

Investigating the predictors of physical activity behavior among female college students in Saudi Arabia using the theory of planned behavior

Zuhair A. Al Salim^{ABCDE}

Department of Sport Science and Physical Activity, College of Science, University of Hafr Al Batin, Saudi Arabia

Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

Abstract

Background and Study Aim Physical inactivity is a major public health concern, particularly among female college students in Saudi Arabia. The theory of planned behavior (TPB) suggests that attitudes, subjective norms, and perceived behavioral control (PBC) are important predictors of behavioral intentions and behaviors. The aim of this study was to examine the role of attitude, subjective norms, and perceived behavioral control in predicting physical activity intentions among female university students in Saudi Arabia, using the theory of planned behavior as a framework.

Material and Methods A cross-sectional study was conducted among 758 female college students from the University of Hafr Al Batin in Saudi Arabia. The measurement tool consisted of Godin-Shephard questions on leisure-time physical activity and theory-planned behavior questionnaires.

Results The study found that perceived behavioral control and attitude were significant predictors of physical activity intentions among female college students. However, subjective norms did not have a significant impact on the predictor variable. Furthermore, there was a statistical effect to predict involvement in physical activity from physical activity intention among female college students.

Conclusions The study's findings suggest that the theory of planned behavior is a useful framework for understanding and interpreting physical activity intentions among female college students in Saudi Arabia. Interventions that aim to increase perceived behavioral control and positive attitudes towards physical activity may be effective in promoting physical activity among this population.

Keywords: theory of planned behavior, physical activity, human health, performance, health behaviors, online courses

Introduction

There is a growing body of research that recognizes the significance of physical activity exercises on youth development for overall health and wellbeing lifestyle [1]. Physical activity improves students' social, physical, emotional, and cognitive development [2]. To specify, students who regularly participate in moderate to vigorous physical activity can improve organ functions of the human body and raise their efficiency, reduce the risk of diseases and health problems, and increase the energy expenditure that helps to manage weight [3]. Moreover, participation in physical activity can help reduce the risk of depression and anxiety and enhance social interaction. The World Health Organization (WHO) recommended that adolescents do around 60 minutes daily exercises of moderate to vigorous physical activities, and adults should do around 150 minutes weekly moderate-intensity exercise [4]. Despite these recommendations, the global averages range between 23% of adults and 81% of adolescents (aged 11-17 years) did not reach the WHO scale on physical activity, and males participate more in physical activity than females.

© Zuhair A. Al Salim, 2023

doi:10.15561/20755279.2023.0507

Students can lower their risk of becoming obese by engaging in physical activity, particularly exercise done during and after college hours. One of the most serious public health issues today is obesity, which can lead to high blood pressure, high cholesterol, and type 2 diabetes. According to the American College Health Association (ACHA), 16% of college students in the United States were obese and about 24% were overweight in 2018 [5], whereas a study from Saudi Arabia found that King Khalid University students were 25% obese and 26% overweight in 2020 [6].

The Saudi Arabian Ministry of Sports has paid a lot of attention into achieving a quality of life for citizens and residents to achieve the Kingdom's Vision 2030. One of the initiatives to achieve the quality of life is promoting the participation of physical activity in society. To illustrate, there were more than 205 women's sports groups in 2020. These groups engaged in a variety of sports, including but not limited to walking, golf, running, and cycling, as well as were more than 523 women's club's sports out of 1549 sports clubs in Saudi Arabia. In addition, there were 25 women's national teams, such as football, volleyball, basketball, and track and field (Ministry of Sport, 2020). In addition, according to

Saudi General Authority for Statistics (GASTAT), In 2018, 20% of the residents and citizens in Saudi Arabia participated in physical activity for at least 150 minutes per week, while 30% participated in physical activity for at least 150 minutes per week in 2021 [7].

