

ORIGINAL RESEARCH

Categorization and determinants of physical activity among nursing students

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ABSTRACT

Background: Emerging literature characterizing physical activity among student nurses suggests the majority (78%) are not meeting physical activity guidelines recommended accumulation of 30 min or more of moderate-intensity physical activity 5 day/week or 20 min of vigorous-intensity physical activity on 3 days per week to promote health. Academic stress is known to influence health through its direct physiological effect and its indirect effect via altered health behaviors and can have detrimental effects on both academic performance and health among nursing students. Determinants of physical activity are necessary to design appropriate and targeted interventions.

Methods: Eighty-five (68F/17M) aged 21 – 48 (\pm 0.6 yrs), pre-licensure (bachelor [BS]), master entry clinical nurse (MECN) and advanced practice nurse (APN) students were part of a cross-sectional study to establish a baseline understanding of the status of health of the student population and then explored for subgroup differences. A convenience sample of BS, MECN and APN students were invited to take part in the study. These three cohorts were chosen because of their availability in university at the time of data collection. Physical activity was determined using the International Physical Activity Questionnaire (IPAQ). Determinants of physical activity were determined utilizing the Behavioral Risk Factor Surveillance Scale, Beck Depression Inventory, Exercise Self-Efficacy Scale and the Transtheoretical Model. Descriptive statistics, ANOVA, chi-square and correlational analysis of the variables were determined.

Results: Baccalaureate students comprised 68.4% of the low physical activity category compared to 62.5% of APN students in the moderate category. Stage of change and self-efficacy exercise values did not differ between groups. Among BS students, low ratings of life satisfaction, 36.8% mild/moderate depression values and higher days of alcohol consumption were reported with BS students reporting +1.73 drinks/week ($p < .05$).

Conclusions: Baccalaureate students may be unaware of health-promotion strategies. Nursing school provides a forum for health promotion interventions during a critical stage of personal and professional development. Faculty members educating the next generation of nurses have a responsibility to create a healthy environment and provide students the tools and resources to develop self-care strategies.

Key Words: Nursing students, Physical activity, Determinants, Health behavior

1. INTRODUCTION

College students identify academic tasks as their greatest source of stress, and report negative health outcomes during

their education including limited physical activity.^[1] Stress is known to influence health through its direct physiological effect and its indirect effect via altered health behaviors^[2]

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and can have detrimental effects on both academic performance and health among college students.^[1] Compared to other health care professional students and the general public, studies suggest that nursing students experience higher levels of academic stress and are particularly vulnerable to poor health risk.^[3] There is some evidence that burnout, psychiatric symptomatology and negative behaviors such as academic fraud and non-attendance are associated with student stress. The literature identifies three main groupings: academic sources of stress, clinical sources of stress and social/personal sources of stress.^[4]

Data suggest that most college students are not meeting physical activity guidelines, suggesting the need for prevention interventions in college students.^[5] The United States Department of Health and Human Services has identified health disparities among college students, recognizing a need for more health promotion programs in order to offset elevated disease risk factors associated with physical inactivity. Physical activity is listed prominently as a leading health indicator in Healthy People 2020^[6] and objectives include increasing the proportion of college and university students who receive information on health-risk behavior on inadequate physical activity from their institution. However, engaging in regular physical activity can be a challenge for students and despite the awareness of the positive benefits associated with this behavior; knowledge alone is not associated with healthy behaviors.^[7]

The known advantages of physical activity are wide-ranging, from prevention of obesity-related disorders to decreased cardiovascular disease risk to enhanced mental well-being by improving psychological mood; reducing anxiety and the risk of depression; increasing self-esteem and satisfaction with life.^[8] Insufficient physical activity and stress long-term is associated with negative health risks resulting in high rates of chronic disease including cardiovascular disease and hypertension contributing to increased premature and preventable morbidity, difficulty sleeping, increased levels of depression, anxiety and attrition.^[9]

