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Factors influencing healthy role models in medical school to conduct healthy behavior: a qualitative study

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Abstract

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Objectives: This study aimed to identify the factors that support or inhibit medical teachers as healthy role models in medical school to conduct healthy behavior.

Method: A qualitative study was carried out with semi-structured in-depth interviews with medical teachers categorized as healthy role models in a medical school from the previous survey. Ten medical teachers were selected using random sampling. Three medical teachers were interviewed by direct meetings, and the remaining was phone interviewed using a semi-structured in-depth interview. However, one interview was facilitated by chat using WhatsApp. The transcribed interviews were coded openly. Themes were finalized through discussion and debate to reach consensus.

Results: Two themes were identified: perceived facilitators and perceived barriers, which were classified into four categories and 13 subcategories: 1) intrinsic facilitators (motivation, conscious awareness, having physical limitations, knowledge, and economic reason); 2) extrinsic facilitators (the impact on doing a particular job, feedback, time, and environment); 3) intrinsic barriers (the lack of self-motivation and having physical limitations); 4) extrinsic barriers (the burden of responsibilities for being medical teachers and environment).

Conclusions: Factors that support and inhibit medical teachers as healthy role models in medical school are influenced by intrinsic and extrinsic factors. This result could be used by the medical school to design an intervention to help medical teachers as healthy role models in conducting healthy behavior. More studies are needed to explore other factors that influence medical teachers to conduct healthy behavior.

Keywords: healthy role model, healthy behavior, medical teacher, medical school

Introduction

Medical school, a part of the university, is a context for implementing the health-promoting University (HPU) initiative. This initiative that was first implemented at The University of Central Lancashire in 1995, aims to create a school environment and culture that integrates health values in their teaching and learning activities as well as in educational policies. It is the main characteristic of a school that has implemented an HPU initiative because conducting health promotion is not enough to state that school has indeed implemented HPU.¹

With the existence of a school environment and culture that integrates health values, it is a chance to develop the characteristics of medical teachers, staff, and students as agents of change of a healthy lifestyle in the community. Medical teachers and students who are from a school that has implemented HPU should be able to act as a healthy role model for making a health change not only for themselves but also for the surrounding community.¹⁻³ To make this happen, practicing healthy behavior in their daily life is a way to fulfill their role as a healthy role model in the community. Dooris¹ said that it is one of six main focuses of HPU implementation in the school.

The term healthy role model in medical school has not been found in publications. Therefore, to explore the definitions and characteristics of a healthy role model in medical

school, we previously conducted a grounded theory.⁴ We interviewed and communicated with 48 medical teachers from various background of 'health professions education,' 'health education and 'behavior / 'health education and promoter,' 'general practitioners/' family medicine," adolescent health," internal medicine, 'and' cardiology-vascular medicine. 'We also conducted three focus group discussions with medical students. We found that a healthy role-model in a medical school is a person who is seen as 1) physically, socially, mentally, and spiritually healthy; 2) internalized healthy behaviors in their life; 3) willing to promote healthy lifestyles; 4) life-long learner. Practicing healthy behavior is one of the descriptions of the first and second characteristics of a healthy role model in a medical school, according to our previous study.⁴

Because a medical school is a place where a future physician is produced, producing not only a competent physician but also healthy—a healthy physician who can model healthy behaviors to their patients and the surrounding community⁵, must also be the primary concern of the medical school. The medical school should provide a safe place to practice healthy behaviors and develop a healthy characteristic among staff and students.¹ Our previous grounded theory⁴ also found that medical teachers are the first and primary person expected to be healthy role models in medical school. The previous participants said that the medical teachers are the sources of who students and academic staff will be modeled. Furthermore, McAleer and Roff⁶ said that medical teachers are the first person whom students will interact when they arrive at medical school for the first time. Therefore, what characteristics their medical teachers have will influence their future characteristics as physicians.

