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Factors Related to Engaging in Physical Activity: A Mixed Methods Study of Female University Students

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Abstract

Objective: As a needs assessment for intervention, quantitative and qualitative methods were used to examine attitude, subjective norms, perceived behavioral control, intention, knowledge, and weight control status related to physical activity in female university students within the Theory of Planned Behavior (TPB). Methods: A two-phase mixed method design was used. In Phase I, 362 students participated in an online survey, and in Phase II, 33 students participated in five focus group discussions. Ages of participants ranged from 18 to 45 years old, with 18 - 25 year olds making up over 74% of the sample. Results: Attitude, subjective norms, and perceived behavioral control, along with weight control status of trying to lose weight, were found to be significant predictors of intention to follow physical activity recommendations, which in turn were the strongest predictor of physical activity. Knowledge was not found to be significant. Group discussions revealed barriers to meeting physical activity recommendations, which included lack of companionship and social support, lack of motivation, time and cost restrictions, and lack of privacy in the gym. Social norms exerted both positive and negative influences. Conclusion: The mixed method approach provided a deeper insight into the influential factors pertaining to physical activity among female students, and results could be used in further research to develop effective interventions.

Keywords

Physical Activity, Theory of Planned Behavior, Female University Students, Mixed Methods

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1. Introduction

Obesity rates have increased dramatically over the past 20 years in the US. According to the Centers for Disease Control and Prevention (CDC), no state has a prevalence of obesity less than 20%, and 20 states have a prevalence of 30% or more [1]. The prevalence of overweight and obesity also has been documented among US university students. In 2014, the American College Health Association-National College Health Assessment (ACHA-NCHA II) showed that more than one-third of students were either overweight or obese [2]. Energy balance and weight control are influenced by energy expenditure [3]; thus, increasing physical activity is critical to addressing concerns about excessive weight in university students. Specifically, leisure time physical activity should be targeted as students do not have occupations that are physically demanding, and are challenged with a great deal of choices on how to spend their leisure time [4].

Years spent as a university student represent a period of transition where adopting and maintaining healthful behaviors is perceived as a great challenge [5] [6]. Female focus group participants described their eating and physical activity (PA) behaviors in college to be unstable [5]. In 2014, only about half of students met national recommendations for PA (ACHA-NCHA II) [2]. This data also indicated that male students (53%) were more likely than female students (49%) to engage in physical activity. Compared to men, women more often perceive themselves as being overweight than they actually are, and report greater use of unhealthy strategies to lose weight, such as vomiting and taking diet pills [7] [8].

College women are typically of childbearing age and thus are part of a priority population who also is experiencing excess weight. A study by Park *et al.* showed that about 41.6% of women started pregnancy as overweight and obese, and more than half of women gained excess weight during pregnancy [9]. These findings emphasize the importance of weight management in women of childbearing age and justify further attention to promote healthy lifestyles including physical activity among female university students. Examining factors affecting students' PA behaviors using a theory-grounded approach will inform interventions promoting physical activity.

One popular theory to examine factors influencing the adoption of health behaviors is the Theory of Planned Behavior (TPB) by Ajzen (1991) [10]. According to TPB, behavioral intention is influenced by attitude, subjective norms, and perceived behavioral control (PBC), and behavioral intention is the best single predictor of a person's behavior. Attitude refers to the individual's evaluation of the outcomes of performing a behavior. Subjective norms refer to the individual's perception about social pressure to perform or not perform the behavior. PBC refers to the individuals' beliefs related to the perceived ease or difficulty of performing a behavior [10].

Most studies addressing PA using the TPB have used only quantitative methods [11]-[13]. Although a study addressed PA in university students in Scotland using a mixed methods approach, results for female university students were not reported separately [14]. The current study addressed this gap using mixed methods to examine factors of the TPB related to following PA recommendations in female university students.

2. Methods

2.1. Study Design and Recruitment

A two-phase mixed-methods design was conducted [15]. The first phase was a quantitative survey to assess factors influencing female university students to follow national recommendations for PA. According to the 2008 Physical Activity Guidelines, at least 150 minutes of moderate-intensity aerobic activity (*i.e.*, brisk walking) or 75 minutes of vigorous-intensity aerobic activity (*i.e.*, jogging or running) or an equivalent combination of moderate- and vigorous intensity aerobic activity every week is recommended [3]. The second phase was qualitative focus group discussions (FGDs) to examine the underlying beliefs related to the TPB constructs. Approval was obtained from the university's Institutional Review Board for both phases of the study.

