Effectiveness of Pender's Model-Based Program on Acculturative Stress, Lifestyle, and Social Adjustment among International University Students

Safaa Abdelazem[1], Azza Ahmed[2], Ebtehal Galal [3], Nagwa Souilm[4]

(1) Psychiatric and Mental Health Nursing, Faculty of Nursing Suez Canal University, Egypt.
(2) Psychiatric and Mental Health Nursing, Faculty of Nursing, Alexandria University, Egypt.
(3) Family and Community Health Nursing, Faculty of Nursing Suez Canal University, Egypt.
(4) Psychiatric and Mental Health Nursing, Faculty of Nursing, Beni-Suef University, Egypt.

Abstract

Background: International Students (IS) are facing complex decisions regarding the maintenance of their original culture and adaptation to the behaviors of the host culture which may affect their mental health, lifestyle, and social adjustment. Pender's Health Promotion Model (HPM) is a helpful and promising strategy for encouraging better health behaviors and altering harmful ones. **Objective:** The study aimed to evaluate the effectiveness of an educational program based on Pender's model on acculturative stress, lifestyle, and social adjustment among international university students at Suez Canal University, Ismailia Governorate, Egypt. **Subjects and method:** A quasi-experimental design using one group involving 64 international undergraduate students. The tools used were the demographic data questionnaire, the acculturative stress assessment scale, the healthy lifestyle of university students scale, and the social adjustment scale. Educational program sessions based on Pender's model were conducted for all participants. **Results:** The total mean score of acculturative stress before the intervention program was 99.85 ± 30.52 compared to 74.77 ± 17.06 after the intervention at P value <0.001. Before the program, the total mean score of healthy lifestyle behaviors was 105.31 ± 12.51 vs. 143.69 ± 18.46 post-intervention, and 68.8% of the studied IS had average social adjustment levels post-intervention, compared to 60.9% pre-intervention. **Conclusion:** Findings indicate a positive effect of the educational program based on Pender's model in enhancing international students (IS) social adjustment and healthy lifestyle and reducing acculturative stress. **Recommendation:** Future research might be guided by the findings of this program to be used as stress management training can improve students' mental health.

Keywords: Acculturative stress, International Students, Lifestyle, Pender's Model, Social adjustment.

Introduction

International students (IS) are those who come with a student visa, a special permit to study, or a scholarship but are not nationals of the nation in which they are enrolled. These students must learn to adapt to a new location and culture, interact and work cooperatively with strangers, and deal with pressures from the outside world (*Gündüz and Alakbarov, 2019*). IS are facing complex decisions regarding the maintenance of their original culture and adaptation to the behaviors of the host culture, resulting in four adaptation styles namely, assimilation, integration, separation, and marginalization. This process is known as acculturation and is relevant to students who face a combination of academic and cultural challenges (*Hwang, and Oh 2020; Schlaudt, Suarez-Morales, and Black, 2021*). Acculturation may influence the mental and physical health of IS who are facing daily cultural struggles with issues related to money, housing conditions, juggling work and family obligations, food, language barriers, and learning styles (*Park et al.,* **2021**).

Furthermore, acculturative stress is the discomfort an individual feels on a psychological and physical level in a new cultural setting because of stressors like racial discrimination, academic obstacles, language barriers, attitudes towards the host country, culture shock, homesickness, and perceived hostility (*Ali et al., 2020; Al-Jaberi et al. 2021*).

However, the improvement of Healthy Lifestyle Behaviors (HLBs), requires behavioral change models to be used to identify the factors influencing the concerned behaviors. One of the most comprehensive and predictive models used as a guide for

promoting healthy lifestyle behaviors among university IS that enhance adjustment is Pender's health promotion model (HPM) *(Fleary, Joseph, and Pappagianopoulos 2018; Mostafa and Mohamed, 2020)*. According to Pender's HPM, the goal of nursing care is to help individuals achieve the best possible level of health and well-being *(Butts & Rich, 2018)*.

Pender's HPM is a helpful strategy for encouraging better health behaviors and altering harmful ones, it posits that there are three main categories of elements that affect health behaviors namely; individual traits and their ecological environment (including microenvironment and mesoenvironment), specific cognition and emotions (with the core being self-efficacy) and behavioral results *(Cha et al., 2022)*. In addition, Pender's theory offers distinct benefits compared with other health behavior promotion modes to health behavior promotion, it emphasizes the importance of significant external individuals in supporting personal health behaviors as well as the significance of the individual's subjective initiative by combining external environmental elements with individual psychological factors *(Santi and Baldissera, 2023)*.