In medical school, students' learning occurs formally in the classroom, but many students also learn much through modeling from their teachers.⁷ Learning through modeling is a learning method that is explained by social cognitive theory.⁸ Ficklin and colleagues⁹ stated that modeling is an effective learning method in medical schools. In modeling, medical

students must observe what is modeled, create a mental representation of it, reproduce what was modeled, monitor what they perform, and motivate themselves to model the behavior continuously.⁸ Perhaps learn how to behave healthy behavior can also be effectively done through modeling.

However, several studies^{10, 11} in medical school, showed that many medical teachers are not aware of their role as role models in medical school. They rarely realized that they are a model for their students. Therefore, we previously surveyed the characteristics of medical teachers as healthy role models in one of the medical schools in Indonesia.¹² Before conducting the survey, we developed a questionnaire to measure the characteristic of a healthy role model roled by medical teachers. The categories and subcategories that we obtained from grounded theory were used as a pool item inventory to develop this questionnaire. We classified medical teachers as a healthy role model in medical school into two groups. The medical teachers who have all characteristics of healthy role models are defined as active healthy role models. The medical teacher who has most of the characteristics of a healthy role model in medical school but did not perform healthy modeling adequately is defined as passive healthy role models. We asked our participants to make a self-assessment of what characteristics of a healthy role model in medical school, they have. We found that 60 of 79 participants who participated in the survey have not modeled healthy behavior effectively; thus, we classified them as passive healthy role models in medical school. To explore the reason behind what we found in this previous survey, we conducted a qualitative study to identify the factors that could be supported and inhibited the medical teacher as a healthy role model in medical school in conducting healthy behaviors.

Methods

Study design, participants, and setting

This study used a qualitative study design. It was used since this study focuses on the experiences and perceptions of medical teachers; highlighting what factors that support and inhibit them as a healthy role model in medical school to perform healthy behaviors.

This study was conducted at the ⁹ Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, in Yogyakarta with medical teachers who were participated in our previous survey.¹² From the previous survey, we have seventy-nine medical teachers, 19 medical teachers categorized as active healthy role models and 60 passive healthy role models. We selected the participants by random sampling in each group using a randomizer research software from the Social Psychology Network.¹³

An invitation to participate in this study was sent out to the selected participants. The first author (MAL) then contacted the participants by WhatsApp. A participant who did not respond in 14 days since the first day of the invitation sent were excluded. Ten medical teachers agreed to participate, five active healthy role models, and five passive healthy role models. All of these medical teachers have a different field background in medicine. They were staff from the Department of Anesthesiology and Intensive Therapy, Department of Ear, Nose, and Throat (ENT), Department of Forensic Medicine and Medicolegal, ² Department of Pharmacology and Therapy, Department of Health Nutrition, Department of Neurology, Department of Microbiology, Department of Histology; ² Department of Health Policy and Management, and Department of ⁵ Psychiatry.

Ethical approval was issued ⁵ by the Medical and Health Research Ethics Committee Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Indonesia, under their file number 0946 and 1217. All participants individually ¹³ signed the informed consent forms regarding their agreement to participate according to the guidelines of brief

descriptions to study subjects ⁶ from the Medical and Health Research Ethics Committee Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada.

²¹ **Data collection method**

Data collection was conducted from February to April 2020. We conducted semi-structured in-depth interviews to stimulate the participants to talk freely about their experiences as a healthy role model in conducting healthy behaviors. All participants received an explanation of the semi-structured in-depth interview process and gave their consent to participate. The ¹⁸ semi-structured in-depth interview was conducted using the following guiding questions, see Appendix 1. The list of questions was based on what was known from the literature on factors related to healthy behavior. The list was validated by three experts, one expert in health education and behaviors and two from a medical education background. ¹⁷ All interviews were audio-recorded using a digital recorder, with the written informed consent of all participants.

The first-three interviews were conducted in a quiet discussion room ⁸ of the Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, where the participants work. Due to the pandemic Covid-19 situation where all medical schools were locked down in March 2020, the remaining interviews were conducted from home using telephone communication, except for one participant who refused to communicate by phone. This participant was facilitated by a chat using WhatsApp. We use the list of questions from the same guide interview to facilitate the communication with this participant. The chat communication was screenshotted and kept by the interviewers.