Female students at a large university in the southwestern United States were invited to participate in the study. At the time of the study in 2013, approximately 15,000 female university students were enrolled. Students were recruited using the university's daily email announcement system. Following students' completion of the surveys for Phase I, they were invited to participate in a FGD for Phase II. Participants in the focus groups included any volunteers who took the survey; thus, there was no exclusion criteria for the focus groups related to those who met/did not meet recommendations for physical activity. A total of 362 students participated in the Phase I online survey, and a total of 33 students participated in five FGDs in Phase II.

2.2. Data Collection

2.2.1. Phase I Quantitative Survey

The self-administered survey had 41 questions. Demographic questions consisted of classification, major, race, age, marital status, international student status, campus resident status, height and weight. Knowledge of PA recommendations was assessed by asking participants to identify the minimum amount of moderate-intensity physical activity recommended for overall health benefits. Response options include "30 minutes on 5 days or more per week," "25 minutes on 3 days or more per week," "30 minutes on 7 days per week," "60 minutes on 7 days per week," "none of these," and "don't know/unsure." For PA behavior within the past 7 days, two questions were asked: 1) "On how many of the past 7 days did you do moderate-intensity cardio or aerobic exercise for at least 30 minutes?" and 2) "On how many of the past 7 days did you do vigorous-intensity cardio or aerobic exercise for at least 25 minutes?" Weight control status was measured using these response options: "I am not trying to do anything about my weight," "I am trying to stay the same weight," "I am trying to lose weight," and "I am trying to gain weight."

Survey questions were developed to assess attitude, subjective norms, PBC, and behavioral intention related to following PA recommendations. Seven Likert scale response choices were provided for these questions. Behavioral intention was an index of three questions on a 7-point scale where 1 meant "strongly disagree" and 7 meant "strongly agree": 1). One question was "I plan to engage in the recommended amount of physical activity over the next month." Questions for other constructs followed that convention. For content validity, questions were reviewed by five faculty experts in Nutrition, Mass Communication, and Education. Also, five graduate students took the online survey in order to assess word/item understanding. Based on their comments, the survey wording was revised. The instrument was tested for reliability with a convenience sample of 14 undergraduate students who were asked to complete the online survey twice, with approximately 10 days between administrations. Results provided support for the reliability of the instruments: Behavioral intention (r = 0.75); attitude (r = 0.67), subjective norms (r = 0.85), PBC (r = 0.99), and the total TPB model (r = 0.96). Internal consistency reliability (Cronbach's alpha) was determined for the TPB constructs: Attitude (α = 0.81), subjective norm (α = 0.55), PBC (α = 0.76), and behavioral intention (α = 0.95) (data not shown). Attitude, PBC, and behavioral intention met the acceptable alpha level of >0.7 [16]. According to Wilson, Magarey, and Mastersson [17] and Pallant [18], Cronbach alpha values may be sensitive to the number of items in a scale, and values lower than 0.70 are common with less than 10 items. Therefore, the two items related to subjective norms were included in the analysis. The hypothesized relationships between the study variables are presented in **Figure 1**.