Approximately 1,300,000 male and female students are involved in the higher education sector in the Kingdom of Saudi Arabia, and the university administration encourages the practice of physical activity, by supporting many sports competitions with the aim of improving public health and combating obesity among university students. However, just 30% of female students at King Saud University in Saudi Arabia meet the WHO requirement of 150 minutes per week of moderate-intensity exercise. Lack of finances, time restraints, and societal pressure were the biggest obstacles to not being physically active [8]. Additionally, 55% of female college students at Taibah University engaged in physical activity [9]. However, a study indicated that only 63% of female students at Hafr Al Batin University engaged in physical activity, and the factors that prevented them from doing so were, in that order, a lack of energy, resources, willpower, time, and social pressure [10].

Physical Activity Education

Physical activity is every movement of the body and muscles that requires energy expenditure, including activities during work, play, household tasks, and recreational activities. Lack of physical activity is one of the main risk factors for diseases such as cardiovascular disease, obesity, and diabetes [11]. To measure physical activity, researchers in the UK asked 90,211 individuals to wear an accelerometer (a small, lightweight motion sensor) on their wrist over a seven-day period between 2013

and 2015. The researchers tracked the participants' health for an average of five years. Overall, there were 3,617 cases of cardiovascular disease diagnosed among the participants, who were part of a larger UK Biobank study of people aged 40 to 69. The incidence of cardiovascular disease decreased among the participants as the amount of moderate and vigorous physical activity increased. The study found that there was no end to the effects of exercise on improving cardiovascular health, with the most active participants having an average reduction in risk of between 48% and 57% at least [12]. These results are consistent with another study to measure the impact of physical activity and sports on the development of some life skills among adolescents, which was conducted at Oran University of Science and Technology on a sample of 235 students. The results showed that social, psychological, physical, and technical skills are highly favored by male and female practitioners in physical exercises compared to non-practitioners [13].

In theory of planned behavior (TPB) the behavioral beliefs link behavior of interest to expected results as depicted in Figure 1. The more real the perceived behavioral control, the more it can serve as a proxy for actual control and contribute to behavior prediction [14]. TPB is evident in the fact that it adopts a scientific approach to observing human behavior based three basic variables, and it is believed that it can reshape and change behavior according to those variables, namely: A) Self-criteria these are the behavioral causes resulting from some social factors such as friends or relatives, or simply to comply with the rules of the surrounding society. B) Attitudes this variable refers to the evaluation process adopted by the human to evaluate behavior and its consequences. This evaluation process falls

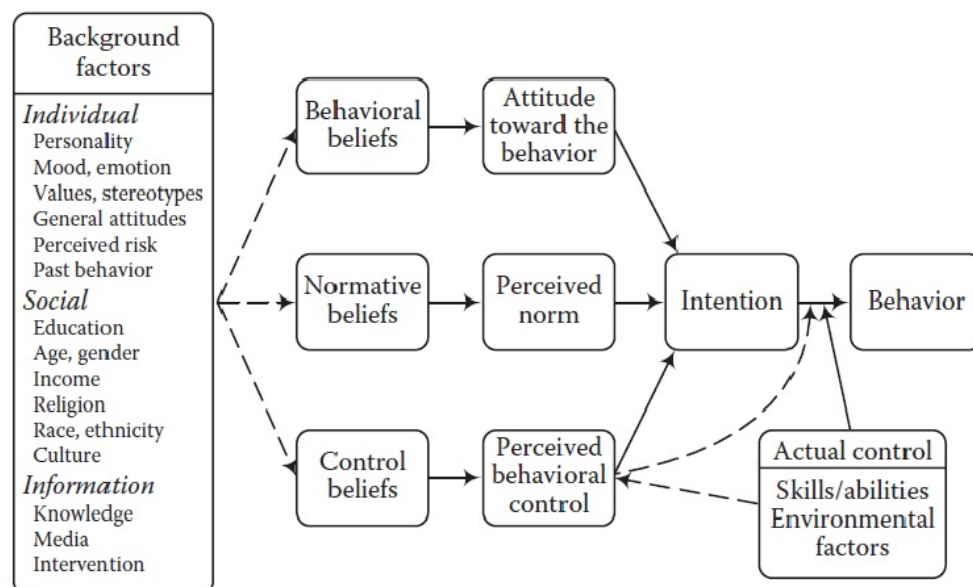


Figure 1. Human behavior and TPB theory [15].

under the framework of the individual's personal beliefs and values. C) Perceiving control over behavior it is the most important variable of the theory, as it refers to the degree of self-monitoring of personal behaviors and is considered one of the most important factors that help predict many individual behavioral choices [15].