The first authors (MAL) conducted all interviews. MAL is a health care profession and had experience as the primary interviewer. MAL also did not work as a medical teacher in the

Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, where the study took place. Therefore, MAL did not have any previous connection with the participants.

All interviews took 30-60 minutes and were transcribed verbatim by the helping of a transcriber service agent. MAL examined all transcripts by checking line by line to see the congruence between the transcripts and recordings. This process was supervised by two other authors (MC and GRR). MC and GRR is a health care profession and had experience in conducting qualitative research. All records listened several times. MAL analyzed the transcript repeatedly and rigorously under the supervision of MC and GRR. The theoretical saturation was achieved with no new comments from the participants, agreed by MAL, MC, and GRR.

Data analysis

Transcripts were read and open coded by two coders, MAL, with the help of one independent coder (NW). NW is a health care profession and had experience in conducting qualitative data analysis. The transcriptions were independently coded line by line by these two coders. Differences in codification were debated and solved through several discussions by the two coders. Through the discussion and debate, the identified subcategories, categories, and its associations that were clustered into theme were explored. The representative quotations were also discussed and selected. MC and GRR help clarified the result of codification made by the two coders. Differences in the codification with MC and GRR were then debated and solved through discussion until a consensus was reached. The subcategories, main categories, and the representative quotations were also reviewed and revised by MC and GRR. No new categories and subcategories emerged after we analyzed seven semi-structured in-depth interview transcripts. The remaining transcripts were used to ensure data saturation.

Credibility was achieved by conducting member checking. Memos and documents from the interviews and coding steps, which were kept by the first author, were also gain to increase credibility. The subcategories and categories were derived from an inductive qualitative content analysis of participants' perceptions and experiences. Triangulation of this study was made by inviting a medical teacher from the two groups, i.e., active and passive healthy role models. MC and GRR were also acted as expert checking whether the coding and representatives quotations were completely described the category and subcategory that was represented. All the identified subcategories, categories, and themes were presented in Table 1.

Results

The result was classified into two themes: perceived facilitators and perceived barriers (Table 1). The intrinsic and extrinsic factors are identified as perceived facilitators and barriers that influenced medical teachers as a healthy role model in medical school to perform healthy behavior.

Insert Table 1 here

Perceived facilitators

The intrinsic facilitators are motivation, conscious awareness, having physical limitation, knowledge, and economic reason. The impact of doing a particular job, feedback, time, and the environment are identified as the extrinsic facilitators. The intrinsic and extrinsic facilitators that support medical teachers as a healthy role model in medical school to perform healthy behavior were explained in more detail below with quotations.

Intrinsic facilitators

Motivation

Most participants stated that they had never desired to become a healthy role model in medical school. A healthy behavior that they perform in their daily lives is done by their motivation to become healthier.

"I have never thought to be a healthy role model in this school. I just want to be healthier...healthy for myself" (No 2, female, Department of Ear, Nose, and Throat)

The interest in exploring something sometimes provokes them to conduct healthy behavior.

"In the Netherlands, I have three friends for bicycles. We like to explore new places by riding bicycles." (No 10, male, Department of Microbiology)

Conscious awareness

All participants mentioned that working as medical teachers, they know how to maintain their health. However, this knowledge does not directly guarantee that they will automatically perform healthy behavior. They need a conscious awareness that health is an important thing, making health their daily basic need. This awareness is needed to make medical teachers perform healthy behavior consciously in their daily lives.

"I found Yoga is different from other physical activities. By doing Yoga, we have a benefit of all aspects of health-physical, mental, social, and spiritual. For example, in the mental health aspect, a Yogis is someone who can control emotions...Therefore, I always replaced my Yoga schedule when I have work on the day I had a Yoga session." (No 2, female, Department of Ear, Nose, and Throat)

"When I work out of town, I used sports facilities in the place where I stay. However, if they did not have facilities, I do only stretching in my room." (No 5, female, Department of Health Nutrition)

Having physical limitations

Physical limitations caused by suffering a chronic disease and the increasing of ages motivate them to perform healthy behavior routinely in their daily lives.

