

Barriers and facilitators of health-enhancing physical activity behavior among health professional students in a Nigerian university setting

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Abstract

Background: Health-enhancing physical activity (HEPA) is very beneficial to humans. However, physical activity levels are declining in many countries even among health care professional students. The aim of this study was to investigate the perceived facilitators and barriers to the practice of HEPA among clinical students in a Nigerian University setting.

Methods: The study utilized a mixed method design, which consisted of cross-sectional survey of 217 clinical students and explorative qualitative study involving 21 clinical students of a Nigerian University. Exercise Barriers Scale and Facilitators of Physical Activity Questionnaire with Likert scale response options were used to assess the perceived barriers and facilitators of HEPA respectively. Descriptive statistics were used to summarize the data obtained from the cross-sectional study. Content thematic analysis was used to analyze the explorative qualitative study.

Results: The female participants were 111 (51.85%) and 106 (48.15%) were male participants. The mean (\pm standard deviation) age of all the participants was 22 ± 2 years. The

facilitators of HEPA among the participants include fitness and health benefits; opportunity to interact with others; availability of conducive environment for exercising; availability of time for physical activity and social support. Barriers to HEPA reported by the participants are tiring and fatiguing nature of exercise; lack of convenient schedule at exercise facilities; few available places for exercise, lack of motivation; and study overload.

Conclusion: Barriers and facilitators of HEPA among college clinical students are very remediable factors. University management can encourage students' participation in HEPA by creating enabling environment and time for recreation.

Keywords: Facilitators, Barriers, Health-Enhancing Physical Activity behavior, Clinical students, University setting

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Introduction

The recommended Physical activity (PA) level is at least 150 minutes of moderate-intensity aerobic PA throughout the week or at least 75 minutes of vigorous-intensity aerobic PA throughout the week or an equivalent combination of moderate and vigorous-intensity activity.¹ Adherence to the recommendation of being physically active daily would improve the health of the population considerably and reduce the costs of health care drastically.² Health Enhancing Physical Activity HEPA is an activity that is beneficial to health, when combined with baseline activity.³ HEPA includes exercise, sports, physically active commuting, and recreational activity which is physically demanding.⁴

The health benefits associated with regular HEPA are well established.⁵ These benefits include improved cardiorespiratory and muscular fitness, subjective well-

being, self-esteem, cognitive performance and sleep quality. These also include reduced risk of premature death, coronary heart disease, stroke, high blood pressure, unfavourable blood lipid profile, type 2 diabetes, metabolic syndrome, obesity, colon and breast cancers, depression and anxiety.^{6,7} Despite the widely documented benefits of HEPA, physical activity levels are declining in many countries.¹ According to Hallal et al,⁸ 31% of the world's population are not physically active. Studies have reported high prevalence of physical inactivity and low PA level across various sub-populations in Nigeria, and females are more likely to be physically inactive.^{9,10,11} There is high prevalence of physical inactivity (41%) among young adults (16 to 39) in Nigeria⁹ including health professional students whose compliance with PA guidelines is only through the accumulation of moderate-intensity activity.¹²

Physical inactivity is the fourth leading risk factor for global mortality, responsible for the death of about 3.2 million people worldwide.^{1,13} It is associated with global obesity pandemic and the increase in the burden of non-communicable diseases (NCDs) in developing countries.¹⁴ The decline in the level of PA is responsible for the prevalence of NCDs like cardiovascular diseases, diabetes and cancer and their risk factors such as high blood pressure, high blood sugar and overweight.¹ Physical inactivity is estimated to be responsible for about 21-25% of the burden of breast and colon cancers,

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27% of the burden of diabetes and 30% of the burden of ischaemic heart disease.¹⁵ The promotion of the adoption of HEPA is important in developing countries to address the growing epidemic of physical inactivity-related diseases and the growing epidemic of NCDs.

Health care professional students will become health care professionals who have an important role to play in the promotion of population-wide participation in physical activity and the effective control of non-communicable diseases. The health care professional especially the physiotherapists, assess the physical status of their patients regularly and recommend the participation in HEPA to their patients, as part of their practice.¹² HEPA behavior in health care professionals must have been inculcated even as students. Since studies have shown that young adults and health care professional students in Nigeria are sedentary,^{9,12} it is important that we understand the factors that affect the practice of HEPA behavior among clinical students especially at university setting. We therefore sought to identify barriers and facilitators of HEPA and experiences in practicing HEPA among clinical students in a University setting. The identification of the perceived facilitators and barriers to the practice of health-enhancing physical activity behavior among these students may be useful in encouraging or reinforcing factors that promote the practice of health-enhancing physical activity behavior and eliminating or modifying factors that hinder the practice of health-enhancing physical activity.