Research examining stress and physical activity in Ireland and Hong Kong student nurse populations of similar ages reported conflicting findings.^[10,11] The literature on physical activity in student nurses varied from 22% to 61% in those meeting national physical activity guidelines of at least 30 minutes or more of moderate-intensity physical activity 5 day/week or 20 minutes of vigorous-intensity physical activity on three days per week.^[12,13] Compared to other healthcare students, student nurses are less physically active although findings are mixed. One study reports that physiotherapy students are more physically active, smoke less, and

eat fewer sweets and unhealthy snacks compared to nursing students, while others show no difference.^[14,15]

In addition to describing physical activity in the nursing student population, research on determinants of physical activity is necessary to design appropriate and targeted interventions. Research findings on determinants associated with greater physical activity in adults include age (inverse), higher levels of education, gender (male), and ethnicity (white).^[16] Psychological determinants include high enjoyment of exercise, greater expected benefits of physical activity, greater intent to become physically active, a positive perception of health and or fitness, perceived activity competence, previous physical activity, social support, opportunities to exercise, self-rated health, high self-efficacy for physical activity, and greater motivation for physical activity.^[17,18] Behavioral determinants with repeated documentation of a positive association with physical activity include having a history of being physically active as an adult, practicing positive dietary habits and process of change.^[19] Process of change refers to stages found within the context of the Transtheoretical Model.^[20]

The Transtheoretical Model consists of four dimensions, *i.e.*, the stages of change, the processes of change, situational self-efficacy, and decisional balance. The stages of change represent the temporal, motivational, and consistency constructs of behavior change. These stages are pre-contemplation, contemplation, preparation, action, and maintenance. The first three stages are frequently categorized as the pre-action and the latter as the action stages.^[21] The Transtheoretical Model hypothesizes that individuals can transition from the pre-action to the action stages through cognitive and behavioral processes of change. The cognitive processes of the Transtheoretical Model focus on gathering information regarding the unhealthy behavior, leading to an attitude change conducive to a positive behavior change. Perceived self-efficacy is an individual's belief that they are capable of achieving a goal and has been increasingly associated with health behavior and its change.^[22] Bandura's Theory of Self-Efficacy^[23] suggests that behavior is better predicted by people's beliefs in their capabilities to do whatever is needed to succeed than by the behavior's importance.

The college years are highly influential in shaping adult behaviors, particularly with regard to physical activity, and other lifestyle habits. A better understanding of physical activity practices among nursing students on university campuses could potentially lead to the establishment of best practices most suitable for university populations. Therefore, the goal of this study was to establish a baseline understanding of the status of health of the student population and then explore for subgroup differences. The specific aim of this

study was to determine if there are significant differences in self-reported physical activity measured by the International Physical Activity Questionnaire (IPAQ) and determinants of physical activity among pre-licensure (bachelor [BS]), master entry clinical nurse (MECN), and advanced practice nurse (APN) students.

2. METHODS

2.1 Design

A cross-sectional design was used with a convenience sample of full-time nursing students (N = 85). Participants gave written informed consent prior to the investigation by the principal investigator. The research protocol was approved by the University of California, Los Angeles Institutional Review Board for use of Human Subjects according to the Helsinki Declaration. Data were collected between April 2013 - June 2013.

2.2 Sample

Students were eligible for this study if they were enrolled full-time at the university. Undergraduate student holds a minimum of a high school diploma and is a bachelor's degree seeking student preparing to become a registered nurse. Masters Entry Clinical Nurse (MECN) student holds the minimum of a bachelor's degree in another field and is a master's degree seeking student preparing to become a registered nurse. The APN student holds a minimum of a bachelor's degree in nursing and is a master's degree seeking student preparing to become an advanced practice nurse.

2.3 Procedure

Sociodemographic information including sex, age, race/ethnicity, and education level was ascertained during the assessment using the Behavioral Risk Factor Surveillance Scale (BRFSS). Height (cm) and body weight (kg) were measured to the nearest 0.25 cm and nearest kg, respectively; body mass index (BMI) was calculated (kg/m^2). Blood pressure (BP) was measured after the participant was seated for ten minutes using sphygmomanometer. The arm being used was relaxed, uncovered, and supported at the level of the heart.^[24]