"If I do not have a physical exercise every day, my heart will not normally run as it needed because I have chronic heart disease." (No 1, female, Department of Forensic Medicine and Medicolegal)

"In the afternoon, when I am going back home, I used to feel pain in my back. Now, when I have this routinely physical stretching exercises, I feel better." (No 6, male, Department of Psychiatry)

Knowledge

The knowledge of health does not guarantee the medical teacher to perform healthy behavior in their daily life. The information about their current health status, the risk of suffering a particular chronic disease, and how to perform a healthy behavior effectively are needed to motivate the medical teacher to conduct healthy behavior.

"I knew that I had a heart problem when I participated in the research. It happened when I was a medical student. Knowing that disease, it was like finding a puzzle on why I usually have a faint since I was a child. Thus, I have to adopt some healthy behaviors to live with my chronic disease." (No 1, female, Department of Forensic Medicine and Medicolegal)

"While working as a physician in the hospital, I realized that the elevator is one contaminated place. It is happening because it has only minimal ventilation. Therefore, I preferred to use emergency stairs, which unconsciously force me to behave healthily by wasting more calories when walking through the stairs." (No 2, female, Department of Ear, Nose, and Throat)

Economic reason

The economic reason can also influence for conducting healthy behavior in daily life.

"In the Netherlands, in order to save money, I used to ride a bicycle to go everywhere in town." (No 10, male, Department of Microbiology)

Extrinsic facilitators

The impact of doing a particular job

Some participants informed that they started to conduct healthy behaviors when they got a new particular job.

"In 2014, when I asked by the State Minister for Youth and Sports Affairs of Indonesia to accompany their athletes at the Football Association, I started to facilitate myself on

doing a routine physical exercise because it was ashamed that how I could promote healthy behavior effectively to their athletes without no experience on doing those behaviors." (No 5, female, Department of Health Nutrition)

Feedback

The feedback obtained from conducting healthy behavior has a significant influence on motivating medical teachers to keep doing such behaviors. This feedback could be a benefit of doing healthy behavior, reward, or a compliment from others.

"My family loves to participate in the marathon event around our home. We got a medal. It motivated us to participated more in other events." (No 3, female, Department of Anaesthesiology and Intensive Care)

Time

All of the participants considered their heavy burden as consequences for being medical teachers. Therefore, the availability of free time to conduct healthy behaviors becomes crucial.

"If other people asked me why I can have my running session every day, I have more time for myself. I remembered in the past several years when this city has only a small number of anesthesia doctors. Imagine how we have to manage all hospitals around this city with a small number of anesthesia doctors. The challenges come when our seniors must attend a seminar out of town. It exhausted us as the junior staff who must cover our senior responsibility as anesthesia doctors in the hospital they work." (No 3, female, Department of Anaesthesiology and Intensive Care)

Environment

The environment contributed: the presence of other people or communities who play a role as social influencers, social reminders, and role models; the availability of limited infrastructure such as no elevator services in the environment which unconsciously force medical teacher to use stairs; the availability of policies in the environment that support people to conduct healthy behavior; the availability of media to promote healthy behavior in the environment, and, the availability of facilities in the environment to support healthy behavior.

"From the last three years, this institution has changed its policy in serving snacks for meeting. Now, it serves more fruits as snacks. They also reduced the number of fatty food for lunch." (No 8, male, Department of Health Policy and Management)

"They put a sticker to inform how much calories we burn on each step we performed when taking stairs to go upstairs. It is successful made many medical teachers for using stairs rather than an elevator." (No 9, female, Department of Neurology)

Perceived barriers

Intrinsic barriers

Lack of self-motivation

The heavy workload as a medical teacher is strongly related to the decreasing in their motivation to engage in healthy lifestyles.

"Sometimes, I do not feel motivated to conduct healthy behavior because I am tired of finishing my whole job in a day." (No 9, female, Department of Neurology)

Having physical limitations

A limited physical condition that medical teachers have sometimes become a barrier for them to conduct healthy behaviors.

