

# Health Behaviour Intentions and Barriers to Physical Activity among Health Science Students: Exploring General Self Efficacy as a Mediator

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**Abstract** The objective of this study was to examine general self-efficacy as a mediator of the association between perceived barriers to physical activity (PA) and health behaviour intentions as well as moderate to vigorous physical activity (MVPA) among health science students. 205 Students completed the self-reported questionnaire. Mediation analysis revealed partial mediation of general self-efficacy on relationships between general barriers to PA and health behaviour intentions ( $b=0.812$ ,  $p=0.001$  reduced to  $b=0.586$ ,  $p=0.001$ ). Mediation analysis also revealed that general self-efficacy fully mediated the association between barriers to physical activity and moderate to vigorous physical activity ( $b=0.416$ ,  $p=0.001$  reduced to  $b=-0.93$ ,  $p=0.120$ ). Pearson correlation was done and revealed that general self-efficacy was significantly correlated to moderate-to-vigorous physical activity  $r(205)=0.751$ ,  $p<0.05$ . In view of the findings obtained from this research, participation in exercise has a positive effect on psychological effects like general self-efficacy, and general self-efficacy played a major role in predicting the health behaviour intention of health science students. This study suggests that, in the effort to encourage the student's physical activity participation, university management should also plan and organize programmes to develop positive attitudes among students, because increasing their self-efficacy will have overall effect on their health behaviour habits.

**Keywords:** *physical activity, self-efficacy, moderate-to-vigorous physical activity*

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## 1. Introduction

Self-efficacy assesses a broad and stable sense of personal competence to deal effectively with a variety of stressful situations. This approach can be used to explain a complex set of adherence behaviour (e.g., in diabetics) or the perception of various health symptoms. The General Self-Efficacy (GSE) scale [1] was created to predict how one can cope with daily hassles as well as adaptation after experiencing stressful situations in life. Self-efficacy is a direct predictor of one's intention and of behaviour hence a personal sense of control facilitates a change of health behavior [2]. Self-efficacy determines whether health behavior change will be initiated, how much effort will be expended and how long it will be sustained in the wake of challenges or barriers. This therefore influences the total effort required to change the risk behaviour and continue striving despite the obstacles against this motivation. Self-efficacy is related to health behavior directly and indirectly through its impact on goals an individual set. Students aspiring to be healthcare practitioners need strong self-efficacy and studies have demonstrated that self-efficacy is vital for nursing students and clinical

nurses [3], the study also found that 181 (53.07%) Nursing students were having high General Self Efficacy and 160 (46.92%) had low General Self Efficacy. A multinational study also supported the present study reported that comparing to fresher's the senior students who have higher extrinsic motivation have higher positive General Self Efficacy [4]. From the point of view of psychological well-being, many studies show that exercise has a positive effect [5]. An extensive study with the participation of 23 countries by Haase, Steptoe, Sallis and Wardle [6] revealed that college students do not engage in physical activities at recommended levels. In addition, a study conducted on 1,097 college students by Savcı et al. [7] in Turkey found that students' activeness levels are low. Studies on exercise behavior are usually conducted with participants who continue to exercise, while studies that focus on psychological factors during this habit are extremely rare [8]. The relationship between psychological well-being and physical activity is supported by previous studies [9,10]. The results of another study showed that there were positive correlations between leisure attitude, motivation, and self-efficacy and leisure time physical activity participation among undergraduate students. [11] findings of other studies that found self-efficacy to be a major instigating force in both forming intentions to

exercise and in maintaining the practice for an extended period of time [12,13,14,15]. In Van der Horst's [16] review a number of different types or components of self-efficacy were examined (e.g., barriers efficacy, asking efficacy, environmental change efficacy, physical activity efficacy). The plethora of self-efficacy measures suggests that there is little to no consensus among researchers as to what self-efficacy constructs are important in physical activity research.