2.4 Physical activity assessment

Participants completed the IPAQ short form to obtain an objective estimate of weekly time spent in different dimensions of physical activity and inactivity during the previous seven days. Similar to Zanovec *et al.*,^[25] the form was administered using an interview probe-type format. IPAQ allows the estimation of time spent per week on physical activities of moderate and strong intensity, in different contexts of the daily life: work, transportation, housework, yard work, and

leisure. The questionnaire also includes time spent in passive activities performed in the seated position. The questionnaire consists of seven open questions and its information allows for an estimation of the time spent per week in different types and intensities of physical activity and inactivity. The IPAQ has good measurement properties for monitoring population levels of physical activity among 18-65 year old adults in diverse settings. Student nurses fall within this age range making the BDI sensitive to the population under study. Typical IPAQ correlations are 0.80 for reliability and 0.30 for validity.^[26]

Total physical activity level was calculated and recorded in MET-minutes per week (MET-min/week) according to the IPAQ scoring protocol. IPAQ responses were converted into metabolic equivalents (METS) and participants were categorized into "low", "moderate" or "vigorous" activity levels based on standard IPAQ scoring cutoffs and guidelines,^[26] with MET values of 8.0, 4.0 and 3.3 min/week corresponding to cut-offs for vigorous-intensity, moderate-intensity, and walking activities, respectively. For ANOVA, the activity level was considered an ordinal variable with values 1 = low, 2 = moderate, 3 = vigorous.

2.5 Determinants of health

2.5.1 The Behavioral Risk Factor Surveillance Scale (BRFSS)

In order to measure self-rated general health by a single item, as suggested by the BRFSS and previous research,^[27] participants were questioned: "How would you describe your health in general?", with the four answering options: "excellent" (1), "very good" (2), "fair" (3), and "poor" (4) from section 1 (Health Status). We measured section 2 (Healthy Days - Health related Quality of Life), 4 (Sleep), 5 (Exercise), 6 (Diabetes) and 8 (Cardiovascular). The Behavioral Risk Factor Surveillance System (BRFSS) has been one of the main data sources that public health officials and practitioners use to track chronic conditions, including health-risk behaviors.

2.5.2 Exercise self-efficacy scale

Self-efficacy was assessed using the Exercise Self-Efficacy Scale.^[28] This 18-item scale asks respondents to indicate their level of confidence for performing physical activity a minimum of three times per week despite potential barriers (*e.g.*, you were depressed). Respondents rated their confidence for performing physical activity using 10-point increments on a 100-point scale (0 = cannot do at all and 100 = certainly can do). This scale has established reliability^[29] and demonstrated a Cronbach's alpha of 0.90 in the current study.

2.5.3 The stages of change

Stage of change was assessed within the context of the Trans-theoretical Model. Participants were asked to select the stage that best describes their physical activity. These stages were defined as pre-contemplation (you have not attempted exercise within the past six months), contemplation (you will attempt exercise within the next six months), preparation (you are occasionally but not regularly), maintenance (you have been regularly exercising for the past than six months), and termination (you have been exercising regularly for at least six months).

2.5.4 Beck Depression Inventory (BDI)

BDI is one of the most widely used measures of the severity of depression in diagnosed patients and for detecting possible depression in normal populations. It is a self-rating inventory consisting of 21 categories with each item rated on a 4-point scale ranging from 0 to 3. The maximum score is 63. The interpretation is as follows: 0 – 13: minimal; 14 – 19: mild; 20 – 28: moderate and 29 – 63: severe.^[30] For chi-square, the Beck Depression rating was considered an ordinal variable with values 1 = minimal or 2 = mild/moderate. The scale is widely used among both adults and adolescents. Student nurses fall within this age range making the BDI sensitive to the population under study. Reliability and validity for the BDI among nonclinical samples of children and adolescents range 0.82 – 0.92 and 0.65 - 0.92 respectively.^[31]

2.6 Statistical analysis

All data were expressed as means \pm SE for continuous variables and as percentages for categorical/binary variables. Analysis of variance (ANOVA) methods for normally-distributed continuous variables were used to assess comparability of the three (educational level) groups with regard to demographic characteristics and physical activity determinant profiles. Subject characteristics were described in terms of demographic and physiological variables including age, ethnicity, body composition variable (BMI), and metabolic equivalent task category (MET's). For further sample description, characteristics are also given for each of the three subsets of subjects by program levels. Chi-square analyses were used to examine the frequency distributions of categorical variables between groups. Pearson correlation coefficients were computed for continuous variables. For all the test statistics in the study, significance was defined as a p value $< .05$. The data were analyzed using Statistical Package for the Social Sciences (SPSS) version 22.0 for Windows (SPSS Inc., Chicago, IL).^[32]