"I had a cervical spine problem several years ago, and it forced me to stop my running activities for quite enough time." (No 3, female, Department of Anaesthesiology and Intensive Care)

Extrinsic barriers

The burden of responsibilities for being medical teachers

Most of the 24 hours that medical teachers have is allocated to fulfill the responsibility of being staff in medical school. It then significantly reduced their time to take care of themselves, e.g., to decrease their motivation to perform physical exercise. With the increasing number of jobs that institutions wanted they have, many medical teachers are finally stuck in their job all the time they have in a day. It increased stress and finally harms their health.

"We have a heavy burden of being a medical teacher. We have to teach, conduct research, make an excellent publication, and be involved in community activities, and we also have

a routine meeting that almost filled out our entire schedule on the workday on campus. How we can provide time for joining a health activities program that is facilitated by this school?" (No 10, male, Department of Microbiology)

"Having a full schedule in a day, it forces us to drive a car even though only moving from one building to a close building. This condition makes us no longer particularly devoted our life to health." (No 9, female, Department of Neurology)

Environment

Some situations happen in the environment which inhibits medical teacher from conducting healthy behavior: the limitations to having access in sports facilities that available in the surrounding environment, do not have support from a close people around them, the event of healthy behavior program only conduct in a specific time, the types of physical activity that held in the environment did not accommodate personal interest, the lack of socialization of health facilities that available in the environment, and the atmosphere in the surrounding environment is less conducive to conducting healthy behaviors.

"My brother and his families have overeating behavior. I always remind them, but it was not easy since they love to taste food in the new cafe." (No 5, female, Department of Health Nutrition)

"They have a gymnastic session every Friday morning. However, I could not join because I have a teaching schedule at that time and also not interest in gymnastics." (No 8, male, Department of Health Policy and Management)

From the analysis, we also found the reason for medical teachers as healthy role models in medical schools to choose one particular healthy behavior. Several reasons provoke medical teachers to choose one particular healthy behavior: an interest to adopt particular healthy behavior, past healthy habits, and joining a community in one particular healthy behavior.

"I like vegetables and fruit so much. When someone invited me to have lunch or dinner, I preferred to choose a 'pecel,' 'or urap.' I do not need any effort to do that because it happens automatically. I did it because I love that food so much." (No 1, female, Department of Forensic Medicine and Medicolegal)

"In the Department of Anaesthesiology and Intensive Care, we have many counselors that love for running. Thus, we made a group to support each other." (No 3, female, Department of Anaesthesiology and Intensive Care)

The differences among medical teachers as a healthy role model in the two groups: active and passive are identified in their motivation and willingness to promote healthy behavior to others. The medical teachers in the active healthy role models group make healthy behavior as their daily habits. They make re-arrangement of doing particular physical exercise, such as when they have a hectic schedule. Whereas, in the passive healthy role model group, the medical teachers only conduct healthy behavior when they have more free time. Furthermore, an active healthy role models conduct their physical exercise routinely. This regular activity then invited other attention to observe what they do. They also have a willingness to ask other people to join them in performing healthy behavior when someone asked about their health behavior. This sense was captured in the interview when they told us with enthusiasm about their experiences on inviting other people to perform healthy behavior together. This experience did not find by the participants from passive healthy role models group because they only more focused on telling how their experiences in conducting what kind of healthy behaviors they perform.

"I like physical activity. I love running so much." I remembered for the first time; it was only me, then finally I started to invite my husband then my children. Now, all of us always have running sessions together." (No 3, female, Department of Anaesthesiology and Intensive Care, an active healthy role model)

"I used static bicycles at home for my physical exercise. It lasts for approximately 15 minutes in one session. However, I do not have this physical; exercise regularly. It only happens when I have more free time." (No 9, female, Department of Neurology, a passive healthy role model)

Discussions

Our study found the intrinsic and extrinsic facilitators that support medical teachers to conduct healthy behaviors. The motivation for doing healthy behavior cannot be separated from their belief in the benefits of doing one healthy behavior (self-efficacy).¹⁴ The benefits could be attributed to a physical aspect, social, and information that useful for making self-

evaluation.¹⁴ In a physical aspect, some participants did not experience back pain when doing stretching exercises routinely. In the social aspect, some participants felt more confident when they see themselves appearing younger after taking yoga classes regularly. It makes them more confident to have social relations with others. In the self-evaluation aspect, some participants felt safe when they knew that regular physical activity could control symptoms of their disease. Medical teachers as healthy role model in medical school needs self-efficacy. Someone who has a high self-efficacy tends to have the belief that everything they do depends on themselves.¹⁵⁻¹⁷ Therefore, with this self-efficacy, they can handle the barriers in performing healthy behaviors.