The idea of planned behavior can be used to explain how university students engage in physical activity [16]. Thompson et al. [17] conducted a study on how physical activity can forecast and understand how students' intents during physical exercise using this hypothesis. The results shows that there was a significant positive correlation between student's who has a favorable attitude and a strong intention toward physical exercise will be more active, since there is a relationship between attitudes and physical activity through intention. This also accords with the findings were made by Brickell et al. [18], who discovered that, while subjective norm was ineffective, attitudes and perceived behavioral control were significant predictors of university students' desire to participate in physical exercise. These results reflect those of Wing Kwan et al. [19] who conducted a study that looked at attitudes, arbitrary norms, and perceived behavioral control to predict first-year university students' intentions to engage in physical exercise and they found that the TPB variables illustrate 37% of the difference in intentions, rising to 39% with the addition of former behavior.

Purpose of the Study. Numerous researchers have demonstrated how The Theory of Planned behavior (TPB), which predicts people's intentions and behavior toward an item, may be used to understand how to influence individuals' behavior. The three factors that influence intents and behaviors are behavioral beliefs, normative beliefs, and control beliefs [20]. The TPB will be used in this study to investigate the role of attitude, subjective norms, and perceived behavioral control in predicting the intentions of female university students to engage in physical activity. There are two primary research questions of this study:

1. Are attitudes, personal standards, and perceived behavioral control significant determinants of the intention to engage in physical activity among female college students?
2. Do female college students' intentions to engage in physical activity significantly affect their actual behavior?

Materials and Methods

Participants

The study used a convenience sample of 758 female college students who completed the surveys were studying for a bachelor's degree at the University of Hfer Al-Batin, located in the Eastern

province of the Kingdom of Saudi Arabid (KSA). The participants were between 18 and 24 years ($M = 19.88$, $SD = 1.37$) from four university branches. Two percent of students were studying in Quria Alulia, 4.5% were studying in Alnayriah, and 21.2 % were studying in Hafer Al-Batin. The participant comprised 323 (42.6%) sophomore students, 375 (49.5%) first-year students, and 60 (7.9%) junior students. All participants were selected from the University of Hafer Al-Batin in the Health and Physical Fitness course, and they had an average body mass index of 22.85 kg/m^2 ($SD= 5.93$). Data were collected by using convenience samples to reach female students easily..

Research Design

The current research used questionnaires as data collection tools through teaching online Health and Physical Fitness courses. The following are the details of the procedures followed by the researcher in collecting data, selecting the sample, and analyzing the results.

The measurement instrument included three stages: *demographic characteristics*, theory planned behavior questionnaires, and Godin- Shephard leisure-time physical activity questionnaire.

Demographic Characteristics

This section had general questions for female students, including participants' age, height, weight, education, location, and the level of the academic year.

The TPB questionnaire

The TPB includes four variables: attitudes, subjective norms, perceived behavioral control, and intention. Attitudes toward physical activity were measured with six questions on a seven-point semantic differential scale (bad/good, harmful/beneficial, useless/helpful, unpleasant/ pleasant, boring/ fun, unenjoyable/ enjoyable). The following statement preceded each semantic differential scale "For me to do 30 minutes of medium-strength physical activity at least five days over the next week would be..." [21]. A score of seven indicated a more positive attitude of students toward physical activity, while a score of one indicated a less positive attitude toward physical activity. The attitude toward physical activity scale had high internal consistency reliability with a coefficient alpha of 0.92. Also, factor analysis was conducted to validate the attitude toward the physical activity scale. All six questions had a range of loading between 0.74 to 0.85. Therefore, the attitudes toward physical activity scale seem to measure one construct.