This study which has a qualitative component is anchored on socio ecological model; Collective Action Model (CAM) is an ecological model of health behavior drawn from a biological science view of ecology, which is interested in capturing the interplay between an organism and its environment, socio-ecological models identify multiple levels of influence, typically ranging from individual factors such as one's biological state to broader community, geopolitical, and policy influences.^{16,17,18} This approach takes account of the inter-relationship between individual and the environment. It is based on the view that health is determined by other factors outside the control of the individual. It engages people in critical thinking in order to improve their understanding of the factors affecting individual and community well-being. It also engages in critical thinking of actions that can contribute positive change at collective level. Considering HEPA, there is need for community empowerment apart from individual behavior change. We opine that using this model in solving challenges associated with health behavior is likely to bring a more permanent solution than individual behavioral change. This study described the perceived facilitators and barriers to the practice of health-enhancing physical activity behavior among health care

professional students of the University of Ibadan, Nigeria.

Materials and Methods

Study design, Setting and participants: This study utilized the mixed method design consisting of a cross-sectional survey and an exploratory qualitative study (focus group design). Studies on lifestyle needs qualitative approach as lived experiences of people can be explored effectively qualitatively. Knowing the limitation of cross sectional study, we decided to combat that limitation by adding qualitative component. Study participants were students of Medicine and Surgery (400, 500 and 600 level), Dental Surgery (400, 500 and 600 level), Physiotherapy (400 and 500 level) and Nursing Science (200, 300, 400 and 500 level) at the University of Ibadan, Nigeria

Students with mobility disability and other health challenges which may require only supervised exercise were excluded from this study.

Sample size and sampling method: The participants for both the cross-sectional survey and qualitative components were recruited to the study by a purposive sampling technique. The sample size for cross sectional component of this study was determined using the Slovin's formula¹⁹ [$n \leq N / 1 + N(e^2)$] where $n \leq$ sample size, $N \leq$ total population of students in the chosen levels of the departments (694), and $e \leq$ confidence level ≤ 0.05 . A sample size of 254 was determined. Twenty one participants were recruited for the focus group discussion with minimum of three for each discipline. Instruments used were the Exercise Barriers Scale (EBS) and Physical Activity Facilitators Questionnaire. The EBS developed by Sechrist, Walker and Pender, is a 14-item scale used to assess the barriers to exercise among the participants. The barriers scale is divided into four subscales: exercise milieu (6 questions), time expenditure (3 questions), physical exertion (3 questions), and family discouragement (2 questions). The Barriers Scale has been assessed as a reliable scale to evaluate the perceived barriers to exercise,²⁰ The Likert 4-point scoring system was used to score all the items in the exercise barriers scale; whereby 4 \leq 'strongly agree'; 3 \leq 'agree'; 2 \leq 'disagree'; and 1 \leq 'strongly disagree'.

Physical Activity Facilitator Questionnaire was developed by the lead authors with other researchers involved in questionnaire and scale development and validation studies.^{21,22,23} The authors have published several articles utilizing mixed method design.^{24,25,26} The developed questionnaire was used to determine the facilitators of physical activity among the participants. It was content and face validated by experts in the Department of Physiotherapy, University of Ibadan, Ibadan. The Likert 4-point scoring system was used to score all the items in the Physical Activity Facilitators

Questionnaire; whereby 4 ≤ 'strongly agree'; 3 ≤ 'agree'; 2 ≤ 'disagree'; and 1 ≤ 'strongly disagree'.

The cross-sectional survey

A biodata form was administered along with the questionnaires to obtain socio-demographic information. The questionnaires were hand-distributed and self-administered by the researchers. The researchers waited to collect each completed questionnaire, when completed immediately or when time permitted. In situations where questionnaires were not completed immediately, the researcher went back to the participant for subsequent collection.

Focus Group Discussion

Twenty-one participants who were purposively selected participated in the focus group discussion which held at the Department of Physiotherapy of a University in southwest Nigeria. The authors planned to have students at every level from Medicine and Surgery, Dentistry, Physiotherapy and nursing. Focal people based on interaction of one of the authors with the students identified the students who would be able to speak freely and give necessary information. A minimum of three for each discipline was deemed adequate being a qualitative study. However, only two nursing students came and many physiotherapy students participated because the focus group discussion held at physiotherapy department. There were three focus group discussions. The first, second and third focus group discussions consisted of seven, six and eight participants respectively. The focus guide was used to guide the discussion and each focus group discussion lasted for about one hour 30 minutes. Focus guide consisted of questions exploring the perceived facilitators and barriers of the practice of HEPA behavior among clinical students of the selected University. The focus group was moderated by the lead researcher. Notes were taken by an independent observer and all information given by the participants during the discussion was recorded with an audio tape recorder. The focus group discussion was conducted until data saturation was achieved. The moderator used probes as necessary to stimulate the discussion. The recorded information from the discussion was transcribed by the transcriptionist and the transcribed work served as the basis for analysis. Validity check was done by comparing information transcribed with notes taken. Analysis was carried out by an expert who is not one of the authors and further validated by the authors to ensure trustworthiness. We also utilized informant triangulation; using a variety of informants from various discipline ensured credibility of the study.