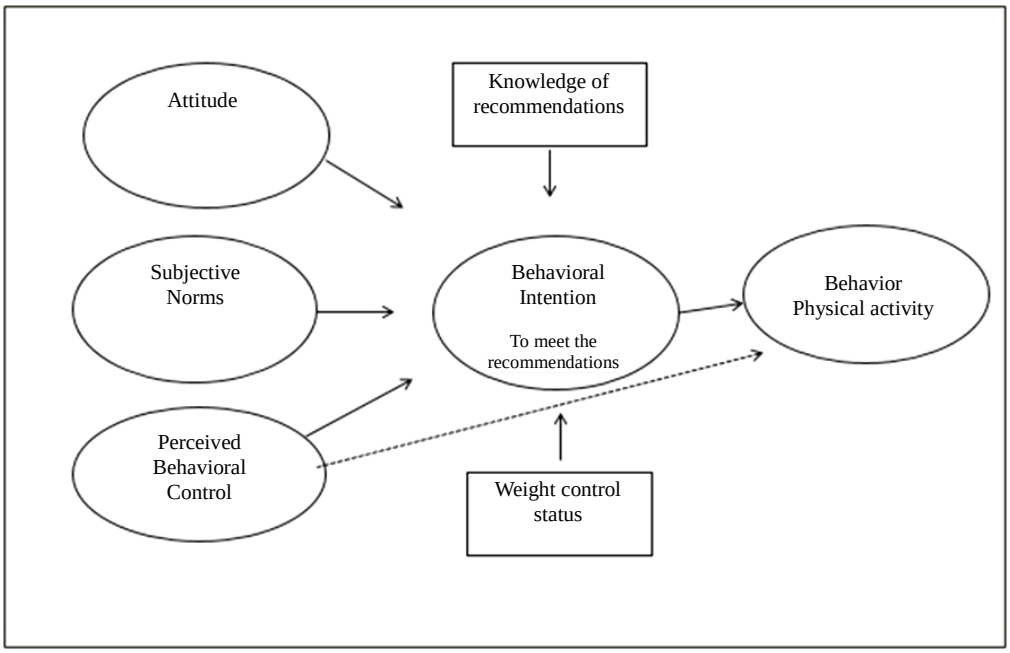

Figure 1. The theory of planned behavior as applied to physical activity in female university students.

2.2.2. Phase II Qualitative Focus Group Discussions

Students who completed the online survey were invited to take part in the focus group discussions. Students who responded and who were available during the scheduled times for the group discussions were selected for participation. Students were included regardless of their physical activity level as self-reported on the survey. Five focus group discussions were conducted by a trained moderator on the university's campus. Each focus group discussion included 5 - 8 participants, and lasted about 60 - 90 minutes. The FGDs included eight semi-structured and open-ended questions that were grounded by the TPB constructs (attitude, subjective norms, perceived behavioral control, and intention) as applied to physical activity (**Table 1**). The FGDs began after each participant signed the informed consent form and completed the demographic survey. Suggested procedures for qualitative analysis by Creswell [15] were used. The focus groups were audio-recorded and transcribed, and analyses were completed using the transcripts and observation notes. Following the completion of the focus group discussion, all comments to each of the questions were compiled into a single Word document. A coding list for recurring key themes and topics were developed throughout the transcript across the five groups. These codes were derived from the study questions or key words or phrases that frequently appeared in the data. The moderator and the assistant reviewed the transcripts separately to generate key themes, and then met to gain consensus. The systematic textual analysis of the FGD transcripts was conducted using ATLAS.ti 7.0 [19].

2.3. Statistical Analysis

Demographic information was summarized using descriptive statistics such as frequencies, percentages, means and standard deviations. Hierarchical and multiple regression analysis were conducted with the survey data to examine the predictor variables influences on intention and to examine students' intention on physical activity. A mean score was calculated from the multiple items corresponding to each TPB construct to have one value for attitude, one value for subjective norms, and so forth. Accordingly, the mean score for the TPB constructs were entered in the regression analysis. Pearson correlation statistics also were conducted to determine the correlation between the predictor variables. Values were considered statistically significant if $p < 0.05$. All statistical analyses were performed for the study variables using the Statistical Package for Social Sciences (SPSS) version 21, 2012 software.

3. Results

3.1. Phase I Quantitative Results

Of the 362 participants, 63.0% identified themselves as white, 87.3% lived off campus, and 82.3% were single (**Table 2**). Ages of participants ranged from 18 to 45 years old, with ages of 18 - 25 making up over 74% of the sample. Most were seniors or graduate students (each 39% of the sample). Body Mass Index, using self-reported height and weight, showed that about one third of students were overweight or obese. About half of participants correctly identified the minimum recommended amount of PA. The results of participants' responses to physical activity behavior within the past seven days indicated that only 26% and 39% of participants met the recommendations for moderate and vigorous-intensity physical activity, respectively. With regard to weight control status, 54.4% indicated that they were trying to lose weight.

