Nurse Education Today 35 (2015) 1199–1205

Contents lists available at ScienceDirect

Nurse Education Today

journal homepage: www.elsevier.com/nedt

Physical fitness, health behaviour and health among nursing students: A descriptive correlational study

Piyanee Klainin-Yobas *, Hong-Gu He [1], Ying Lau [2]

Alice Lee Centre for Nursing Studies, National University of Singapore, Level 2, Clinical Research Centre Block MD11, 10 Medical Drive, Singapore 117597

ARTICLE INFO

Article history:
Accepted 22 June 2015

Keywords:
Health behaviour
Physical fitness
Perceived physical health
Psychological health
Nursing students

SUMMARY

Background: Health behaviour is of great importance for nursing students to achieve optimal health. Healthy students tend to complete their study and remain in the nursing workforce. They will also serve as a role model of for patients. However, there is limited research concerning physical fitness and health behaviour (such as sleep problems) in this population.
Objectives: This study aims to examine the relationships among health behaviour, personal variables, physical fitness, perceived physical health and psychological health.
Design: A cross-sectional descriptive correlational study was used.
Participants: A total of 335 nursing students who were enrolled in a university in Thailand.
Methods: Data were collected by self-administered questionnaires and physical fitness tests. Independent variables were personal variables and health behaviour. Outcome variables included physical fitness, perceived physical health and psychological health. Descriptive statistics and path analyses were used to analyse data.
Results: Nursing students had poor to moderate levels of total physical fitness, with cardiovascular fitness and body flexibility components having the lowest scores. Students who exercised regularly tended to have better physical fitness, perceived physical health and psychological health. Those who did not have sleep problems had better psychological health.
Conclusion: Some personal variables and health behaviours were associated with health among nursing students. Appropriate interventions are required to promote positive health behaviour in this population.

Introduction

Heath behaviour plays a crucial role in maintaining optimal health, preventing chronic illnesses, and achieving an independent lifestyle (Conner, 2005). Health behaviour refers to individuals' activities undertaken to prevent or detect possible illnesses, or to improve health and wellness (Conner and Norman, 1996). Within this definition, the behaviour encompasses self-directed behaviour or health-promoting behaviour (such as regular exercise, healthy diet, and the absence of smoking and alcohol consumption), healthcare services utilisation (such as annual health screening and vaccination), and adherence to medical treatments (such as dietary modification and medication regimen) (Conner, 2005).

Nursing students are an important part of future healthcare workforce. Poor health behaviour is linked to physical and psychological problems; and frequent sickness absence among nurses (Malik et al., 2011). Nurses with such problems are more likely to quit their profession (Hayes et al., 2006), increasing the problem of nurse shortage. Furthermore, nursing students are expected to serve as role models given that their roles cover patient education concerning positive health behaviours (Al-Kandari et al., 2008). Several studies explored health behaviour among nursing students in different countries (Al-Kandari et al., 2008; Bryer et al., 2013; Hawker, 2012). However, little is known about physical fitness and sleep problems in this population and limited studies have explored the relationships among personal variables, health behaviour and health outcomes. Therefore, this study aimed to minimise the knowledge gaps by: a) exploring levels of physical fitness and health behaviour among nursing students, and b) examining the relationships among personal factors, health behaviour, physical fitness, perceived physical health and psychological health.

Literature Review

According to World Health Organization (WHO, 2014), physical activity refers to any bodily movement requiring energy utilisation such as walking, swimming and doing household chores. It is recommended that adults aged 18–64 years should perform moderate-

* Corresponding author. Tel.: +65 6516 7789, +65 9785 2344 (office); fax: +65 6776 7135.
E-mail addresses: nurpk@nus.edu.sg (P. Klainin-Yobas), nurhhg@nus.edu.sg (H.-G. He), nurly@nus.edu.sg (Y. Lau).
[1] Tel.: +65 6516 7448 (office); fax: +65 6776 7135.
[2] Tel.: +65 6516 1603 (office); fax: +65 6776 7135.

http://dx.doi.org/10.1016/j.nedt.2015.06.014
0260-6917/

intensity aerobic exercise at least 150 min per week (such as 30-minute exercise five times per week) (WHO, 2014). Several studies revealed the health behaviour of nursing students. In the UK, a cross-sectional survey on 215 student nurses reported that only 23.8% of participants fulfil the WHO guideline for physical activity (Hawker, 2012). Furthermore, approximately 40% were overweight or morbidly obese as evidenced by body mass index (BMI) greater than 25 (Hawker, 2012). In Germany, a longitudinal study on female nurses ($n = 266$ at Time 1; $n = 259$ at Time 2) documented that only 18.9% of respondents exercised at least three times per week (Lehmann et al., 2014).