The subjective norms scale contains six items with five Likert scales (5= strongly agree, 4= agree, 3= uncertain, 2= disagree, 1= strongly disagree). The subjective norms scale consists of two subscales: normative beliefs and motivation. Each subscale

consists of three items. Higher scores indicate higher subjective norms for physical activity. Coefficient alpha was computed to examine the internal consistency of the subjective norms scale. The researcher found that the test for subjective norms resulted in a coefficient alpha score of 0.81, indicating good internal consistency reliability. Also, factor analysis was conducted to validate the subjective norms toward physical activity. All six questions had a range of loading between 0.64 to 0.77, so validity coefficients for the scale were acceptable.

The perceived behavioral control scale contains six items, and this scale consists of two subscales: control beliefs and perceived power. Control beliefs subscales contain three items with a five-point semantic differential scale (not at all confident/very confident, very difficult/very easy, extreme lack of control/ extreme control). Also, the perceived power subscale contains three items with five Likert scales (5= strongly agree, 4= agree, 3= uncertain, 2= disagree, 1= strongly disagree). A score of five indicated a more positive perceived behavioral control toward physical activity, while a score of one indicated a less positive perceived behavioral control toward physical activity. Therefore, Cronbach's alpha for the perceived behavioral control scale was acceptable ($\alpha = 0.86$). Also, factor analysis was conducted to validate the perceived behavioral control toward physical activity. All six question had a range of loading between 0.68 to 0.95, so validity coefficients for the scale was acceptable. The intention to be physically active scale contains one item with five Likert scales ranging from 1 (*strongly disagree*) to 5 (*strongly disagree*). The statement was, "During the next week, I intend to do 30 minutes of medium-strength physical activity for at least five days." [21]. Higher scores indicate higher students' intention to be physically active.

The GSLTPAQ

The Godin- Shephard leisure-time physical activity questionnaire (GSLTPAQ) was self-administered with the following statement "During a typical 7-Day period (a week), how many times on average do you do the following kinds of exercise for more than 15 minutes during your free time (write on each line the appropriate number)". The questionnaire has three generic items, including strenuous, moderate, and mild/light physical activity, and participants can write an appropriate number in three levels of physical activity. Each number was multiplied by its suitable value (frequency of strenuous PA x 9, frequency of moderate PA x 5, and frequency of mild/light PA x 3) to know whether students had active, moderately active, or insufficiently active/passive. Using the following formula: Weekly leisure activity score = (9 x Strenuous) + (5 x Moderate) + (3 x Light) to classify

participants into three groups (active, moderately active, or insufficiently active/passive) based on the following criteria:

- 1) Students are classified as active when they cumulate 24 units or more.
- 2) Students are classified as moderately active when they cumulate 14 to 23 units.
- 3) Students are classified as insufficiently active when they cumulate less than 14 units [22].

The Godin- Shephard leisure-time physical activity questionnaire had good test-retest reliability and concurrent validity [23].

Procedures

The cohort of this study participated in an online course dealing with health and physical fitness, and the course was designed based on the TPB. The students' studies how to benefit from physical activity to improve public health according to the principles of the TPB theory. The Principal Investigator (PI) explained the purpose of this study and provided the participants with information about the importance of this study, as well as informed them that participation in this study was voluntary. After the PI got consent from students, put a link to participate on the blackboard. The survey was conducted over one month beginning in March 2022, and more than 63% of students completed the study survey.

Statistical Analysis

Statistical analysis was performed using SPSS software (version 23). The descriptive statistics to measure personal information and outcome measures for the study variables. Multiple regression tests were used to predict students' intention to be physically active from the three variables of the theory of planned behavior among female college students. Also, a linear regression test was used to predict participation in physical activity from physical activity intention among female college students. A p value descriptive data was generated for all variables at $P < 0.05$.

Results

All participants in this study were female college students aged 18 to 24 years. Approximately 17% of students were active, 37.7% were moderately active, and 45.4 % were sedentary in their leisure time physical activity. Also, fifteen percent of students were underweight, 23.1 % of students were overweight or obese, and 61.6 % of the students were normal weight (Table 1).

Table 2 shows that participants reported moderate to strong attitudes, perceived behavioral control, subjective norms, and intention to be physically active. Also, the strongest correlation of intention of being physically active was perceived behavioral control (0.74), attitudes (0.44), and subjective norms (0.42), respectively.