3. RESULTS

3.1 Sample characteristics

Participants included a volunteer convenience sample of eighty-five (85), students enrolled in an urban public university (19 BS, 24 APN students, 42 MECN). A majority (49.4%) of the sample was Caucasian with representation of other major racial/ethnic groups. A significant majority of BS students (63.2%) were Asian/Pacific Islanders (see Table 1). Eighty percent of the group was female. The average age was 27.7 years; the subset of BS students were significantly younger (average 21.4 yrs) than APN students (32 yrs), and MECN (28 yrs) students. The groups differed with regard to clinical parameters including diastolic blood pressure with BS students significantly lower than MECN, and APN students controlling for age. Calculated BMI and BMI classification did not differ between groups. Although gender differences were not observed in BMI in the overall group, BMI gender differences were significant among BS students (see Table 1).

3.2 Physical activity

IPAQ: Categorization of IPAQ activity category were 37.8% low activity, 36.5% moderate activity category and 25.9% high activity category for the overall nursing student population. BS students comprised 68.4% of the low activity category and APN students comprised 62.5% of the moderate activity category ($p < .005$) (see Table 2).

3.3 Stage of change and self-efficacy of exercise values

No group difference was observed in stages of change that described engagement of physical activity. The majority (48.2%) of the overall student population was in the termination phase, reporting they had been regularly exercising for at least six months (see Table 2). As noted in Table 1, there was no group difference in total self-efficacy exercise values (54.1 ± 20.1).

3.4 The behavioral risk factor surveillance scale

Significant differences were reported within the past 30 days for, "other you're your regular job, did you participate in any physical activity or exercise such as running, calisthenics, golf, gardening, or walking for exercise?" with 65.4% of APN students responding no, compared to 15.4% and 19.2% of BS and MECN students respectively ($p < .005$).

No group difference was observed within the past 30 days for: the number of days of poor mental health; the number of days of poor physical or mental health preventing usual activities; the number of days including physical illness and injury that physical health was not good; the number of days of not enough sleep or rest; the number of drinks on average in the past 30 days; and the largest number of alcoholic

drinks consumed on any occasion. Compared to 29.2% of APN students, significant differences were reported in BS (84.2%) and MECN students (77.5%) reporting at least one alcoholic drink in the past 30 days ($p < .01$). A significant difference is observed between APN and BS for the number of days per week in the past 30 days of having at least one drink of any alcoholic beverage, with BS +1.73 drinks/week ($p < .05$) (see Table 3).

A group difference was observed in life satisfaction with 15.8% of BS students reporting dissatisfied, compared to APN (0%), and MECN (4.9%), $p < .01$. There were no group differences in self-reported general health between groups with 36.5% of the total group reporting fair/poor (see Table 2). No group difference was observed in how often social emotional support was received, with 81.2% of the total group reporting always or usually (see Table 3).

Table 1. Individual characteristics of nursing students by program

	Bachelor	Advanced Practice Nurse	Master Entry Clinical Nurse
Number of subjects	19	24	42
Female (%)	73.7	79.2	83.3
Age (yr)*	21.4 ± 0.77 [†]	32.0 ± 6.46 [‡]	28.0 ± 3.55 [‡]
Race**			
African American	5.3% (1)	0% (0)	16.7% (7)
Asian/Pacific Islander	63.2% (12)	20.8% (5)	19% (8)
Caucasian	31.6% (6)	58.3% (14)	52.4% (22)
Hispanic	0% (0)	8.3% (2)	9.5% (4)
Other	0% (0)	12.5% (3)	2.4% (1)
Systolic BP (mmHg)	105.8 ± 9.2	112.8 ± 11.1	109.7 ± 10.8
Diastolic BP (mmHg)**	64.7 ± 5.9	71.5 ± 7.4	72.0 ± 8.6
BMI (kg·m⁻²)	23.1 ± 2.49	24.2 ± 3.03	24.2 ± 4.33
Female	22.4 ± 2.30*	23.9 ± 2.96	24.1 ± 4.56
Male	25.0 ± 2.11	25.1 ± 3.45	24.8 ± 2.94
Overweight (%)	21.1	33.3	26.2
Obese (%)	0	4.2	9.5
Self-Efficacy/Exercise Confidence (mean ± SD)	51.2 ± 23.6	52.0 ± 21.3	56.5 ± 17.8
Employed (%) **	10.5% (2)	52.2% (12)	4.85 (2)
Type II diabetes	0	0	2
Asthma	2	2	7
Tobacco Use (%)	0	0	0
Cardiovascular Disease	0	0	1