Ethical consideration

Ethical approval was sought and obtained from the University of Ibadan/University College Hospital (UI/UCH) Research Ethics Committee before the commencement of the study. An informed consent was obtained from the participants after the rationale for the study was explained to them.

Data Analysis

Descriptive statistics of mean and standard deviation (for age of participants) frequency, percentages, and range were used to summarize the results. The audio-recorded responses from the focus group discussion was transcribed verbatim and was used to update the write-up of the recorder. Content and context analysis using a thematic approach involving the grouping together of similar themes in each item was followed by identifying trends and differences across transcript.

Results

A total of 270 copies of the questionnaires were distributed to the participants. However, 256 copies of the questionnaires were returned (response rate of 94.8%). Two hundred and seventeen (80.37%) were deemed fit for analysis.

Table 1: Socio-demographic Characteristic of the Participants

Variables	Frequency (%)
Age (years)	
16-20	49 (22.6%)
21-25	149 (68.7%)
26-30	16 (7.4%)
31-35	2 (0.9%)
36-40	1 (0.5%)
Sex	
Male	106 (48.8%)
Female	111 (51.2%)
Degrees	
B.D.S	43 (19.8%)
MB;BS	97 (44.7%)
B. Physiotherapy	34 (15.7%)
BNSc	43 (19.8%)
Level of Study	
200	19 (8.8%)
300	8 (3.7%)
400	78 (35.9%)
500	62 (28.6%)
600	50 (23.0%)
Marital Status	
Single	212 (97.7%)
Married	5 (2.3%)

Table 2: Themes/ sub-themes used for qualitative study

S/N	Themes	Sub-themes
1	Knowledge of physical activity	Difference between physical activity and exercise with examples
2	Knowledge of health-enhancing physical activities	Participation in health-enhancing physical activity Examples of health-enhancing physical activity
3	Specific health-enhancing physical activities engaged in	The frequency and duration of participation in these health-enhancing activities
4	How physical activity enhances health	Physical health, mental health, emotional health
5	Perceived facilitators to the practice of health-enhancing physical activity behavior	Environmental, institutional and personal
6	Perceived barriers to the practice of health-enhancing physical activity behavior	Environmental, institutional and personal
7	Recommendations on possible solutions to eliminating barriers to health-enhancing physical activity	Personal and institutional

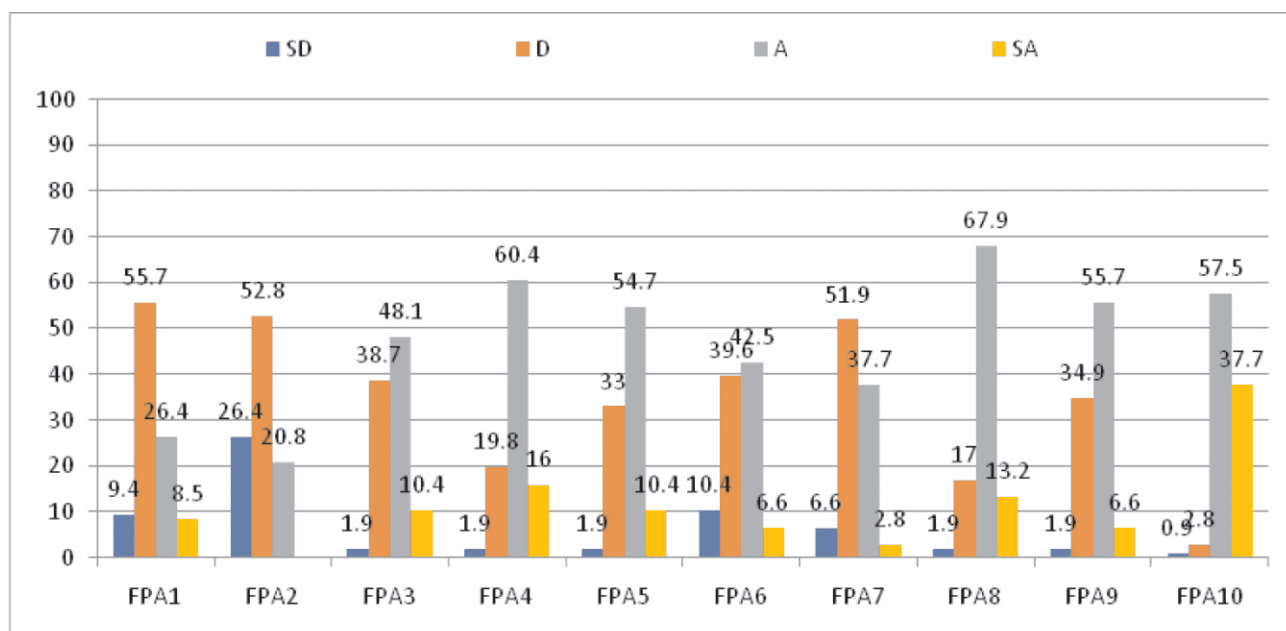


Figure 1: Overall Distribution of Male Participants' Responses to Facilitators of PA

