed to gain a more accurate understanding. Alternative research methods and the use of additional parameters of healthy lifestyle behaviors beyond the scope of the HPLP-II may be considered.

Conclusion

In summary, a moderate level of health-promoting lifestyle is observed among medical students in Jakarta, Indonesia. Notably, experience in health promotion training is a significant factor in healthy lifestyle behaviors. Medical schools should proactively establish a supportive environment that encourages and facilitates healthy living. Additionally, this study's findings suggest the importance of prioritizing, developing, and implementing promotive and preventive health programs to enhance the overall lifestyles of medical students. Further assessment and exploration of other factors influencing healthy lifestyle behaviors among medical students are necessary.

Abbreviations

NCDs: Noncommunicable Diseases; HPLP-II: Health-Promoting Lifestyle Profile-II.

Ethics Approval and Consent to Participate

The study protocol was approved by the Research Ethics Committee of the Faculty of Medicine and Health Sciences of the Atma Jaya Catholic University of Indonesia (number: 20/30/KEP-FKIKUAJ/2023).

Competing Interest

The authors affirm that no notable conflicts of interest, including financial, professional, or personal aspects, could have influenced the execution of the study.

Availability of Data and Materials

The raw data and STATA outputs obtained from the study are available and kept by the corresponding author.

Authors' Contribution

SSV and TNT conceptualized theories and frameworks related to healthy lifestyle behaviors among medical students. SSV analyzed the data using statistical computation software and interpreted the results. SSV and KK contributed to the design and preparation of this manuscript. All authors reviewed and approved the final version of the manuscript and agreed to be responsible for all aspects of this work.

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