Table 1. Demographic characteristics of participants

Variables	Frequency	%
Female	758	100
Level of Physical Activity		
Active	128	16.9
Moderately Active	286	37.7
Sedentary	344	45.4
BMI Categories		
Under weight	116	15.3
Normal Weight	467	61.6
Overweight and Obese	175	23.1

Table 2. Descriptive statistics and correlations among the study variables

Variables	Mean	SD	1	2	3	4	5
1-Leisure time physical activity	16.56	7.08	-	0.57**	0.24**	0.41**	0.22**
2- Intention to be physically active	3.54	1.05		-	0.44**	0.74**	0.42**
3- Attitudes	5.18	1.42			-	0.54**	0.43**
4- Perceived Behavioral Control	3.55	0.87				-	0.58**
5- Subjective Norms	3.41	0.88					-

Note. *p < .05; **p < .001; (N=758)

This study set out with the aim of assessing the role of attitude, subjective norms, and perceived behavioral control in predicting the intentions of female university students to engage in physical activity. With respect to the first research question “are attitudes, personal standards, and perceived behavioral control significant determinants of the intention to engage in physical activity among female college students?”, it was found that there was a statistically different related to the physical intention among female college students with $F(3, 754) = 304.51$, $P < 0.001$, $R^2 = 0.55$, which shows a moderate correlation between the three predictors and the criterion. Moreover, the results indicate that both attitude and perceived behavioral control were perfect predictors of physical activity intention among female college students. Perceived behavioral control was the strongest predictor of physical activity intention with $t(756) = 21.79$, $P < 0.001$, which shows the largest Beta coefficient (0.708). This indicates that 70.8% of the variation in the criterion variable (physical activity intention) is explained by perceived behavioral control. Attitudes with a significant level, $t(756) = 2.34$, $P < 0.019$, with a Beta value of 0.069, which means only 6.9% of the variation of the criterion variable is explained by attitudes. Most noteworthy is the fact that subjective norms do not seem to have a significant influence on the predictor variable, with a Beta value of (- 0.012) and a P value of - .0411 ($P > 0.05$) as highlighted in Table 3.

The second question in this research was “do female college students’ intentions to engage in physical activity significantly affect their actual behavior?” To investigate this question, a linear regression analysis was conducted to evaluate the prediction of participating in physical activity from physical activity intention among female college students. The most interesting finding with the data in Table 4 which shows a significant regression equation was found, $F(1,756) = 359.59$, $P < 0.001$, with an R^2 of 0.322, that mean 32.2 % of the variance of participating in physical activity was accounted for by its linear relationship with physical activity intention among female college students. Furthermore, a Beta value of 0.567 indicates a positive correlation between the predictor and criterion variable. This means that there was a positive moderation relationship between participation in physical activity and physical activity intention.

Discussion

Prior studies that have noted the importance of the TPB to observing and explaining human behavior and helps to understand how people change or modify behavior [24]. In general, the finding of this study indicated that the overall means of attitudes, subjective norms, and perceived behavioral control for all participants toward participation in physical activity were

Table 3. Multiple regression analysis predicting physical activity intention from attitudes, subjective norms, and perceived behavioral control female college students.

Variables	Unstandardized Coefficient		Standardized Coefficient	t	Sig	R ²
Predictors	B	Std. Error	Beta			
(Constant)	0.300	0.123		2.432	0.015	
Attitudes	0.051	0.022	0.069	2.344	0.019	0.55
Perceived Behavioral Control	0.853	0.039	0.708	21.786	0.001	
Subjective Norms	-0.015	0.036	-0.012	-0.422	0.681	

Note: Predicted Variable= Physical activity intention

Table 4. Linear Regression Analysis Predicting Participation in Physical Activity from physical activity Intention among Female College Students.