## 2. Theoretical Framework

Self-efficacy is a proximal and direct predictor of intention and of behavior. According to Social Cognitive Theory (SCT; [2]), a personal sense of control facilitates a change of health behavior. Self-efficacy pertains to a sense of control over one's environment and behavior. Self-efficacy beliefs are cognitions that determine whether health behavior change will be initiated, how much effort will be expended, and how long it will be sustained in the face of obstacles and failures. Self-efficacy influences the effort one puts forth to change risk behavior and the persistence to continue striving despite barriers and setbacks that may undermine motivation. Self-efficacy is directly related to health behavior, but it also affects health behaviors indirectly through its impact on goals [17]. Social cognitive theory recognizes that self-efficacy acts upon other determinants of health behaviour e.g. environmental and individual factors (SCT; [2]). In our study, we apply social cognitive theory to examine individual factors e.g. self-efficacy as a mediator of the association between an environmental factor Barriers to physical activity and health behavior intentions, we are also confirming this mediation by checking against the self-reported moderate to vigorous physical activity. In social cognitive theory, self-efficacy is a cognitive mechanism that can function as a mediator in health behaviors. Studies have been done before and have found evidence for self-efficacy mediating the association between environmental factors and physical activity [18,19,20,21].

This study is important to perspectives on community health care since encouraging individuals to increase physical activities, including regular and medium level exercise, in their daily routines and contributing to this effort signifies support of community health care. In addition, this result of this study will expand knowledge related to the effects of attempts to alter physical activity based on notions like general self-efficacy. This study's aim is to examine the relationship between health behavior intentions, self-reported moderate to vigorous physical activity and general self-efficacy of university students. Based on the extant research, we hypothesized that: (1) general self-efficacy and barriers to physical activity would be associated with healthy behaviour intentions; (2) General self-efficacy would mediate the association between healthy behaviour intentions and barriers to physical activity (3) general self-efficacy would mediate the association between barriers to physical activity and self-reported moderate to vigorous physical activity; (4) There would be significant gender differences with

regards to, barriers to physical activity and general self-efficacy scores

## 3. Methods

### 3.1. Participants

A cross-sectional design was used in the study and a random sample of 164(80%) Female and male 41(20%) for a total of 205 (X age= 21± 1.2) health science students who age ranged 19 to 24-year-old. All participants participated to the study voluntarily. All participants provided signed an informed consent before taking part in the study.

### 3.2. Measures

#### 3.2.1. Physical Activity Barriers

Perceived barriers to physical activity were measured with modified questionnaire used by Dishman [22]. General barriers were assessed with the following items: (1) Physical activity is boring; (2) The weather is bad; (3) I don't know how to do the physical activity that I want to do; (4) I don't have a place to be physically active; (5) I don't have time and (6) I don't have energy. Personal barriers were assessed with the following items: (1) my hair would get messed up; (2) I don't like to sweat; (3) it would take time away from my friends (4) I might get hurt or be sore; (5) it would make me embarrassed and (6) it would make me tired. For all items, there were 4 responses ranging from Not at all=1 to exactly true=4, which were summed to create scale scores, with higher scores indicated more barriers. The internal consistency of the items was checked and the Cronbach alpha was 0.637 hence the items had good to moderate internal consistency.

#### 3.2.2. General Self-efficacy

The self-efficacy level of participants was measured by 10-item scale which is originally developed by Shwarzer and Jerusalem [1]. It was constructed to test attitude and proved to be competent for adolescents and adults. The instrument has proven to be reliable with majority of the studies reporting an internal consistency of 0.76 to 0.90. The students were asked: (1) I can always manage to solve difficult problems if I try hard enough. (2) If someone opposes me, I can find the means and ways to get what I want. (3) It is easy for me to stick to my aims and accomplish my goals. (4) I am confident that I could deal efficiently with unexpected events. (5) Thanks to my resourcefulness, I know how to handle unforeseen situations. (6) I can solve most problems if I invest the necessary effort. (7) I can remain calm when facing difficulties because I can rely on my coping abilities. (8) When I am confronted with a problem, I can usually find several solutions. (9) If I am in trouble, I can usually think of a solution. 10. I can usually handle whatever comes my way. There were 4 responses for each item 1 = Not at all true 2 = Hardly true 3 = Moderately true 4 = Exactly true, which were summed to create the scale score, with higher scores indicating greater self-efficacy.