Note. BMI: Body Mass Index (kg·m⁻²); Overweight (25 ≤ BMI < 30); Obese (BMI > 30); ** $p < .01$, * $p < .05$ from comparison of groups by likelihood ratio chi square (for race) and ANOVA for other characteristics; † ‡ significant group differences using Bonferroni's Post Hoc comparisons, $p < .05$.

3.5 Beck depression

A group difference was observed in Beck Depression values with 36.8% of BS students reporting mild to moderate values compared to APN (16.7%), and MECN (9.5%) students ($p < .05$) (see Table 2). Total Beck Depression value were negatively correlated with total IPAQ MET's in BS students ($R = -0.48$, $p \leq .05$); these findings were not significant in the APN or MECN cohorts.

4. DISCUSSION

The main objective of this study was to establish a baseline understanding of the status of health of the student population

and then explore subgroup differences among pre-licensure BS, MECN, and APN nursing students. Of interest was the overall health status of the BS students. As expected, students in the bachelors program were younger. Blood pressure was lowest in this student group which may reflect biological characteristics and modifiable risk factors that predict cardiovascular risk which were not evaluated.^[33] Although we did not observe overall group or gender differences in BMI we did observe gender differences among BS students which may reflect a normal transition period from adolescence to adulthood. Interventions, including physical activity, aimed at the college population may help reduce the rate of be-

coming overweight during the transition from adolescence to adulthood and thereby prevent some of the long-term health consequences of obesity.

4.1 Physical activity

“You must be able to take care of ourselves before we can take care of others.” Likely something a nurse would tell a patient or family member. However, nurses often put others first, neglecting their own needs thereby leaving them as less effective care givers, leaving them particularly vulnerable. Poor habits acquired during their education may contribute to lifelong health risks and limit nurses’ effectiveness as health educators.^[34] Similarly, in a study examining primary prevention of cardiovascular risk factors in medical students, primary prevention rules had improved somewhat in students

as they progressed in their program of study, but were not ideal.^[35]

Consistent with others,^[12, 13] we demonstrated that 37.6% of all nursing students were categorized into the low physical activity category according to the IPAQ scoring system. The majority (68.4%) of the baccalaureate nursing students were in the low activity category, indicating that they did not meet national physical activity guidelines to optimize health benefits associated with active living. This is an unexpected finding as lower age is considered a determinate of physical activity.^[16] Our findings are similar to others who examined undergraduate physical activity levels and reported overall, relatively low proportions of students achieved the recommended guidelines of physical activity, particularly in female students.^[36]