Table 1. Focus group discussion questions.

1. The recommended amount of physical activity is 1) at least 30 minutes of moderate activity on at least 5 days of the week (*i.e.*, brisk walking) or 2) at least 75 minutes of vigorous activity per week (*i.e.*, jogging, running). What is influencing your ability to meet these recommendations in the next month?
2. What do you believe are the advantages of meeting the recommendations of physical activity in the next month?
3. What do you believe are the disadvantages of meeting the recommendations of physical activity in the next month?
4. Are there any individuals or groups who would approve of you meeting the recommendations for physical activity in the next month? In what ways would they show approval?
5. Are there any individuals or groups who would disapprove of you meeting the recommendations for physical activity in the next month? In what ways would they show disapproval?
6. What makes it easy to meet the recommendations of physical activity in the next month?
7. What makes it difficult or impossible for you to meet the recommendations of physical activity in the next month?
8. For those of you who intend to meet the recommendations of physical activity in the next month, please tell me how you plan to do that.

Table 2. Participant demographics and characteristics (n = 362).

Demographic/Characteristic	Frequency	%
Race		
American Indian/Alaskan Native	1	0.3
Asian/Pacific Islander	7	1.9
Black-Non-Hispanic	24	6.6
Hispanic	61	16.9
White-Non-Hispanic	228	63.0
Other	16	4.4
Missing values	25	6.9
International Student		
Yes	41	11.3
No	320	88.4
Missing values	1	0.3
Classification		
Freshman	6	1.6
Sophomore	26	7.2
Junior	48	13.3
Senior	141	39.0
Graduate	141	39.0
Live on Campus		
Yes	46	12.7
No	316	87.3
Marital Status		
Single	298	82.3
Married	50	13.8
Divorced	5	1.4
Separated	1	0.3
Other	8	2.2
Body Mass Index Classification		
Underweight	19	5.2
Normal weight	222	61.3
Overweight	67	18.5
Obese	53	14.6
Participants correctly identifying minimum recommended amount of PA	182	50.3
Do moderate intensity cardio or aerobic exercise for at least 30 minutes/per day		
0 days	55	15.2
1 - 4 days	213	58.8
5 - 7 days	94	26.0
Do vigorous intensity cardio or aerobic exercise for at least 25 minutes/per day:		
0 days	129	35.6
1 - 2 days	92	25.4
3 - 7 days	141	39.0

Note: Body Mass Index (BMI): Underweight (<18.5); Normal weight (18.5 - 24.9); Overweight (25.0 - 29.9); Obese (≥30).

Attitude, subjective norms, PBC, and weight control status of 'trying to lose weight' were all significantly correlated with behavioral intention (**Table 3**). The item of 'trying to lose weight' was found to be significantly correlated with subjective norms, but not with attitude or PBC.

Hierarchical regression analysis was used to test the impact of attitude, subjective norm, PBC, knowledge, and weight control on behavioral intention to follow PA recommendations. Demographic variables were included in the first model to control for BMI, race, classification, and age. These demographic variables were not significant and did not add any change to the regression model. In the second model, The TPB constructs of attitude, subjective norms, and PBC contributed significantly to the regression model explaining 58.5% of the variance in behavioral intention ($F(3,351) = 169.161$, $p < 0.001$). The addition of knowledge in the third model was not statistically significant ($F(1,350) = 2.677$, $p = 0.103$). Finally, the addition of weight control was significant and explained an additional 2.1% of the variance in behavioral intention ($F(3,347) = 6.229$, $p < 0.05$). The "trying to lose weight" variable was statistically significant, whereas "not trying to do anything about my weight," "trying to gain weight," and "trying to stay the same weight" were not statistically significant. Together the four independent variables accounted for 60.4% of the variance in behavioral intention (**Figure 2**). PBC had the strongest relationship with behavioral intention followed by attitude, subjective norms, and weight control status of trying to lose weight.

Table 3. Correlation matrices, means, and standard deviations of predictor variables for female university students' physical activity ($n = 362$).