### 3.2.3. Moderate to Vigorous Physical Activity

Weekly frequencies of moderate to vigorous physical activity was measured with a modified version of the Godin leisure-Time exercise Questionnaire (GLTEQ, [23]), The GLTEQ has been shown to be reliable and significantly correlated with other measures of physical activity [23,24]. In a study done by [25] a similar tool was used in a subsample of 65 students, the correlation between hours per week of moderate to vigorous physical activity as measured by actigraphy accelerometer and self-report measure was found to be significant ( $r= 0.49$ ;  $p< .0001$ ). For this study, frequency of physical activity was defined as number of occurrences of an exercise bout over a typical 7-day period and it was calculated by summing the number of exercise sessions. Responses to 2 questions were summed to measure moderate to vigorous physical activity. Students were asked, "In a usual week, how many sessions over 30 minutes do you spend doing strenuous exercise (heart beat rapidly)? examples Biking fast, aerobic dancing, running, swimming laps, rollerblading, soccer, basketball, football". They were also asked, "In a usual week, how many sessions over 30 minutes do you spend doing moderate exercise (not exhausting)? Examples walking quickly, baseball, gymnastics, easy bicycling, volleyball, dancing, skate boarding". This study defined intensity of physical activity as the sum of the metabolic equivalent (MET) values of the activities in which the participant engaged during a typical 7-day period, multiplied by the number of minutes per activity. This can be interpreted as how long (minutes) the individual participated at the different MET levels 9 and 5 METS for strenuous and moderate exercise, respectively (i.e. 5 = jogging, moderate breathing, light sweating, 9 = running, heart beats rapidly) [23]. The total physical activity (TPA) score was determined by multiplying the MET values by the frequencies of activity for each level of exercise (strenuous, moderate, and mild) and then summing the three categories.

### 3.2.4. Health Behaviour Intentions

The health behaviour intentions of the students was measured using 10 items split into nutrition intentions and exercise intentions. In the nutrition section the following questions were asked and the response was given on a Likert scale: I can manage to stick to healthy foods...; (1) even if I need a long time to develop the necessary routines (2) even if I have to try several times until it works (3) even if I have to rethink my entire way of nutrition (4) even if I don't receive a great deal of support from others when making my first attempts (5) even if I have to bring a slice of bread with fiber to school for a snack. The exercise intentions section asked the following; I can manage to carry out my exercise intentions...; (1) even when I have worries and problems (2) even if I feel depressed (3) even when I feel tense (4) even when I am tired (5) even when I am busy. There were 4 responses for each item 1 = Strongly disagree 2 = disagree 3 = Agree 4 = Strongly agree, which were summed to create the scale score, with higher scores indicating greater health behaviour intentions. The internal consistency of the ten items was good to moderate having a Cronbach alpha of 0.66.

## 3.3. Demographics Characteristics

Demographic characteristics assessed in the study included institution, age, year of study, course and Gender of the respondents.