FPA1: There are many exercise facilities around where I live

FPA2: Physical activity is not costly

FPA3: I have time for physical activity

FPA4: Physical activity is fun for me

FPA5: Physical activity does not take too much time from academic activities

FPA6: My friends keep me company and encourage me when exercising

FPA7: Exercise facilities have convenient schedule and appropriate fitness programme for me

FPA8: Physical activity gives me an opportunity to interact with others

FPA9: My environment is conducive for exercising

FPA10: Physical activity makes me fit and healthy

SD: Strongly disagree

D: Disagree

A: Agree

SA: Strongly agree

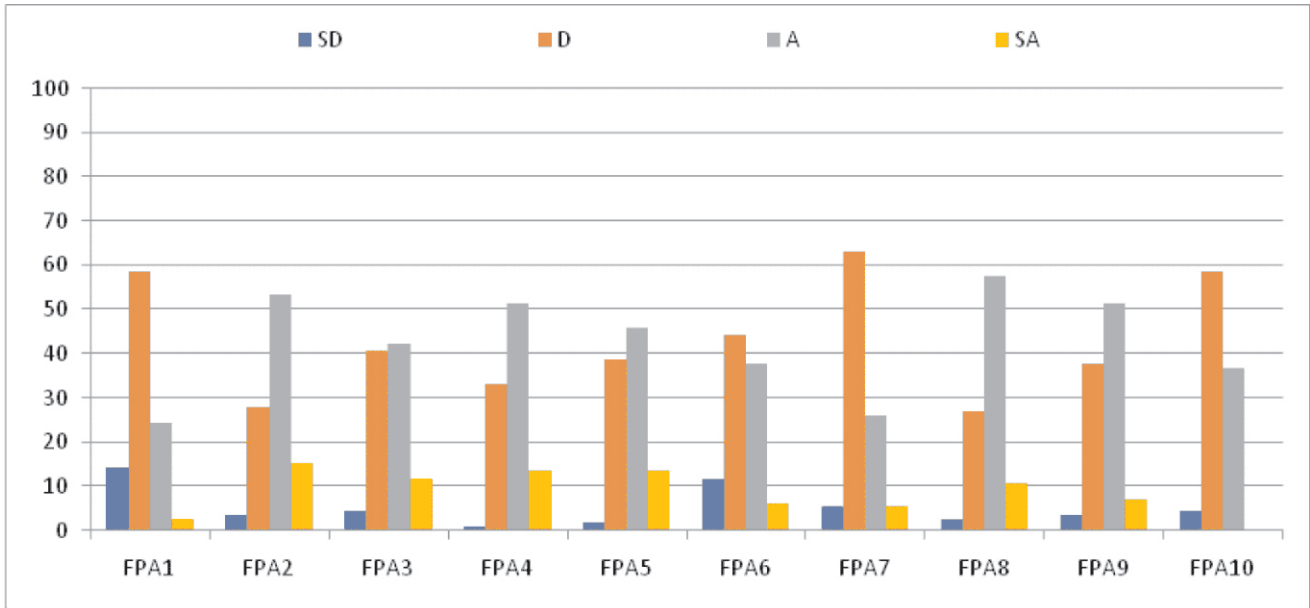


Figure 2: Overall Distribution of Female Participants' Responses to Facilitators of PA