Variables	Attitude	Subjective Norms	PBC	Behavioral Intention	Weight Control Status: Trying to Lose Weight
Attitude	1.000				
Subjective Norms	0.146**	1.000			
PBC	0.439**	0.152**	1.000		
Behavioral Intention	0.564**	0.378**	0.649**	1.000	
Weight Control Status: Trying to Lose Weight	−0.035	0.180**	−0.064	0.161**	1.000
Mean	5.910	4.566	5.729	5.616	0.544
Standard Deviation	0.970	1.013	0.998	1.380	0.498

*Correlation is significant at 0.05 level.

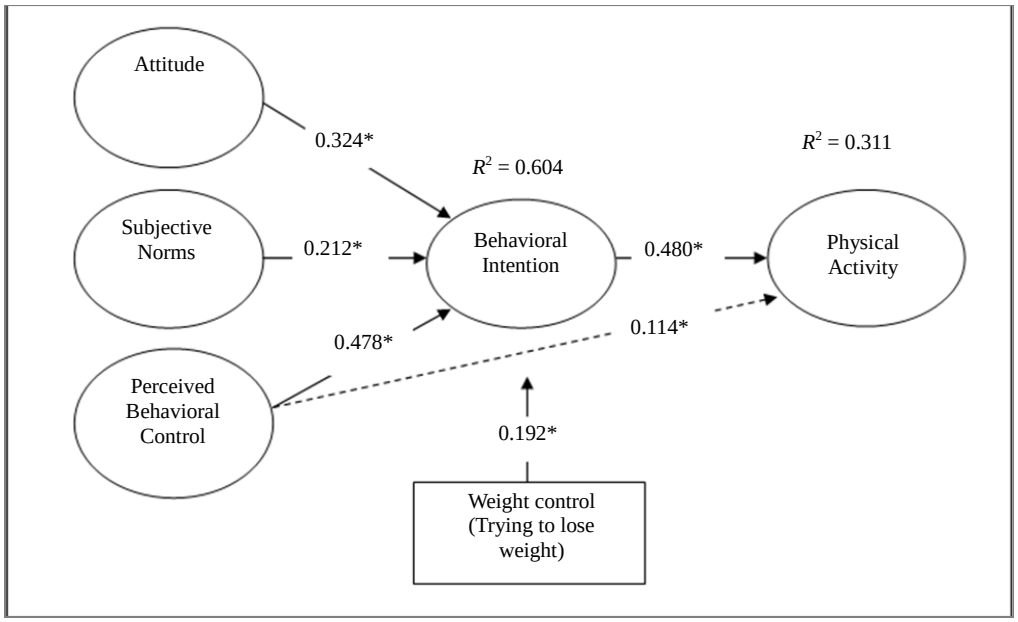

Figure 2. Research model with regression coefficients for female university students' physical activity ($n = 362$). *Regression coefficient is significant at <0.001 level.

Using the regression analysis to test the impact of PBC and behavioral intention to predict PA behavior, a significant model was determined ($F(2,359) = 82.626$, $p < 0.001$). Results showed that behavioral intention and PBC significantly predicted PA, ($\beta = 0.480$, $p < 0.001$) and ($\beta = 0.114$, $p = 0.047$) respectively, and accounted for 31.1% of its variance. Behavioral intention contributed more to PA than PBC (**Figure 2**).

3.2. Phase II Qualitative Results

Thirty-three female university students participated in one of five FGDs. Across the sample, most lived off campus ($n = 32$) and were American students ($n = 26$). Ages ranged from 18 to 45 years old, with ages of 18 - 25 year olds made about 60% of total sample. Senior ($n = 12$) and graduate students ($n = 18$) represented the majority of the sample ($n = 30$). Most students were single ($n = 24$). Categories related to the TPB constructs as related to PA are discussed with representative comments illustrating each construct.

3.2.1. Attitude

When asked about the advantages of meeting PA recommendations, a number of positive outcomes were mentioned, indicating a positive attitude toward PA. The most frequently mentioned outcomes were being healthy, increased energy, feeling positive, and weight loss. Other advantages included feeling happier, increased fitness, better sleep, and increased stress relief.

As one participant stated: "I just feel good about everything. My stress level goes down, my energy level goes up. I love the after-effects of exercise. Exercising itself is not that fun…but it makes you feel good."