Some of our participants have a chronic disease. It makes them aware that they were vulnerable to getting an illness. Thus, it motivates themselves to conduct healthy behaviors. In the health belief model (HBM),¹⁸ people who realize that they are vulnerable to a particular disease that can harm their lives, having a belief that doing healthy behavior could prevent them from the risk of suffering that disease, will adopt the healthy behavior they believe. The benefits which our participants got from doing one healthy behavior make them have a high self-efficacy in doing healthy behavior. However, some chronic diseases could lead to a physical limitation condition; thus, it will provide a barrier to healthy behavior. The presence of physical limitations caused by chronic disease also causes a decrease in a medical teacher's self-efficacy gets worse, especially to a person who has a lack of self-motivation to conduct healthy behavior.

The knowledge of health as a medical teacher only acts as a prerequisite for health behavior change. Because it only increases one's self-awareness that they are vulnerable to the risk of illness or increased their attention to observe their healthy colleagues.¹⁹ However, this knowledge is still needed in creating a healthy behavior change.¹⁴ Because people who

lack the knowledge of their vulnerability to particular disease tend to position themselves who were difficult to change their unhealthy behavior.

Our findings on the economic reason could serve as one of the factors that support medical teachers to conduct healthy behaviors. This finding is different from other studies outside the context of medical schools. Those studies had found that low-income influence the more significant practice of unhealthy living behaviors, such as physical activity^{20, 21}, and unhealthy eating habits.²²⁻²⁴ Humphreys and Ruseski²⁰ aimed to explore if a person's economic factors influence their active ¹⁶ participation in physical activity. They found that the higher the amount of income that someone who has would increase a tendency to participate in physical activity actively. Kari and colleagues²¹ ¹⁵ conducted a study to determine the relationship between the amount of a person's income and physical activity carried out every day, the physical activity carried out during the free time, and the number of footsteps in one day measured by a pedometer on 753 adults in Finland. They found a strong ¹² relationship between the amount of income and physical activity, but only in the female participants of the study and not for men. Appelhans and colleagues²² conducted a cross-sectional study to visitors who shop at a supermarket and found that visitors with low income tend to buy more fat and are less nutritional. French and colleagues²³ studied the relationship between the amount of income in a household and the quality of food purchased. Their results showed that households with low incomes tend to buy unhealthy food. Pechey and Monsivais²⁴ assessed households' economic status with food choices purchased from supermarkets. They found that households with higher economic status tend to buy healthy food. However, our participants' characteristic in this study that is different from other studies might result in these differences.

In this study, we also found extrinsic facilitators that have a significant impact on supporting medical teachers to conduct healthy behavior. The environment, as one of the

extrinsic facilitators, is explained by Bandura's social cognitive theory.⁸ According to Bandura, human behavior is influenced by its interactions with personal factors and the environment, known as reciprocal determinism. The presence of medical teachers as a healthy role model in the medical school environment served as a social influencer, social reminder, and role model to students and staff. Several studies found that parents, friends, or teachers can also play a role as social influencers;²⁵ social reminders;²⁶ and role models.²⁶⁻³⁰ We used these studies since no publication was found regarding healthy role models in medical school context. Cheng, Mendoca, and de Farias Junior²⁵ conducted a cross-sectional study of adolescents aged 14-19 years to assess the relationship between physical activity frequency and social support originating from parents and friends. They found that social support increased self-efficacy in children. Tibs and colleagues²⁶ interviewed African-American parents to evaluate the parents' frequency modeling healthy eating behaviors for their children. They found that African-American parents did not just play a role model by modeling healthy eating foods to their children. They also have a lunchtime together with their children when they want to model one new healthy food. Angoorani and colleagues²⁷ surveyed to evaluate the relationship between parental weight status and physical activity and television viewing habits in their children. They found that children who have obesity parents tend to sedentary activity. Brunet and colleagues²⁸ conducted a longitudinal study on 190 adolescents and found an increase in adolescents' physical activity when their parents were actively involved in their physical activities. Cheney, Oman, and Vesely²⁹ conducted a longitudinal study on 467 pairs of parents and teenagers aged 12-17 years and found that other family members in a house who has similar age as a child could reduce the frequency of smoking behavior in adolescents. Layzer, Rosapep, and Barr³⁰ conducted interviews to evaluate the effectiveness of safe sex learning in adolescents using adolescent models as peer educators who were older than subjects. They found that more participants conducted this