Ideally, nursing students should adopt positive health behaviours given their exposure to health-related knowledge during the course of their study. Nevertheless, evidence shows that many nursing students engage in risky health behaviours and are physically inactive (Al-Kandari and Vidal, 2007). In the US, a descriptive study involving 153 undergraduate nursing students revealed barriers to having a health-promoting lifestyle, including financial problems, feeling too tired to exercise, bad weather, lack of time, and interference with other tasks (Bryer et al., 2013). Furthermore, numerous stressors associated with nursing education (such as assignments) may hamper the practice of positive health behaviour (Kanji et al., 2006) and trigger the use of maladaptive coping behaviours (Seyedfatemi et al., 2007). Studies show that 18–42% of nursing students were smokers and 52–62% were alcohol consumers (Lehmann et al., 2014; Hawker, 2012). Additionally, a survey in Spain showed that nursing students consumed higher fat diets and lower dietary fibre than the recommended intake levels (Irazusta et al., 2006).

The Current Study

The research questions of the current study were formulated as follows:

1. What is the level of physical fitness of nursing students in a university in Thailand?
2. What are the relationships between *personal variables* (age, marital status, perception of family income, study programme, grade point average, body mass index and satisfaction with body weight) and perceived physical health, physical fitness and psychological health?
3. What are the relationships between *health behaviours* (exercise, nutritional intake, annual health screening and sleep problems) and perceived physical health, physical fitness and psychological health?

Methods

Research Design

A cross-sectional, descriptive correlational study was carried out to examine the relationships among the study variables. This was part of a larger study examining stress and health among university students in Thailand. Results concerning the mediating effects of coping were published elsewhere (Klainin-Yobas et al., 2014).

Participants

The target participants of this study were nursing students enrolled in a university in Thailand. A total of 1210 students were enrolled in one of the four main nursing programmes in the university: four-year Bachelor, four-month Nursing Specialty, Master's, and Doctoral programmes. All students were eligible for this study except those who had chronic physical illnesses requiring hospitalisation and/or who had mental disorders diagnosed by psychiatrists. The rationale behind the exclusion criteria was that physical illness and mental disorders are confounding factors that might affect outcome variables (such as physical fitness).

Participant recruitment commenced after we had received ethics approval from the university. A convenience sampling was used and the researchers approached all eligible students and scheduled meetings with them. During the meetings, the researchers described the study aims and invited them to participate in this research. Eligible and interested students were assigned to groups and scheduled to go to the School of Science and Sport Technology of the university. The school had a fitness centre, sports clinic and a physical fitness test centre equipped with standard equipment and experienced staff who delivered, recorded and interpreted the test data. On the data collection day, all students were asked to sign a consent form and complete a self-administered questionnaire before undergoing physical fitness tests conducted by experienced examiners. All the participants received an honorarium of 100 baht, the equivalent of US$3.50.

Sample Size Calculation

This study used power analysis for covariance structure models (MacCallum et al., 1996) to determine an adequate sample size. The following four parameters are needed: root mean square error of approximation (RMSEA), significant level (α), power, and degrees of freedom (*df*). For the first three parameters, the recommended values are: RMSEA $= 0.05$, $\alpha = 0.05$ and power $= 0.80$ (Cohen, 1988; MacCallum et al., 1996). Degrees of freedom are the number of data point (D) minus the number of parameter estimates (P) (Bryne, 2013) and D was calculated by using the formula $k(k + 1) / 2$, where k was the number of measurements. Based on the tested model (Fig. 1), there are 14 measurements and thus D would be 105 [$14(14 + 1) / 2$]; and there are 36 estimated parameters. Hence, the resulting *df* would be 69 (105–36). Taken all together, the minimum sample size for this study would be 177 (MacCallum et al., 1996).

Measurements

Data were collected through self-administered questionnaires and physiological measures. The outcome variables were physical fitness, perceived physical health and psychological health, and the independent variables were health behaviour and personal variables.

The *physical fitness tests* were conducted by experienced examiners at the School of Science and Sport Technology of the study university. This school has equipment that meets national standards and it also conducts physical fitness tests for national athletes. Prior to data collection, all instruments were calibrated according to the manufacturers' guidelines to ensure accuracy. The students were asked to go through five stations testing the following: lung capacity, handgrip strength, leg strength, body flexibility and maximum oxygen consumption. Standard testing protocols were used across all the stations.

Lung capacity, the amount of air that an individual can inhale or exhale, was measured with a spirometer (Miller et al., 2005). Before the assessment, participants were instructed on how to perform the test using the spirometer. During the procedure, participants sat down on a chair and were asked to place their lips around a mouthpiece of the spirometer. They were instructed to take a breath as deep and as hard as they could and then exhale through the mouthpiece (Miller et al., 2005). Each participant repeated the test three times and the highest score was used. Lung capacity was reported in the amount of air (in millilitres) per body weight.

The *handgrip strength test* uses a handgrip dynamometer to measure the maximum strength of participants' hand and forearm muscles (Roberts et al., 2011). In a standing position, the participants held the handgrip dynamometer in one hand with the arm of the same hand positioned on the side of the body. Then, the participants squeezed the dynamometer as hard as they could. For each hand, the procedure was repeated three times with 10–20 seconds' rest between each attempt to minimise muscle fatigue. The highest scores of the three trials were used. All raw data were reported in kilogramme per body weight.

The *leg strength test* was conducted with a leg dynamometer. During the assessment, participants were asked to stand upright on the foot