Table 2. Physical activity, mood and life satisfaction

	Total N = 85	Bachelor n = 19	Advanced Practice Nurse n = 24	Master Entry Clinical Nurse n = 42	<i>p</i>
International Physical Activity Questionnaire					
Low (category 1)	37.5% (32)	68.4% (13)	20.8% (5)	33.3% (14)	< .005
Moderate (category 2)	36.5% (31)	15.8% (3)	62.5% (15)	31.0% (13)	
High (category 3)	25.9% (22)	15.8% (3)	16.7% (4)	35.7% (15)	
Stage of Change - Engagement in Physical Activity					
<i>Pre-contemplation</i>	4.7% (4)	50.0% (2)	50.0% (2)	0.0% (0)	.17
You have not attempted to exercise within the past 6 months					
<i>Contemplation</i>	3.5% (3)	33.0% (1)	0.0% (0)	66.7% (2)	
You will attempt to exercise within 6 months					
<i>Preparation</i>	30.6% (26)	19.2% (5)	42.3% (11)	38.5% (10)	
You are occasionally but not regularly exercising					
<i>Maintenance</i>	12.9% (11)	36.4% (4)	9.1% (1)	54.5% (6)	.93
You have been regularly exercising for less than 6 months					
<i>Termination</i>	48.2% (41)	17.1% (7)	24.4% (10)	58.5% (24)	
You have been regularly exercising for at least 6 months					
Beck Depression					
Minimal (0 – 13)	82.4% (70)	63.2% (12)	83.3% (20)	90.5% (38)	< .05
Mild/moderate (14-28)	17.6% (15)	36.8% (7)	16.7% (4)	9.5% (4)	
Life Satisfaction					
Very Satisfied	40.5% (34)	15.8% (3)	33.3% (8)	56.1% (23)	< .05
Satisfied	53.6% (45)	68.4% (13)	66.7% (16)	39.0% (16)	
Dissatisfied	6% (5)	15.8% (3)	0.0% (0)	4.9% (2)	
Self-Reported General Health					
Excellent	23.5% (20)	21.1% (4)	20.8% (5)	26.2% (11)	.93
Very Good	40.0% (34)	47.4% (9)	41.7% (10)	35.7% (15)	
Fair/Poor	36.5% (31)	31.6% (6)	37.3% (9)	38.1% (16)	

Although the beneficial effects of physical activity on health and well-being have been reported extensively,^[3] the role of physical activity in enhancing physical and mental well-being in student nurses has received limited attention. A general student population engaging in physical activity showed improved mental health.^[15] The college population is of particular interest because this group of emerging adults is known to experience a number of stressors during the transitions including change of residence,^[36] increased responsibility, peer pressure, coursework management, and difficult schedules.^[38]

4.2 Alcohol consumption

Baccalaureate students reported consuming alcohol more days per week. Alcohol use increases in the transition out of

high school rising to the highest levels across the life span during emerging adulthood with approximately 9% meeting criteria for alcohol dependence.^[39,40] The college environment is one potential contributor to elevated drinking rates and findings suggest students may use alcohol for both self-regulation and sensation seeking.^[39] BS students reported the largest number of drinks on any occasion, suggesting possible episodic drinking among the BS population. Reports indicate that roughly two in five students engage in heavy episodic drinking.^[41] These findings are similar to a recent nursing student survey that reported at-risk alcohol consumption within the population of female nursing students.^[8] National data indicate that 39% of college students have had a binge-drinking episode in the last two weeks.^[42]

Table 3. The behavioral risk factor surveillance scale items

Question	Bachelor n = 19 Mean ± SD	Advanced Practice Nurse n = 24 Mean ± SD	Master Entry Clinical Nurse n = 40 Mean ± SD	p
Thinking about your physical health, which includes physical illness and injury, for about how many days during the past 30 days was your physical health not good?	2.21 ± 4.0	1.89 ± 2.6	2.29 ± 3.7	.91
Now thinking about your mental health, which includes stress, depression and problems with emotions, for about how many days during the past 30 days was your emotional health not good?	8.05 ± 6.6	5.62 ± 6.6	6.86 ± 8.2	.57
During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work or recreation?	4.47 ± 6.3	1.79 ± 3.1	2.95 ± 4.3	.17
During the past 30 days, for about how many days have you felt you did not get enough rest or sleep?	11.42 ± 9.5	8.0 ± 8.6	11.96 ± 8.5	.20
During the past 30 days, how many days per week did you have at least one drink of any alcoholic beverage?	2.79 ± 3.2a	1.06 ± 1.9b	1.83 ± 1.9	< .05 ^y
During the past 30 days, on the days when you drank, about how many drinks did you drink on average?	3.34 ± 4.5	0.63 ± 1.3	2.5 ± 4.7	.07
Considering all types of alcoholic beverages, how many times during the past 30 days did you have (CATI X=5 men, X=4 for women) or more drinks on one occasion?	1.95 ± 2.7	1.08 ± 2.4	1.16 ± 2.1	.41
During the past 30 days, what is the largest number of drinks you had on any occasion?	7.11 ± 7.12	2.14 ± 2.6	3.21 ± 2.5	.14
	% yes (n)	% yes(n)	% yes (n)	
During the past 30 days, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?	78.9% (15)	29.2% (7)	88.1 (37)	< .01**
During the past 30 days, have you had at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?	84.2% (16)	29.2% (7)	77.5% (31)	< .01**