healthy behavior because they were motivated to practice what they learned from their peers. The presences of parents and peer who modeled healthy behavior has been proved to increase the self-efficacy of observers to carry out healthy behaviors by mediating as a social influencer, social reminder, and role model.^{15, 17}

To be an active healthy role model, a medical teacher must-have much experiences in conducting healthy behavior actively. Active healthy role model should be the right place to consult about challenges when doing healthy behavior. Their shared experience of doing healthy behavior, especially the strategies to maintain their self-efficacy for healthy behavior, is important to support their characteristic of active healthy role model in medical school. Whittaker and colleagues³¹ found that the effectiveness of smoking cessation programs in adolescents occurred because the program is facilitated by role models who have experience in smoking cessation. Parent and Fortin³² also found that the effectiveness of compliance of participants who were patients undergo coronary artery bypass graft to attend a rehabilitation program was occurred only in the group which accompanied by a role model who was a patient with the same treatment history and had succeeded through a rehabilitation program to have regular daily activities. Our study found that the active healthy role models have an experience that some of their colleagues used them as consultation places when they have a problem doing the same healthy behavior as healthy role models do.

Voorhees and colleagues also found the role of the environment in facilitating healthy behavior.³³ They found that public facilities that could be used both for recreation and having physical activities would increase the intention of people to use that facility. Also, the regulation that obligates people to conduct healthy behavior has proved to increase people's intention to conduct healthy behaviors.³⁴ Our study found that the presence of new regulations on changing a meeting snack to healthier is unconsciously developed to a new healthy habit of medical teachers.

Furthermore, the role of media to promote healthy behaviors available in the environment effectively increases people's intention to perform healthy behavior. The study of Pappas-DeLuca and colleagues³⁵ and Whittaker and colleagues³¹ showed that the media effectively promotes healthy behavior to their participants. Pappas-DeLuca and colleagues³⁵ surveyed 555 adolescent participants in Botswana to evaluate the effectiveness of radio broadcast programs to promote HIV screening testing. They found that the promotional broadcast program increased the enthusiasm of participants to conduct HIV screening examinations. Whittaker and colleagues³¹ conducted an experimental study with a ¹¹ randomized controlled trial to evaluate the effectiveness of smoking cessation promotion using mobile media in teenagers and young adults aged 16-25. They found that media is effective in promoting smoking cessation behavior in teenagers and young adults. In our study found, we found that sticker which informed the number of calories will be wasted per step when using a stairs increase the tendency of medical teachers to choose stairs than elevator when they go upstairs.

The main barrier for medical teachers to conduct healthy behavior in this study is the workload. It diminished leisure time for medical teachers to take care of themselves. The decrease in leisure time will decrease their motivation to conduct healthy behavior because the remaining time is preferably used to rest. The lack of time to conduct healthy behavior is a barrier to prevent people from having healthy behavior. It is also explained by ¹⁴ the theory of planned behavior (TPB).³⁶ Even though the lack of time only has a short-term effect by causing delays in practicing healthy behavior, but if this issue is maintained for a long time, it will decrease motivation to perform healthy behavior. A study of Wright and Caresse³⁷ and mentioned by Cruess, Cruess, and Steinert¹⁰ explained that the workload of the medical teacher is a primary factor that inhibits the effectiveness of role modeling in medical schools. Our participants explained that with the increase of academic qualification of medical

teachers, it would directly impact the increase of a task that gave by the institution to them. Therefore, many medical teachers finally stucked their life only for work. It will tend to increase physical fatigue, lack of leisure time, stress, and decrease their motivation to conduct healthy behavior.