## 4. Analysis

Data obtained on the research were transferred to SPSS 21.0 program. Data was tested for normal distribution and homogeneity of variance using Shapiro-Wilk and Levene's test before statistical procedures were applied. The independent factors were gender, age, year of study, course and institution. The dependent variables were the modified GLTEQ scale scores, General self-Efficacy scores GSES, Barriers to physical activity scores and Healthy behaviour intention scores (Nutrition intentions and Exercise intentions). T-test were conducted to determine whether there was a significant gender differences on perceived barriers to physical activity, general self-efficacy and modified GLTEQ scores. Pearson correlation analyses were conducted separately for males and females to examine the association between perceived barriers to physical activity, GSES scores and Healthy behaviour intentions. Mediation analysis was conducted to determine if general self-efficacy mediated the association between perceived barriers to physical activity and health behaviour intentions. Mediation was conducted using multiple linear regression using the steps put forth by Baron and Kenny [26]. The first step in testing mediation is there must be a significant association between the predictor (perceived barriers to physical activity) and the outcome (Healthy behaviour intentions). Next, there must be a significant association between the predictor (perceived barriers to physical activity) and the mediator (General self-efficacy). Third, there must be a significant association between the mediator (General self-efficacy) and the outcome (Healthy behaviour intentions). Lastly, if all 3 of these associations are significant, a fourth regression analysis is conducted to test if the first association between the predictor (perceived barriers to physical activity) and the outcome (Healthy behaviour intentions) dropped in significance when the mediator was added to the model. If the association between the predictor (perceived barriers to physical activity) and the outcome (Healthy behaviour intentions) is reduced or drops to non-significance. [26]. Full mediation occurs if the association between the predictor (perceived barriers to physical activity) and the outcome (Healthy behaviour intentions) is completely explained by the mediator (General self-efficacy). Partial mediation occurs when the association between the predictor (perceived barriers to physical activity) and the outcome (healthy behavior intentions) is only partially explained by the mediator (General self-efficacy).

## 5. Results

Descriptive analysis was conducted for the demographic variable in the study. The sample included 205 health science students 164 (80%) Female and male 41(20%)

with a mean age of 21 and a standard deviation of 1.2 years. The students ranged in age from 19 to 24 (M=20.96 yrs., SD=1.29). The sample was 39% first years, 31.2% second years and 29.8%. 59% of the health science students were stationed in Mukumu while 41% were stationed in Mumias. The sample was almost evenly distributed on the course of study Nursing 59% and 41%.

The general self-efficacy score varied from 0 - 40 points and was classified into 3 levels according to the Blooms' (1956) cut off point, 60-80% as follows:

- Good level (81-100%) 32 - 40 scores
- Moderate level (61-80%) 25 - 32 scores
- Fair (less than 60%) 0 - 24 scores

The mean general self-efficacy score for the respondents was 27.12 (SD=4.467) which was in the "moderate level" group with the highest score being 36 and the lowest score being 16. 28.3% (n=58) of the students had "fair level", 59.5% (n=122) had "moderate level" and only 12.2% (n=22) had "good level". Females got higher general self-efficacy scores compared to males with 61.6% scoring in the "moderate levels" while for males it was 51.2%. In the "Good level" females also scored higher, 12.8% of females were in this group while only 9.8% of males managed to be in this group.

The Levene's test of equality of variances (Table 2) showed homoscedasticity of variance across all independent variables in the data, hence meeting the assumption of homogeneity of variance required to conduct parametric tests. The T-test outputs (Table 2) showed that there were significant differences between males and females on modified GLTEQ scores  $t(203) = 1.929$ ,  $p=0.055$ , Perceived barriers to PA  $t(203)=4.543$ ,  $p=0.001$  and General self-efficacy  $t(203)=0.051$ , however there were no significant gender differences in health behaviour intentions  $t(203)=1.873$ ,  $p=0.63$ . Females had a higher mean in general self-efficacy as compared to males (Table 1).

Pearson correlation analysis showed that there was a significant positive relationship between general self-efficacy and health behaviour intentions  $r(205)=.728$ ,  $p=0.001$ , there was also a significant positive relationship between general self-efficacy and barriers to PA participation  $r(205)=.629$ ,  $p=.001$ . The results also yielded a significant positive relationship between healthy behaviour intentions and barriers to PA participation  $r(205)=.812$  also there was a significant relationship between barriers to PA and moderate to vigorous PA  $r(205)=.416$ ,  $p=.0012$ .