**p < .01, *p < .05 from comparison of groups by likelihood ratio chi square and ANOVA for other characteristics; ^y Bonforoni post-hoc analysis

4.3 Mental health

Baccalaureate students reported an average of 4.47 ± 6.3 mental health days or number of days physical or mental health prevented usual activities or the number of emotional health days within the past 30 days. Significant differences were observed in Beck Depression values among BS students, with 36.8% reporting mild/moderate ratings, and Beck Depression values were significantly negatively correlated with total IPAQ MET's. These findings are consistent with a growing body of literature that has also shown the positive effects

of regular exercise on mental health.^[43] Conflicting findings have reported in other health care students where depression was not correlated to exercise. Research is warranted to better understand physical activity in this population with regard to academic demands and possible long-term health associated with emotional health.

4.4 Life satisfaction

We observed significant differences in ratings of life satisfaction with 15.8% of BS students reporting dissatisfied. Physical activity has been linked to satisfaction with life through

within-person processes reflecting the effect of time-varying factors, including daily life events, behaviors, or states, on satisfaction with life, because the accumulation of physical activity within a day has a revitalizing effect.^[44] We did not report similar findings such as those who have examined the effects of social support, and self-efficacy on health behavior of college students and found high self-efficacy was a strong predictor of health-promoting behaviors.^[45,46] Poor habits acquired and/or sustained during nursing education may contribute to lifelong health risks.

4.5 Self-reported health status

Self-reported health status is often a predictor of exercise participation and has been shown to be significantly related to better subjective health among various populations.^[16,47] Disconcertingly, 15.8% of the BS student population reported fair/poor general health status. This finding is of concern among our student body, as health is becoming a valid indicator of a person's health status and consistently predicts adverse health outcomes and can be an independent predictor of mortality.^[48]

4.6 Action model to achieve a healthy campus

These study findings provide preliminary data which can be associated with health outcomes and feedback to future intervention planning utilizing the Action Model to Achieve a

Healthy Campus^[49] (see Figure 1) which is an ecological approach addressing determinants of health to improve student health. The majority of the development process for Healthy Campus 2020^[49] was guided by the Healthy People framework^[6] and provides an evidence-based approach to achieve the 2020 goals emphasizing the determinants and ecological nature of health in campus communities. The model promotes the importance of implementing interventions that address health at multiple levels, including individual level intervention which can lead to changing social environments, physical environments, and policies within a campus community.^[6,49]

4.7 Limitations

The possibility of self-selection bias since the participants volunteered for the study. Although insufficient physical activity is reportedly associated among student nurses in this sample, findings are based upon a survey that are subject to issues of accuracy and reliability with self-report.^[50] We did not measure dietary habits, nor were we totally inclusive of all determinants associated with physical activity. It would be important to examine these factors in future research with larger samples and objectively measuring physical activity, to guide evidence-based interventions specific to the nature of physical activity among nursing students.