Variables	Unstandardized Coefficient		Standardized Coefficient	t	Sig	R ²
Predictors	B	St. Error	Beta			
(Constant)	2.98	0.75		3.99	0.001	0.322
Intention	3.86	0.2	0.57	18.96	0.001	

Note: Predicted Variable= Participating in physical activity

(5.18 out of 7.00), (3.41 out of 5.00), and (3.55 out of 5.00) respectively. The current finding agrees with several previous studies that indicated that students had moderately positive attitudes, subjective norms, and perceived behavioral control toward participation in physical activity [25, 26].

The findings of this study revealed that attitudes and perceived behavioral control were meaningful predictors of physical activity intention among female college students. However, the subjective norms had no significant influence on the predictor variable. These findings agree with previous studies regarding the theory of planned behavior variables [15]. These findings suggest that participants had reasonable behavioral beliefs about being physically active, and they felt to obtain perfect possible outcomes when they participated in physical activity, such as beneficial, useful, pleasant, and enjoyable. Attitudes are feelings and beliefs toward objects that can affect students' intentions. Also, they can impact students' intentions toward physical activity because positive feelings and beliefs can play a vital role in promoting students' attitudes toward physical activity [27].

The perceived behavioral control was a good predictor to predict physical activity students' intention to be physically active. It seems that most participants had an existence of factors that can facilitate physical activity performance which indicated that students with a high level of perceived behavioral control were more likely to engage in the

behavior than those with a lower level of perceived behavioral control. Therefore, students can engage effectively in physical activity if they have belief and confidence in their ability and good opportunities such as enough time, access to facilities, and no injury [15].

The subjective norms had no significant influence on physical activity students' intention to be physically active. Hagger et al. [28] reported that subjective norms had a lower predictive variable to predict behavioral intention for engaging in physical activity after setting attitudes and perceived behavioral control. Based on these findings, it is likely that social influence does not affect students' participation in physical activity. Thus, the strongest prediction of all three variables of the theory of planned behavior were perceived behavioral control and then positive attitudes to predict students' intentions for performing physical activity.

The finding of the second research question indicated there was a statistical impact to predict participation in physical activity from physical activity intention among female college students. The finding of this study is consistent with previous research by [29] and [30] they found that whenever students had high physical activity intention, they increased participation effectively in physical activity. Thus, the effect of intention on participation in physical activity may be mediated by positive attitudes and perceived behavioral control variables.

Conclusions

This study evaluated the theory of planned behavior constructs on physical activity intention. The physical activity intention was the strongest predictor variable to predict participation in physical activity. Based on the findings of the present study, the following recommendations are being made: 1) University should construct or renovate recreational facilities, including a fitness center, swimming pool, climbing wall, and basketball and volleyball courts to provide opportunities for students to engage in a variety of physical activities and sports. 2) University should establish an indoor and outdoor rental center to provide sports equipment to a number of female students so that they can participate effectively in recreational activities and sports. 3) University should organize internal events and activities in several games such as football, basketball, tennis, squash, and other games. In addition, universities should participate in external tournaments with other universities. 4) University should raise awareness about the importance of physical activity and offer popular sports to attract female students to be physically active. 5) There should be more cooperation between the Saudi Universities Sports

Federation and the Ministry of sports to increase the number of female college students in sports activities and support and encourage them to participate in competitive sports. 6) Universities should have female sports clubs that allow them to engage in Saudi Games.

The study had some limitations that should be considered. First, this study was conducted at only one university in eastern Saudi Arabia, so the findings cannot be generalized to all regions of Saudi Arabia or other countries. Second, the researcher used the self-reported survey to assess all participants' physical activity levels. Instead of using self-reported physical activity levels, they should use directly measured physical activity. Finally, the researcher concludes that using the theory of planned behavior is very important to understand and explain the behavior intention to design modifications and interventions in order to increase participation in physical activity among female college students in Saudi Arabia.

Conflict of interest

The author have no conflicts of interest to declare.