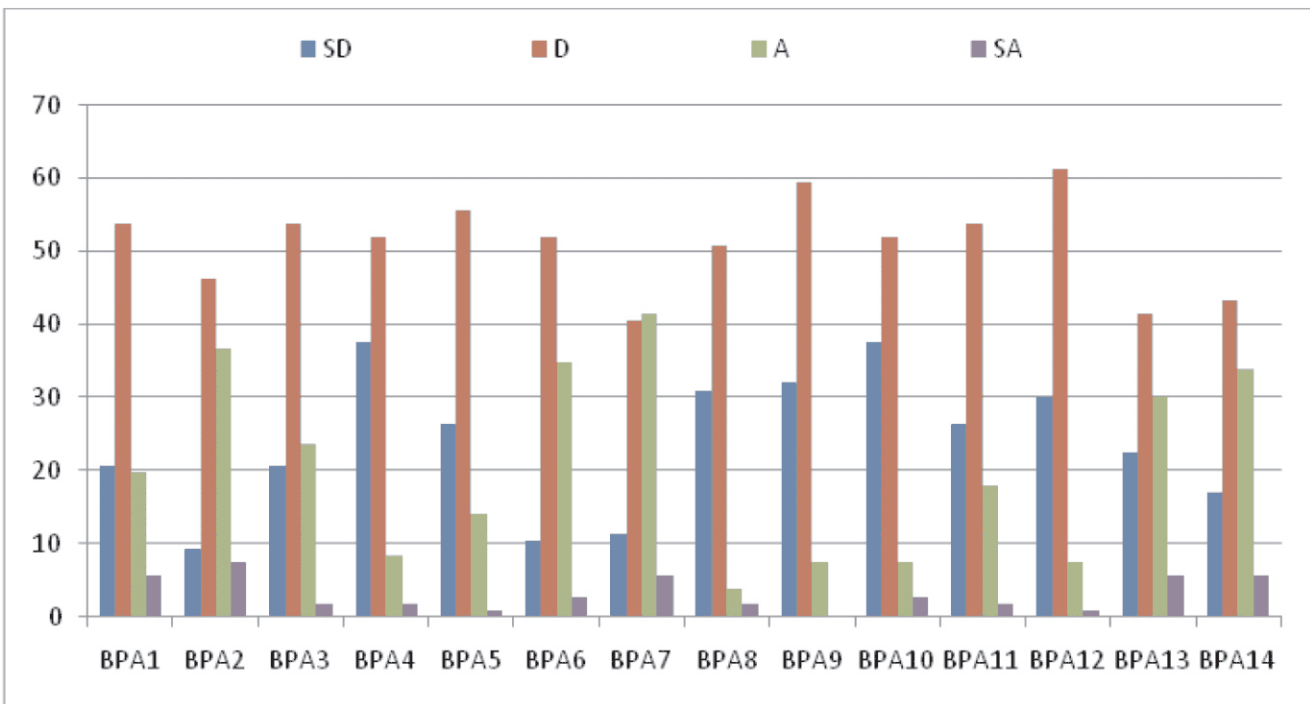


Figure 3: Overall Distribution of Male Participants' Responses to Barriers to PA

BPA1: Exercising takes too much of my time

BPA2: Exercise tires me

BPA3: Places for me to exercise are too far away

BPA4: I am too embarrassed to exercise

BPA5: It costs too much to exercise

BPA6: Exercise facilities do not have convenient schedules for me

BPA7: I am fatigued by exercise

BPA8: My spouse (or significant other) does not encourage exercising

BPA9: Exercise takes too much time from family relationships

BPA10: I think people in exercise clothes look funny

BPA11: My family members do not encourage me to exercise

BPA12: Exercise takes too much time from my family responsibilities

BPA13: Exercise is hard work for me

BPA14: There are too few places for me to exercise

SD: Strongly disagree

D: Disagree

A: Agree

SA: Strongly agree

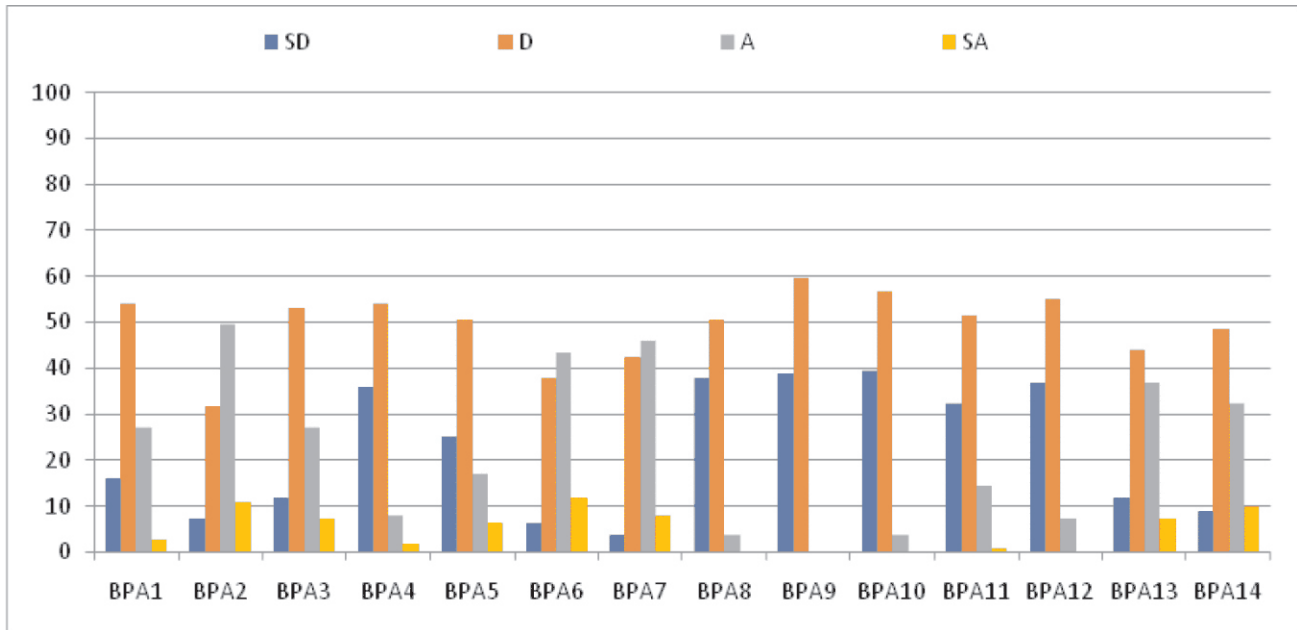


Figure 4: Overall Distribution of Female Participants' Responses to Barriers to PA

Socio-demographic Characteristics of participants

The 217 study participants were made up of 111(51.15%) females and 106 (48.85%) males. The mean age of the students in the cross-sectional study was 22 ± 2. The distribution of participants according to study discipline (Table 1) was 43 (19.8%) Dental and Surgery, 97 (44.7%) Medicine and Surgery, 34 (15.7%) physiotherapy and 43 (19.8%) Nursing Science .