**Table 1. Descriptive statistics for the variables of interest**

| Variables                    | Cronbach's Alpha | Whole Sample n=205 |       |       | Males=41 |       |       | Females=164 |       |       |
|------------------------------|------------------|--------------------|-------|-------|----------|-------|-------|-------------|-------|-------|
|                              |                  | M                  | SD    | Range | M        | SD    | Range | M           | SD    | Range |
| General self-efficacy        | 0.631            | 27.12              | 4.467 | 16-36 | 25.9     | 4.543 | 18-35 | 27.42       | 4.41  | 16-36 |
| Perceived Barriers to PA     | 0.637            | 21.54              | 4.475 | 12-34 | 18.83    | 3.434 | 12-25 | 22.2        | 4.456 | 13-34 |
| Healthy Behaviour Intentions | 0.66             | 25.8               | 4.296 | 12-37 | 24.68    | 4.590 | 12-33 | 26.08       | 4.187 | 17-37 |
| METS MVPA                    | 0.918            | 34.28              | 9.438 | 14-42 | 31.76    | 9.404 | 14-42 | 34.91       | 9.369 | 14-42 |

Note.  
M=mean; SD=standard deviation; PA=physical activity; MVPA=moderate-to-vigorous physical activity.

**Table 2. T-test for the variables of interest**

|                                 | Levene's Test for Equality of Variances |      |       |     |                 |
|---------------------------------|---|------|-------|-----|-----------------|
|                                 | F                                       | Sig. | t     | df  | Sig. (2-tailed) |
| Moderate to vigorous PA         | .268                                    | .605 | 1.929 | 203 | .055            |
| Barriers to participation in PA | 3.778                                   | .073 | 4.543 | 203 | .000            |
| General self-efficacy           | .064                                    | .800 | 1.960 | 203 | .051            |

**Table 3. Correlations for the variables of interest**

|                                 |                     | MVPA   | HBI    | Barriers | GSE    |
|---------------------------------|---------------------|--------|--------|----------|--------|
| Moderate to vigorous PA(MVPA)   | Pearson Correlation | 1      | .470** | .416**   | .751** |
|                                 | Sig. (2-tailed)     |        | .000   | .000     | .000   |
| Health behaviour intention(HBI) | Pearson Correlation | .470** | 1      | .812**   | .728** |
|                                 | Sig. (2-tailed)     | .000   |        | .000     | .000   |
| Barriers to participation in PA | Pearson Correlation | .416** | .812** | 1        | .629** |
|                                 | Sig. (2-tailed)     | .000   | .000   |          | .000   |
| General self-efficacy(GSE)      | Pearson Correlation | .751** | .728** | .629**   | 1      |
|                                 | Sig. (2-tailed)     | .000   | .000   | .000     |        |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Table 4. Regression table showing Barriers to PA and GSE as predictors of MVPA**

| Model |   | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|---|-----------------------------|------------|---------------------------|--------|------|
|       |   | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant)  | 15.369                      | 2.961      |                           | 5.191  | .000 |
|       | Barriers to participation in physical activity scores | .878                        | .135       | .416                      | 6.523  | .000 |
| 2     | (Constant)  | -7.855                      | 2.740      |                           | -2.867 | .005 |
|       | Barriers to participation in physical activity scores | -.196                       | .125       | -.093                     | -1.562 | .120 |
|       | General self-efficacy scores                          | 1.710                       | .126       | .809                      | 13.612 | .000 |

Dependent Variable: GLTEQ scores

Note: GSE-General self-efficacy, MVPA-moderate-to-vigorous PA

The linear regression revealed that general self-efficacy partially mediated the association between general barriers to physical activity and health behaviour intentions ( $b=0.812$ ,  $p<0.001$  reduced to  $b= 0.586$ ,  $p<0.001$ ). When the mediation analysis was done the linear regression analyses revealed that general self-efficacy fully mediated the association between barriers to physical activity and moderate to vigorous physical activity ( $b= 0.416$ ,  $p<0.001$  reduced to  $b=-0.93$ ,  $p<0.120$ ) as shown in Table 4.