References

1. Trošt Bobić T, Bobić G, Mohorović A, Novak D. Are We Doing the Right Thing? Motor Assessment in Adapted Physical Education. *Collegium Antropologicum*, 2021;45(3):261–270. <https://doi.org/10.5671/ca.45.3.10>
2. Habyarimana JDD, Tugirumukiza E, Zhou K. Physical education and sports: A backbone of the entire community in the twenty-first century. *International Journal of Environmental Research and Public Health*, 2022;19(12):7296. <https://doi.org/10.3390/ijerph19127296>
3. Burridge K, Christensen SM, Golden A, Ingersoll AB, Tondt J, Bays HE. Obesity history, physical exam, laboratory, body composition, and energy expenditure: An Obesity Medicine Association (OMA) Clinical Practice Statement (CPS) 2022. *Obesity Pillars*, 2021;1:100007. <https://doi.org/10.1016/j.obpill.2021.100007>
4. World Health Organization. *Global action plan on physical activity 2018-2030: more active people for a healthier world*. WHO; 2019.
5. Bailey CP, Sharma S, Economos CD, Hennessy E, Simon C, Hatfield DP. College campuses' influence on student weight and related behaviors: A review of observational and intervention research. *Obesity Science & Practice*, 2020;6(6):694–707. <https://doi.org/10.1002/osp4.445>
6. Shehata SF, Althubait BM, AboTamrah AA, Alotaibi KM, Amer KA, Aldosari AA, BinZahif AA. Prevalence of Obesity among King Khalid University students in Saudi Arabia. *Middle East Journal of Family Medicine*, 2021;19(4):10–15.
7. GASTAT: *The General Authority for Statistics in Saudi Arabia*. GASTAT releases results of household health survey [Internet]. 2021. [cited 2023 Jan 2]. Available from: <https://www.stats.gov.sa/sites/default/files/Household%20Sports%20Practice%20Survey%202021%20-%20En.pdf>
8. Aljehani N, Razee H, Ritchie J, Valenzuela T, Bunde-Birouste A, Alkhaldi G. Exploring Female University Students' Participation in Physical Activity in Saudi Arabia: A Mixed-Methods Study. *Frontiers in Public Health*, 2022;10:829296. <https://doi.org/10.3389/fpubh.2022.829296>
9. Jalloun RA, Surrati AM. Physical Activity Pattern Among Female College Students at Taibah University. *International Journal of Nutrition, Pharmacology, Neurological Diseases*, 2020;10(3):137–143.
10. Al Salim ZA. Barriers to physical activity participation among university students in Saudi Arabia. *Information Sciences Letters an International Journal*, 2023;12:353–360.
11. Myburg CM, Kriel C. Teacher's evaluation of the social skills and recreation activities of 10- to 12-year-old children with Down Syndrome. *South African Journal for Research in Sport, Physical Education and Recreation*, 2022;44(2):63–80. <https://doi.org/10.36386/sajrsper.v44i2.61>
12. Ramakrishnan R, Doherty A, Smith-Byrne K, Rahimi K, Bennett D, Woodward M, et al. Accelerometer measured physical activity and the incidence of cardiovascular disease: Evidence from the UK Biobank cohort study. *PLoS Medicine*, 2021;18(1):e1003487. <https://doi.org/10.1371>