Several comments were made that expressed negative beliefs such as time requirement, injury/soreness, lack of insurance for injuries, and the cost of gym membership for graduate students.

One student stated: "Don't have time, like when I work out, I could be studying for this test."Another one stated: "I don't have insurance …so if I get injured at this point, I can't get sick …I can't afford to go to the doctor."

3.2.2. Subjective Norms

When exploring social norms, responses showed that peers, partners, and family emerged as positive influences. Approval was shown by family and friends who were physically active. A couple of participants who were mothers mentioned that husbands and children were supportive, which provided motivation for the whole family to be active.

One participant stated: "If I'm going by myself, I'm more likely to convince myself, oh I have something (else besides physical activity) that I need to get done, but if you are going with people you can't do that."

3.2.3. Perceived Behavioral Control

When students were asked about what makes it difficult to meet PA recommendations, the major barriers were lack of time due to work and school commitments.

As one participant stated: "I'll feel pressure when there's a deadline… I don't want to look like I'm taking care of myself and my work comes second…I feel nervous about that."

This quote also reflects a perceived subjective norm on campus that values work above health. Participants who were mothers also indicated that family responsibility in addition to school commitment makes it more difficult to find time for PA.

As one mother stated: "I feel like going out for a run on Saturday, but then my husband and my son will be home."

Other self-reported barriers to PA included injury/soreness, cost, lack of companionship, laziness, extra laundry for workout clothes, lack of privacy in gym and lack of knowledge about the use of the machines, and inclement weather. When asked about what would make it easy to meet the recommendations of PA, support from friends and partners, making PA a priority, having access to an affordable facility, having equipment at home, PA that doesn't require equipment, and ideas appropriate for women with lower fitness levels, were the frequently mentioned factors.

3.2.4. Intention

The majority of participants expressed their intention to follow the recommendations in the next month. Partici-

pants suggested plans such as making PA a priority. One participant mentioned that knowledge of the health benefits, especially the long term benefits of PA, would help her to get motivated. Having companionship during PA was also frequently mentioned across all focus groups. Other participants suggested strategies such as using electronic applications (apps) in smart phones, and committing to gym membership fees.

4. Discussion

The rationale of using a mixed methods approach in this study was to develop a better understanding of the factors influencing female university students' intention and behavior related to PA. Collectively, the use of this design allowed the Phase II qualitative data to follow from and expand on the Phase I quantitative findings. The TPB has been used broadly across a wide range of health-related behaviors; yet there has been a deficit in the literature for the mixed methods application of the TPB. Our theory-grounded study is unique in that it comprehensively integrates the TPB quantitatively and qualitatively along with other external variables of knowledge and weight control to better understand underlying beliefs associated with PA among female university students.

This study showed that about 36% of the sample in the Phase I survey did not meet the recommended amount of PA as compared to 49% of university females in a national sample [2]. This finding could be a result of sampling differences, such as age and classification make-up of the samples as well as timing of data collection, since our study was conducted in the summer, when weather permits more outside activities.

A large percentage (60.4%) of the variance in PA intention was accounted for by attitude, subjective norm, PBC, and weight control status of trying to lose weight. Given the differences in our theoretical model of including external variables to the TPB framework, and that our sample included mainly females who were seniors or graduate students, it is difficult to compare independent effects of the TPB main constructs with previous PA studies. In our study, behavioral intention and PBC were significant predictors of PA behavior, and accounted for about 31% of its variance. Translating intention into action was good as intention itself explained 30% of PA behavior. This is higher than the 5.7% reported by Poobalan, Aucott, Clarke, and Smith for male and female university students in Scotland [14].

Weight control was investigated as an addition to the TPB in this study to examine its impact on behavioral intention to follow the recommendations of PA, and it was found to be significant. The quantitative Phase I showed that more than half of students were trying to lose weight. These findings suggest the potential benefit of including a weight control component in an intervention promoting increased PA for female university students.

Knowledge of the recommended amount of physical activity was also examined as an external variable to the TPB in the Phase I survey. Knowledge did not seem to affect the students' intention. Future research may investigate the influence of knowledge on intention, taking into account not only the knowledge of recommendations, but the health benefits of PA, use of gym equipment, and different types of exercise, which were mentioned in Phase II. Though Phase I of this study showed no significant relationship, knowledge is considered an important target for health education and has the potential to contribute to increasing desired behaviors [20] [21].