For the qualitative component, twenty-one students (11(52.4%) males; 10 (41.6%) females with a mean age of 22.0 ± 1.6 participated in the focus group discussion. Three focus group discussions were conducted with the first, second and third focus group discussion consisting of seven (3 males; 4 females; mean age ≤ 22 ± 1.5 years), six (4 males; 2 females; mean age ≤ 22 ± 2 years) and eight (4 males; 4 females; mean age ≤ 22 ± 1 years) participants respectively.

Perceived facilitators to the Practice of Health-Enhancing Physical Activity Behaviour

The perceived facilitators to physical activity reported by the participants were fitness and health benefits (95.4%); opportunity to interact with others (75.3%); cheapness of physical activity (71.0%); fun nature of physical activity (70.5%); not taking too much time from academic activities (62.2%); availability of conducive environment for exercising (60.4%); having time for physical activity (56.3%)(table 2).

Out of the 106 male participants, 95.2% of the participants perceived that the facilitator to physical activity was that physical activity made them fit and healthy, 81.0% perceived that physical activity gave them an opportunity to interact with others, 76.4% perceived

that physical activity was fun for them, 65.1% perceived that physical activity does not take too much time from academic activities, 62.3% perceived that their environment was conducive for exercising, and 58.5% perceived that they had time for physical activity as shown in figure 1.

Out of the 111 female participants, 68.5% of the participants perceived that the facilitator to physical activity was that physical activity was not costly and physical activity gave them an opportunity to interact with others, 64.9% perceived that physical activity was fun for them, 59.4% perceived that physical activity did not take too much time from academic activities, 58.6% perceived that their environment was conducive for exercising, and 54.0% perceived that they had time for physical activity as shown in figure 2.

Perceived barriers to the Practice of Health-Enhancing Physical Activity Behaviour

The participants identified the following as barriers to physical activity: tiring nature of exercise (52.7%); fatiguing nature of exercise (50.7%); lack of convenient schedule at exercise facilities (46.6%); few available places for exercise (41.0%); and hard nature of exercise (40.1%)(table 3)

Out of 106 male participants, 47.2% of the participants perceived that the barrier to physical activity was that exercise fatigued them, 44.3% perceived that exercise tired them, 39.7% perceived that there were too few places for them to exercise, 37.7% perceived that exercise facilities did not have convenient schedule for them, and 35.9% perceived that exercise was hard work for them as shown in Figure 3.

Out of the 111 female participants, 60.3% perceived that the barrier to physical activity was that exercise tired them, 54.9% perceived that exercise facilities did not have convenient schedule for them, and 54.0% perceived that they were fatigued by exercise as shown in figure 4.

Result of the qualitative component of the study

A group of students including males and females participated in the focus group discussion. The participants were called by numbers 1, 2, 3 till 8 and their socio-demographic variables are summarized in tables 10, 11 and 12. The participants were asked question in relation to the aim of the study. Themes and sub-themes were also generated (Table 5).

Knowledge of Physical Activity

The participants generally could not precisely define physical activity and had inadequate knowledge of the difference between physical activity and exercise. They generally saw exercise as general body movement. However, one of the participants (physiotherapy student) got the definition of physical activity and exercise correctly. Below are the excerpts:

“Physical activity is anything that involves doing something. If I'm looking may be not but speaking is physical activity”

“Exercise is what you engage your body in to keep fit and it can come in any form. Like anything you do just to make sure that the body is in the normal position, normal state”

“The difference between exercise and physical activity is the fact that exercises are structured and physical activities are just activities of daily living. If I walk to class every day, it's a physical activity. Some people, they might see it as a form of exercise but if it's not planned or it's not structured, it's just a physical activity and not an exercise. But if I plan the walking and have the repetition, the frequency, the number of minutes I walk, the number of days I have to walk and I actually achieve my goal, that makes it an exercise program”

Knowledge of Health-Enhancing Physical Activity

Some of the participants could not correctly define health-enhancing physical activity and neither could they mention correct examples of physical activities that are health-enhancing while some were able to provide examples. Some of the participants believed that they were fully involved in health-enhancing physical activity while some believed that they have not been engaging in health-enhancing physical activity in recent times. Below are the excerpts:

“Physical activity can be anything you're doing. Walking, cooking, they are all physical activity but health-enhancing

physical activity is a physical activity I can may be relate to exercise. You have a plan, it's not you can do it in your leisure hours but it's to enhance the body”

“What I understand by health-enhancing physical activities are activities to promote one's health, to prevent illnesses”

The participants gave some examples of activities they considered to be health-enhancing. These include jogging, walking, running, pushups, pull-ups, sit-ups, squatting, volley ball.