## 6. Discussion

The present study adds to literature examining the role of self-efficacy as a mediator of the association between perceived barriers to physical activity and health behavior e.g. physical activity [18,21,25,27]. According to social cognitive theory, the study showed that self-efficacy (individual factor) explained part of the association between barriers to physical activity (environmental factors) and health behaviour intentions. The hypothesis the researcher set that general self-efficacy & barriers would associate with health behavior was confirmed. There was a strong association between general self-efficacy and health behaviour intentions  $r(203)=0.728$ ,  $p<0.05$ . This agrees to previous research that has been done in the past where a positively high relationship was found between self-efficacy and continuity in exercise [28]. In comparison to these results, previous studies of the same nature also found a positive relationship between regular exercise and general self-efficacy [29,30]. Research has found that those who exercise and show continuity in exercise positively affects psychological phenomena like self-efficacy and psychological well-being, while not engaging in exercise or not considering exercise has a positive relation with depression [21]. This is very important considering health science student require stable psychological wellbeing to be able to study. Studies have recommended that educators and faculties of nursing colleges should manage stress and self-efficacy to improve the abilities of critical thinking of nursing students [31]. The researcher also hypothesized that general self-efficacy would mediate the association between health behaviour intentions and barriers to physical activity Mediation analysis revealed partial mediation of general self-efficacy on relationships between general barriers to PA and health behaviour intentions ( $b=0.812$ ,  $p<0.001$  reduced to  $b= 0.586$ ,  $p<0.001$ ). Mediation analysis also revealed that general self-efficacy fully mediated the association between barriers to physical activity and moderate to vigorous physical activity ( $b= 0.416$ ,  $p<0.001$  reduced to  $b=-0.93$ ,  $p<0.120$ ). Pearson correlation was done and revealed that general self-efficacy was significantly correlated to moderate-to-vigorous physical activity  $r(205) =0.751$ ,  $p<0.05$ . This is in agreement with previous studies as well. In a study done by Kenyon et al [25] physical activity self-efficacy explained part of the association between perceived general barriers to physical activity and moderate-to-vigorous physical activity but for females only. For the male subsample, although the associations between perceived barriers and moderate-to-vigorous physical activity and perceived barriers and physical

activity self-efficacy were moderate ( $r = -.33$  through  $-.47$ ), self-efficacy did not explain the association between perceived barriers and moderate-to-vigorous physical activity [25]. This study did not check the mediation separately for females and males but the mediation effect of self-efficacy was confirmed. The researcher also tested the hypothesis that there would be gender differences with regards to general self-efficacy and barriers to physical activity. The results confirmed the hypothesis because there were significant gender differences with regards to general self-efficacy  $t(203) =1.960$ ,  $p<0.05$ . The analysis also confirmed significant gender differences with regards to barriers to physical activity  $t(203) =4.543$ ,  $p<0.005$ . The study showed that females had higher self-efficacy compared to males. This is contrary to a study done where males reported significantly higher levels of coping and scheduling self-efficacy for physical activity than females [27].

## 7. Limitations and Future Directions

The present study makes an important addition to the literature because it examined health science students who were situated in various stations. The present study participants were representative of the study stations and consistent with descriptions of health science students nationally. Other positive aspects of our study were that scales had acceptable to good reliability. However, the results must be viewed in light of the limitations. Our study was limited to a few stations and only few courses were represented. Consequently, the results may not be generalizable to all health science students in the Kenya. Only self-report was used, which may introduce shared method variance and social desirability [32]. A cross-sectional design does not allow for causal inferences or for an estimation of the test-retest reliability. In addition, our sample size was too small to conduct analyses to examine differences by course of the students. The limited sample size may have masked our ability to find statistical significance.

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