In this study, one of the three reasons for a medical teacher to choose a particular health behavior is past healthy habits. Some of our participants told their history to explain the reason to choose their healthy behavior. Verplanken and Aarts³⁸ and Ajzen.³⁹ They explained that past behavior directly influences future behavior through repetition. It must occur continuously in a stable condition. When the same situation occurs, the production of behavior will automatically happen, and this process occurs unconsciously. By understanding this process, we could explain the relationship between the habitual factor and the healthy behavior adopted by our participants.

The difference between the characteristics of two groups of healthy role models found in this study also supports the interpretation of our developed questionnaires in the previous survey.¹² The difference between active and passive healthy role models is emphasized on adequately healthy modeling characteristics. A passive healthy role model also did not have a willingness to promote health behavior actively to others. Furthermore, the inconsistent time to conduct healthy behavior in the passive healthy role model group did not attract other's attention to observe their healthy behavior, which is essential to initiate the modeling process.^{8,14} Therefore, healthy modeling could not occur adequately in a passive healthy role model group.

Limitations

We considered that this study only has a limited number of subjects that led a challenge to generalize this result. With this number of subjects, we difficult to explain comprehensive

factors that support and inhibit medical teachers in medical school to conduct healthy behaviors. We realized that other factors did not explain in this study, e.g., personality traits that might influence medical teachers to conduct healthy behavior. Several studies found that some personality traits (conscientiousness and extraversion) have a relationship with healthy behavior. Siegler, Feaganes, and Plaeffli⁴⁰ found that the conscientiousness trait affected the patient's obedience to mammography treatments. Rhodes and Plaeffli^{41, 42} found that individuals with extraversion trait had a high intensity of physical activity. Hampson and collegeaus⁴² found that a person with extraversion and conscientiousness traits is easier to motivate in smoking cessation. From the results of previous studies about the influence of personal trait above, we suggested that future research about a healthy role model in medical school need to consider it. Hagger-Johnson and Shickle⁴³ found that a person with conscientiousness trait tends to have more frequent physical activity, consume less alcoholic drinks, the low tendency of using illegal drugs, and rarely engage in dangerous sexual behavior.

Conclusions

Our participants acknowledge factors that serve as facilitators and barriers for a medical teacher as a healthy role model in medical schools to conduct healthy behavior. Understanding these factors could be considered in the planning and designing of the intervention, mainly to focus on removing barriers and strengthening facilitators to increase the effectiveness of the characteristics of medical teachers as healthy role models. By doing this, medical schools have contributed to increasing the health nation by producing a healthy physician who serves as a healthy role model in the community.

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³ Conflict of interest

The authors report no conflict of interest. The authors alone are responsible for the content and writing the article.

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Table 1. Classification of theme, categories, and subcategories

Subcategories	Categories	Theme
Motivation <i>Conscious awareness</i>	Intrinsic facilitators	Perceived facilitators
Having physical limitation		
Knowledge		
Economic reason		
The impact of doing a particular job	Extrinsic facilitators	
Feedback		
Time		
Environment		
The lack of self-motivation	Intrinsic barriers	Perceived barriers
Having physical limitation		
The burden of responsibilities for being medical teachers	Extrinsic barriers	
Environment		

Appendix 1.

Interview Guide

Semi-structured Questionnaire:

1. Do you have the desire to be a healthy role model in medical school?
2. What kind of healthy behaviors do you do in your daily life?
3. Did you share your gaining experiences in performing healthy behaviors?
4. Is this institution provide a pleasant environment for you to conduct healthy behaviors effectively?
5. What factors that this institution has in order to support you in conducting healthy behavior?
6. What inhibition factors that challenge you to conduct healthy behavior?
7. Is there any recommendation to maximize the effectiveness of this institution in supporting their medical teachers for conducting healthy behavior?

All of the above questions are then explored again using the words 'What,' 'Why,' and 'How.'

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