PBC was the strongest predictor of behavioral intention, which is consistent with previous literature. This finding is promising because female university students will more likely succeed at achieving the recommendations if they perceive that they have actual control. Thus, an intervention aimed at increasing intentions needs to include strategies to increase the students' overall self-efficacy to engage in PA as a central component.

The FGDs identified key barriers and facilitators to meet PA recommendations from female university students' perspectives. Barriers to adequate amounts of exercise included time constraints, school and work commitment, cost for gym fees, and family responsibilities for students who were mothers. Low cost strategies that do not involve going to the gym, such as exercise videos or interactive technology may meet some of the needs of university females. Intention to be physically active in the next month was expressed by the majority of participants. However, based on our results, education interventions to increase positive attitudes and sense of control to overcome perceived barriers are needed for female university students.

Subjective norms were found to be a significant predictor of behavioral intention to follow the recommendations for PA. Interventions should consider the source of social pressure on students. Our FGDs found that support from important people, such as partners, friends, and family was seen as a major catalyst to participate in PA. Participants who were married or had children felt that it was their responsibility to set the example for their family. Conversely, subjective norms may negatively affect intention to do PA if students are in work groups where participating in PA may be seen as shirking research or other academic responsibilities. Thus, future stu-

dies should look at university campus norms in terms of work expectation versus health promotion.

Participants reported several strategies to meet PA recommendations, such as increasing social support, increasing awareness about more PA options, and making healthy habits a priority and a daily routine. Information about and demonstrations on the use of reputable, popular PA electronic apps may address some of the participants' needs. Health education messages that the work load will always be there (even after graduation) reinforces the importance of making healthy choices part of one's daily schedule while a university student. Sending announcements about fitness classes from the university recreation center could be a useful strategy to motivate students to exercise, but non-gym alternatives should be promoted also to overcome some perceived barriers.

To our knowledge, this is the first study that expanded the theoretical framework of the TPB to include knowledge and weight control status and used qualitative FGDs to augment quantitative findings related to PA in female university students. However, this study has several limitations. It used a convenience sample of female students attending one university in the southwestern US; thus, the results cannot be generalized to male students and students at other universities. Senior and graduate level students constituted a majority of the sample, and this could be due to data collection being conducted during the summer sessions.

5. Conclusion

As universities address the obesity epidemic by offering physical activity choices and implementing educational programs, research studies such as this one can be helpful in designing programs based on female university students' needs. Promoting a healthier weight during female students' child bearing years can have a positive effect on their short and long-term health and that of their current and future families. The mixed method, theory-grounded approach of this study provided a deeper insight into the influential factors pertaining to PA among female university students. Most of the female students in this study had high intentions to follow the PA recommendations in the quantitative study; yet the qualitative findings revealed that factors such as time constraints, school responsibilities, perceived subjective norm that valued work over health, lack of motivation and companionship, and gym discomfort limited students' intention to achieve PA recommendations. These findings can inform the content and messaging of PA interventions in addressing the specific needs of female university students.

Competing Interest

Authors declare that they have no conflict of interests.

References

[1] Centers for Disease Control and Prevention (2013) Overweight and Obesity. http://www.cdc.gov/obesity/data/prevalence-maps.html

[2] American College Health Association-National College Health Assessment (2014) Reference Group Executive Summary Spring 2014. http://www.acha-ncha.org/reports_ACHA-NCHAII.html

[3] World Health Organization (2010) Global Recommendations on Physical Activity for Health. Geneva. http://apps.who.int/iris/bitstream/10665/44399/1/9789241599979_eng.pdf

[4] Sylvia-Bobiak, S. and Caldwell, L.I. (2006) Factors Related to Physically active Leisure among College Students. *Leisure Sciences*, **28**, 73-89. http://dx.doi.org/10.1080/01490400500332728

[5] Cluskey, M. and Grobe, D. (2009) College Weight Gain and Behavior Transitions: Male and Female Differences. *Journal of the American Dietetic Association*, **109**, 325-329. http://dx.doi.org/10.1016/j.jada.2008.10.045