“As therapeutic measures in the ward, some patients that they notice are at risk of having thrombotic diseases like deep venous thrombosis, they ensure that they not just lie down like that, they take walk round the ward”

“Physical activity that helps enhance health include push-ups, pull-ups, sit-ups, squatting”

Some of the participants believed that they were involved in health-enhancing physical activity why others did not:

“I believe I'm maximally involved”

“Well, I won't really say I've been enhancing my health lately or performing exercises that have been enhancing my health lately because at a point I started but then I stopped”

Specific Health-Enhancing Physical Activities

The participants stated some of the activities they perform that they consider as health-enhancing. Some of the participants did not perform these activities consistently. Below are the excerpts:

“What I do basically is walk and weight lifting sometimes”

“Okay, I'm actually engaged in quite a lot ah I used to jog round circular road early in the morning then I walk, I take evening walks too, then I also dance. Then I do abdominals too sometimes”

How Physical Activity Enhances Health

The participants believed that physical activity enhances health, and that effect of physical activity is not only limited to physical health but also mental health. They stated that physical activity is beneficial in preventing diseases like cardiovascular diseases and obesity, and in dealing with stress and improving cognition. Below are the excerpts:

“One, it helps build up cardiovascular endurance and that makes you fit, even muscular endurance sometimes. Like the previous participant said the body composition, what actually determines what the body would look like is energy expenditure and energy intake. If they are structured to tailor your needs and even if it's just health-enhancing physical activity you perform, that way you get to stay healthy and you do not gain

unnecessary weight by just accumulating fat or fluid intake”

“I agree 100% exercise boost the mood, you feel better, you feel good, you feel relaxed, you feel happy. Then asides the mood, it helps to how do I put this, relieve stress or probably prevent stress. Then like the previous participant said, it could help to prevent obesity and break down body fat, helps the muscle, it improves cognitive ability too”

Facilitators of Health-Enhancing Physical Activity Behavior

The participants identified the presence of social support, availability of time and the desire to lose weight as the perceived facilitators to the practice of health-enhancing physical activity behavior. Below are the excerpts:

“My own major facilitator is because of my weight. I'm trying to work on my weight”

“What facilitates it is availability of friends and also the time they say they want to go. If I don't have anything to do, I'll follow”

Barriers to the Practice of Health-Enhancing Physical Activity Behavior

Most of the participants mentioned lack of time, lack of motivation and too much workload as perceived barriers to the practice of health-enhancing physical activity behavior. Other barriers include lack of access to well-equipped exercise facilities, lack of effective time management, laziness, lack of knowledge, lack of personal space, lack of immediate result, lack of interest, financial constraint, parental influence, pain and self-consciousness. Below are the excerpts:

“Well, I'll say the major barriers for me is time. I have times where I feel tired, lazy. Another one is affordability. The only gym close to us is in our hostel and it's not that very good. Also, I think lack of enough knowledge”

“Well it comes down to school too. There's really no time”

“Yes, basically, the major one is laziness. Personally, for me I feel I'm quite lazy getting committed. And yes the gym, guys are doing their stuff, girls are doing their stuff. You kind of feel self-conscious. It's not a standard gym. Most of the things there are tailored to strengthening guys muscles and everything”

Recommendations on Possible Solutions to Eliminating Barriers to Health-Enhancing Physical Activity

Since most of the participants reported that the major perceived barrier to the practice of health-enhancing physical activity was lack of time and increased workload, most of the participants agreed that reducing the workload would go a long way in encouraging them

to engage in health-enhancing physical activity. Other recommendations include educating them on the importance of physical activity and how to go about engaging in physical activity. Below are the excerpts:

“To me, I think students really need to be enlightened. Why exercise, why is it necessary, what to do”

“All departments can just set out time when all students should, must go for physical activity”

“Like the previous participant said, what I think we need is not them organizing a physical thing.

I think what we need is them breaking down the load, letting us have time”

Discussion

In the cross-sectional study, the participants agreed with majority of the items on the perceived facilitators scale. The perceived facilitator to physical activity reported by the majority of the participants was that physical activity made them fit and healthy. Other facilitators reported were opportunity to interact with others; cheap nature of physical activity; fun nature of physical activity; not taking too much time from academic activities; availability of conducive environment for exercising; having time for physical activity. This finding is supported by Silliman et al,²⁷ who reported that the most cited reasons for exercising among college students was health. Mandic et al,²⁸ also reported improvement of cardiovascular fitness, general health/disease prevention, and improvement of musculoskeletal health as some of the motivators of physical activity among medical students.