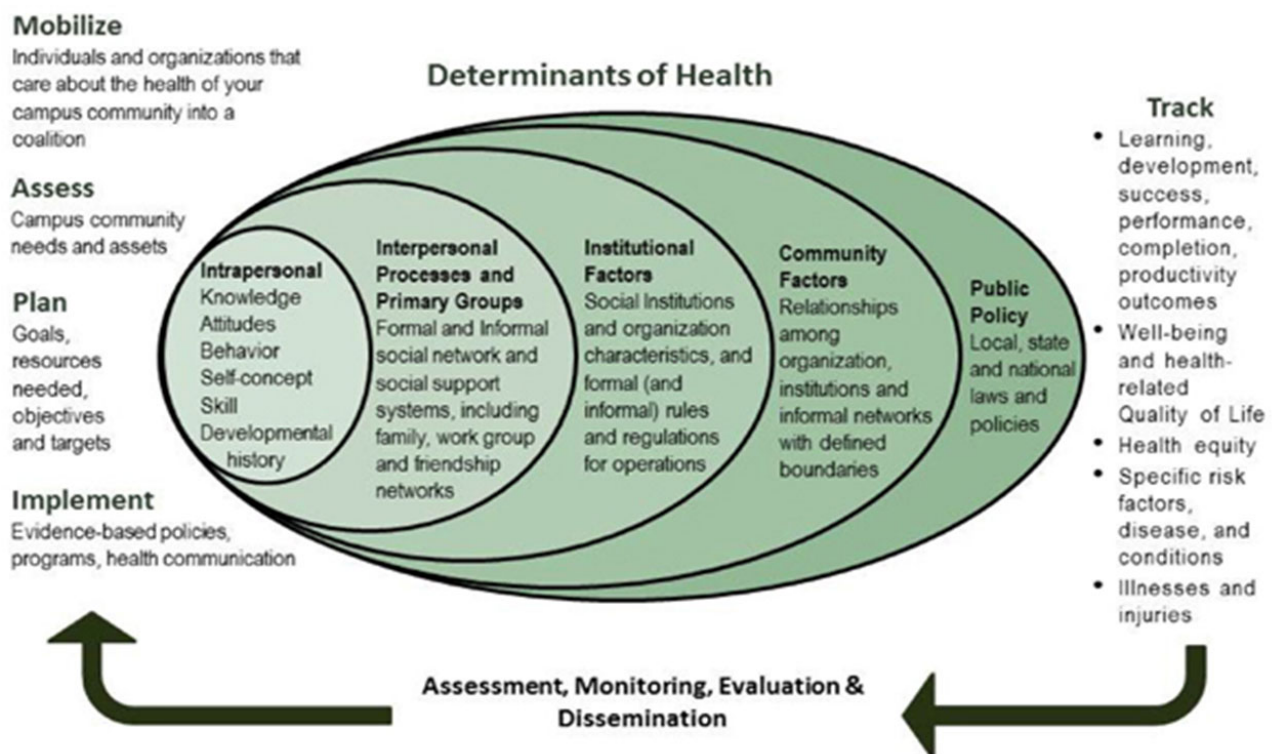


Figure 1. Action model to achieve a healthy campus

5. CONCLUSION

Nurses across the educational spectrum share a commitment to health promotion and disease prevention. They are often in the position to manage, counsel and prevent the many chronic diseases related to inactivity. However, even though this basic content is in the curricula in many nursing schools, it is rarely applied to the students themselves. Furthermore, evidence suggests nursing students exhibit poor levels of physical activity, poor coping mechanisms, and poor life satisfaction. Irregular working times and shift work with long working hours are common among nursing students, in addition to high levels of academic stress. There remain many potential means by which exercise influences biological functions that are not well understood, in particular the effect of exercise on cognitive function. Within the umbrella of cognitive function, executive control is critical for learning and memory and has been shown to improve with exercise in various populations.^[13]

The academic institutions educating the next generation of health care professionals have a responsibility to create a healthy environment and provide students the tools and resources to develop self-care strategies to make health a part of their daily lives such as fitness centers, and yoga groups. Findings clearly demonstrate that social support is a powerful motivator for young adolescents' participation in exercise and physical activity.^[51] Given the prevalence of inactivity

in student nurses and its associated health risks, there is a need to identify effective physical activity intervention for this population. It is worth understanding these determinants because knowing which characteristics are associated with such habits can guide interventions on malleable variables and reinforce health promotion practice. College presents an appropriate time and place to promote healthy behaviors such as physical activity. A 2012 survey found that total enrollment in all United States nursing programs leading to the baccalaureate degree is 259,100, an increase from 238,799 in 2010, and in graduate programs, 94,480 students are enrolled in master's programs, providing a captive audience to promote healthy behaviors.^[52]

Nursing school is a potentially fruitful location for health promotion intervention, presenting an important opportunity during a critical stage of professional and personal development. Further, students will continue to develop behaviorally and experience ongoing psychosocial, cognitive and psychological development. In addition, a lack of attention to self-care instruction for student nurses has been suggested.^[50] Developing effective health promotion programs for student nurses requires an in-depth understanding of their physical activity levels and of the factors uniquely related to behavior.

CONFLICTS OF INTEREST DISCLOSURE

The author declares that there is no conflict of interest statement.

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