[6] Burke, V., Beilin, L.I., Dunbar, D. and Kevan, M. (2004) Changes in Health-Related Behaviours and Cardiovascular Risk Factors in Young Adults: Association with Living with a Partner. *Preventive Medicine*, **39**, 722-730. http://dx.doi.org/10.1016/j.ypmed.2004.02.038

[7] Harring, H.A., Montgomery, K. and Hardin, J. (2010) Perceptions of Body Weight, Weight Management Strategies, and Depressive Symptoms among US College Students. *Journal of American College Health*, **59**, 43-50. http://dx.doi.org/10.1080/07448481.2010.483705

[8] Kilpatrick, M., Hebert, E. and Bartholomew, J. (2005) College Students' Motivation for Physical Activity: Differentiating Men's and Women's Motives for Sport Participation and Exercise. *Journal of American College Health*, **54**, 87-94. http://dx.doi.org/10.3200/JACH.54.2.87-94

[9] Park, S., Sappenfield, W., Bish, C., Salihu, H., Goodman, D. and Bensyl, D. (2011) Assessment of the Institute of

Medicine Recommendations for Weight Gain during Pregnancy: Florida, 2004-2007. *Maternal & Child Health Journal*, **15**, 289-301. http://dx.doi.org/10.1007/s10995-010-0596-5

[10] Ajzen, I. (1991) The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, **50**, 179-211. http://dx.doi.org/10.1016/0749-5978(91)90020-T

[11] Everson, E.S., Daley, A.J. and Ussher, M. (2007) Brief Report: the Theory of Planned Behaviour Applied to Physical Activity in Young People Who Smoke. *Journal of Adolescence*, **30**, 347-351. http://dx.doi.org/10.1016/j.adolescence.2006.11.001

[12] Rhodes, R.E. and Courneya, K.S. (2003) Investigating Multiple Components of Attitude, Subjective Norm, and Perceived Control: An Examination of the Theory of Planned Behaviour in the Exercise Domain. *British Journal of Social Psychology*, **42**, 129. http://dx.doi.org/10.1348/014466603763276162

[13] Payne, N., Jones, F. and Harris, P.R. (2004) The Role of Perceived Need within the Theory of Planned Behaviour: A Comparison of Exercise And Healthy Eating. *British Journal of Health Psychology*, **9**, 489-504. http://dx.doi.org/10.1348/1359107042304524

[14] Poobalan, A.S., Aucott, L.S., Clarke, A. and Smith, W.C. (2012) Physical Activity Attitudes, Intentions and Behaviour among 18 to 25 Year Olds: A Mixed Method Study. *BMC Public Health*, **12**, 640. http://dx.doi.org/10.1186/1471-2458-12-640

[15] Creswell, J.W. (2009) Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 3rd Edition, Sage Publications, Thousand Oaks.

[16] George, D. and Mallery, P. (2003) SPSS for Windows Step by Step: A Simple Guide and Reference. 11.0 Update. 4th Edition, Allyn & Bacon, Boston.

[17] Wilson, A., Magarey, A. and Mastersson, N. (2008) Reliability and Relative Validity of a Child Nutrition Questionnaire to Simultaneously Assess Dietary Patterns Associated with Positive Energy Balance and Food Behaviours, Attitudes, Knowledge and Environments Associated with Healthy Eating. *The International Journal of Behavioral Nutrition and Physical Activity*, **5**, 55. http://dx.doi.org/10.1186/1479-5868-5-5

[18] Pallant, J. (2004). SPSS Survival Manual. Allen & Unwin, Crows Nest.

[19] ATLAS.ti. Version 7.0 [Computer software] Berlin, Scientific Software Development. http://www.atlasti.com

[20] Moore, L.V., Fulton, J., Kruger, J. and McDivitt, J. (2010) Knowledge of Physical Activity Guidelines among Adults in the United States, HealthStyles 2003-2005. *Journal of Physical Activity and Health*, **7**, 141-149.

[21] Pérez-Cueto, F.A., Pieniak, Z.Z. and Verbeke, W.W. (2011) Attitudinal Determinants of Fish Consumption in Spain and Poland. *Nutrición Hospitalaria Journal*, **26**, 1412-1419.