Physical activity providing an opportunity to interact with others, physical activity not being costly, physical activity not taking too much time from their academic activities, having a conducive environment for exercising, and having time for physical activity were facilitators that were not mentioned in studies conducted in other countries.^{28,29} Perhaps availability of time was not mentioned in studies conducted in other countries because these countries have better organized system or structured programmes. A major factor to note in those studies is that students knew the health benefits of physical activity and were motivated.^{28,29} In this study however, the qualitative component has highlighted the gross lack of knowledge about exercise by health care professional students except those in Physiotherapy. The need to include physical activity in the curriculum of all health care professional is pivotal. The results of the qualitative aspect of the study highlighted further facilitators of exercise including availability of friends to exercise with, availability of time and the desire to lose weight. Hoare et al,²⁹ reported that the most frequently reported motivator of physical activity among adults was the desire to lose or maintain weight. We observed that

availability of time and friends to exercise with were not reported in studies conducted in other countries.^{28,29} The factors of time and availability of friends to exercise is not surprising as an average Nigerian sees exercise as a game and it is better carried out in company. Anecdotal evidence of the belief of exercise as a game carried out in company of people is shown in the statement; "How can one go alone running about and people will not take you for an insane person especially in rural communities"? From the declaration statement above, having company is important to people generally so that they do not appear odd in the environment.

The major perceived facilitator to physical activity reported by the male participants was that physical activity made them fit and healthy while the major perceived facilitator to physical activity reported by the female participants was that physical activity was not costly. Mandic et al,²⁸ had previously reported that the major motivator to physical activity among male medical students was likely to improve health. However, one of the previous studies,²⁹ reported that the major motivator to physical activity among female participants was loss or maintenance of weight.

The perceived barriers to the practice of health-enhancing physical activity behavior reported by most of the participants is tiring and fatiguing effect of exercise. This finding is in agreement with Saleem et al,³⁰ who reported tiredness and exhaustion as major barriers to physical activity. Due to the tiring and fatiguing effect of exercise, the participants of the cross-sectional study perceived exercise itself as a hard task. This may imply that the participants did not view exercise as a venture worth striving for. The participants also complained about paucity of exercise facilities, with those available not having convenient schedule for them. This finding corresponds with a study by Samara et al,³¹ who reported having too few places to exercise as one of the barriers to physical activity among university students. Another study reported that lack of accessible and suitable sports places was one of the barriers to physical activity perceived by health college students.³²

Many of the items on the barrier scale were not perceived as barriers to the practice of health-enhancing physical activity behavior by the participants in our setting. However, other barriers were reported by other participants in the explorative qualitative study.

More barriers to exercise were revealed by the explorative qualitative study. Lack of time was revealed as the major perceived barrier to the practice of health-enhancing physical activity behavior. This is supported by previous results.^{33,34} Study overload, financial constraint, parental influence, pain, self-consciousness and lack of the following: motivation, access to adequate exercise facilities, knowledge, personal space, effective time management, immediate result, interests and

security were further revealed as the perceived barrier to physical activity. Studies have reported lack of motivation as the second major barrier to physical activity.^{28, 34} High cost, family discouragement, lack of effective time management, lack of interest in sports, lack of sport skills, lack of space, lack of resources, lack of safe sporting places and ignorance about the benefits of sports had been previously reported as some of the perceived barriers to physical activity among health college students.^{35, 36, 37, 38} Lack of immediate result, pain and self-consciousness were perceived barriers that are peculiar to our society as they were not reported as barriers to health-enhancing physical activity in other countries.

Lack of immediate results implies that the participants do not have adequate knowledge of exercise, they expect that once they begin exercise, they should begin to see the benefits of weight loss and others. This calls for more educational programs on benefits and mechanisms of benefits of exercise. The factor of self-consciousness is cultural particularly among females (anecdotal evidence) and this can only be overcome by education and acculturation. It is important to note that most people have multiple barriers which are both personal and environmental. The environmental barriers are created and so can be removed but the personal barriers have a lot to do with knowledge and personality of individuals.

There is a need for system and environmental change through policies which will enhance HEPA and a lot of health Education program on HEPA to transform clinical students' perception and knowledge of physical activity.

Limitations. We utilized a mixed method to give credence to this study by eliminating the limitations of the cross sectional survey. The study was conducted in one University but it had a large student population from all geopolitical zones of Nigeria. We recommend similar studies in other African Universities. We did not consider beliefs, cultural and religious influences on HEPA.

We however believe that the study was conducted ensuring credibility and trust worthiness using the following; informant triangulation, validity checks between the notes and information transcribed and involving an expert who is not one of the authors in analysis of the study. Therefore, this study can be replicated in other African University settings

Conclusion

The greatest facilitator reported by the participants in the cross-sectional study was that physical activity gave them an opportunity to interact with others. The facilitators reported in the explorative qualitative study include the presence of social support, availability of time and the

desire to lose weight. The major barriers reported by participants in the cross-sectional study was fatiguing and tiring effect of exercise. The greatest barrier reported in the explorative qualitative study was lack of time, lack of motivation and heavy workload. University management needs to encourage students' participation in exercise by: creating time for recreation for the students; building exercise facilities in hostels; placing professionals in charge of the built facilities; and organizing health education programmes regarding exercises. There may be a need for the development of a suitable instrument for assessing perceived barriers in our society since many items on the exercise barrier scale seemed not to be applicable in our society.

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