- journal.pmed.1003487
13. Yahyaoui A. The role of physical sport activity to improve some life skills of teenagers in secondary schools. *El-Bahith in Human and Social Sciences Journal*, 2021;13(2):275–288.
14. Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 1991;50(2):179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
15. Ajzen I. The theory of planned behavior: Frequently asked questions. *Human Behavior and Emerging Technologies*, 2020;2(4):314–324. <https://doi.org/10.1002/hbe2.195>
16. Wei-Yuan SHIH, Yih-Lih PU, Tu-Kuang HO. Validation of the teaching beliefs scale of postmodern physical education. *South African Journal for Research in Sport, Physical Education & Recreation*, 2023;45(1):12–16.
17. Thompson NR, Asare M, Millan C, Umstattd Meyer MR. Theory of planned behavior and perceived role model as predictors of nutrition and physical activity behaviors among college students in health-related disciplines. *Journal of Community Health*, 2020;45:965–972. <https://doi.org/10.1007/s10900-020-00814-y>
18. Brickell TA, Chatzisarantis NL, Pretty GM. Using past behavior and spontaneous implementation intentions to enhance the utility of the theory of planned behavior in predicting exercise. *British Journal of Health Psychology*, 2006;11(2):249–262. <https://doi.org/10.1348/135910705X52471>
19. Wing Kwan MY, Bray SR, Martin Ginis KA. Predicting physical activity of first-year university students: An application of the theory of planned behavior. *Journal of American College Health*, 2009;58(1):45–55. <https://doi.org/10.3200/JACH.58.1.45-55>
20. Hagger MS, Cheung MW-L, Ajzen I, Hamilton K. Perceived behavioral control moderating effects in the theory of planned behavior: A meta-analysis. *Health Psychology*, 2022;41(2):155–167. <https://doi.org/10.1037/hea0001153>
21. Blanchard C, Fisher J, Sparling P, Nehl E, Rhodes R, Courneya K, Baker F. Understanding physical activity behavior in African American and Caucasian college students: an application of the theory of planned behavior. *Journal of American College Health*, 2008;56(4):341–346. <https://doi.org/10.3200/JACH.56.4.341-346>
22. Godin G. The Godin-Shephard leisure-time physical activity questionnaire. *The Health & Fitness Journal of Canada*, 2011;4(1):18–22. <https://doi.org/10.14288/hfjc.v4i1.82>
23. Amireault S, Godin G. The Godin-Shephard leisure-time physical activity questionnaire: validity evidence supporting its use for classifying healthy adults into active and insufficiently active categories. *Perceptual and Motor Skills*, 2015;120(2):604–622. <https://doi.org/10.2466/03.27.PMS.120v19x7>
24. Cao Z, Yang Y, Ding W, Huang Z. From Physical Activity Intention to Behavior: The Moderation Role of Mental Toughness Among College Students and Wage Earners. *Frontiers in Psychology*, 2021;12:584760. <https://doi.org/10.3389/fpsyg.2021.584760>
25. Cheng OY, Yam CLY, Cheung NS, Lee PLP, Ngai MC, Lin CY. Extended theory of planned behavior on eating and physical activity. *American Journal of Health Behavior*, 2019;43(3):569–581. <https://doi.org/10.5993/AJHB.43.3.11>
26. Vamvaka V, Stoforos C, Palaskas T, Botsaris C. Attitude toward entrepreneurship, perceived behavioral control, and entrepreneurial intention: dimensionality, structural relationships, and gender differences. *Journal of Innovation and Entrepreneurship*, 2020;9(1):1–26. <https://doi.org/10.1186/s13731-020-0112-0>
27. Siegel D. Middle school students' attitudes toward physical education. *Journal of Physical Education, Recreation & Dance*, 2007;78(9):9–19. <https://doi.org/10.1080/07303084.2007.10598090>
28. Hagger M, Chatzisarantis N, Biddle S. A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport & Exercise Psychology*, 2002;1:3–32.
29. Kirk TN, Haegele JA, Zhu X. Predicting physical activity among adults with visual impairments using the theory of planned behavior. *Disability and Health Journal*, 2022;15(4):101363. <https://doi.org/10.1016/j.dhjo.2022.101363>
30. Gorozidis GS, Tzioumakis YS, Krommidas C, Papaioannou AG. Facebook group PETCoN (Physical Education Teacher Collaborative Network). An innovative approach to PE teacher in-service training: A self-determination theory perspective. *Teaching and Teacher Education*, 2020;96:103184. <https://doi.org/10.1016/j.tate.2020.103184>

Information about the author:

Zuhair A. Al Salim; <https://orcid.org/0000-0002-1148-6363>; drzuhair@uhb.edu.sa; Department of Sport Science and Physical Activity, College of Science, University of Hafr Al Batin; Hafr Al Batin, Saudi Arabia.

Cite this article as:

Al Salim ZA. Investigating the predictors of physical activity behavior among female college students in Saudi Arabia using the theory of planned behavior. *Physical Education of Students*, 2023;27(5):270–278.
<https://doi.org/10.15561/20755279.2023.0507>

This is an Open Access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited
<http://creativecommons.org/licenses/by/4.0/deed.en>

Received: 28.08.2023

Accepted: 28.09.2023; **Published:** 30.10.2023