The HPM summarizes that each person has unique personal characteristics and experiences that affect subsequent actions, the set of variables for behavioral-specific knowledge and effect has important motivational significance. These variables can be modified through nursing actions. Health-promoting behavior is the desired behavioral outcome and is the endpoint in the Health Promotion Model. Health-promoting behaviors should result in improved health, enhanced functional ability, and better quality of life at all development stages. The final behavioral demand is also influenced by the immediate competing demands and preferences, which can derail intended health-promoting actions *(Heydari & Khorashadizadeh, 2014)*.

Furthermore, Pender's HPM is concentrated on the promotion of health and individual empowerment for healthier behaviors and illness prevention through putting into practice changes that are based on social cognitive theory, which include cognitive-perceptual factors like perceived benefits, self-efficacy, and barriers that affect engagement in behaviors that promote health, as well as modifying elements like interpersonal influences, behavioral traits, that may interact with one another to affect cognitive-perceptual processes *(Pender, Murdaugh, and Parsons (2011)*.

The provision of care for the IS requires knowledge and understanding regarding the role of culture in providing holistic care that addresses the bio-psychosocial and spiritual needs to ensure their psychological health, self-efficacy, and wellness *(McFarland and Wehbe-Alamah, 2019)*. However, community mental health nurses play a crucial role in providing care for the IS implementing health promotion programs, and saving individuals, families, and communities' lives *(Darch, Baillie, and Gillison, 2017)*

Significant of the study:

In the academic year 2019/2020, the number of IS in higher education in Egypt comprised 1.9% of approximately 3.34 million students *(Galal, 2021)*.

The prevalence of unhealthy lifestyle behaviors among IS is alarming, with 44.1% for smoking, 50.1% to 69.3% for alcohol consumption, 31.8% to 57.8% for physical inactivity, poor sleep quality from 26% to 61.9%, and 14.5% to 33.8% for unhealthy eating habits; the most worrying aspect is that these lifestyles are directly related to higher mortality *(Alvarez-Alvarez, et al., 2021)*.

IS are at high risk of acquiring some psychological issues such as anxiety and poor mental and emotional health. Most of them are struggling with homesickness, language hurdles, loneliness, isolation, and low self-esteem as well as depression, anxiety, and discrimination *(Al Abiky, 2021)*.

Operational Definitions:

Acculturative stress: IS experience stress when they face problems originating from intercultural contact that cannot be overcome easily by simply adjusting to challenging situations through behavioral change. It is measured by the Acculturative Stress Assessment Scale for IS (ASASIS).

Social adjustment is a psychological process of handling new social standards and values for individual acceptance. Integrating into the social life of a university, a city, and a country, building an environmental network, and managing social freedoms in a new environment. It is measured by the Social Adjustment Scale.

Aim of the study

To evaluate the effectiveness of an educational program based on Pender's model on acculturative stress, lifestyle, and social adjustment among international university students.

Research hypothesis:

Educational programs based on Pender's Model would:

H1: lower the level of acculturative stress and improve levels of lifestyle, and social adjustment in IS.

H0: Not having any effect on acculturative stress, lifestyle, and social adjustment level in IS.

Participants and Method:

Research Design:

A quasi-experimental pre-posttest one-group design was used.

Study setting:

The study was conducted in four colleges where IS were registered namely, Science, Veterinary Medicine, Nursing, and the Egyptian-Chinese College of Applied Technology, and three institutes Nursing, Fisheries, and Afro-Asian Studies where IS enrolled at Suez Canal University, Ismailia, Egypt.

Participants:

A total of 130 International undergraduate university students enrolled at Suez Canal University, Egypt during the academic year 2022-2023, and according to sample size calculation 64 students were recruited for the current study. They were divided into seven groups based on their colleges and institutes.

The inclusion criteria:

1. Aged 18 years and above, both gender

2. Residing in Egypt, regardless of legal classification (transit migrant, refugee, asylum seeker, and expatriate).

3. Understand the administered questionnaires (in Arabic or English)

The exclusion criteria:

1. Having major physical or psychiatric ailments.

2. Current alcohol or substance abuse/ dependence.

Sampling techniques:

A simple random sample used. A list of all IS (130) enrolled in the mentioned colleges and instituteswas obtained. Theresearchers use a random table to select the calculated sample as follows: number each member of the population, select a starting point on the random number table by close eyes and point randomly onto the page. Whichever number your finger is touching is the number that starts with, up to down is a direction used to read, continue this way through the table until having selected entire sample.

Sample size calculation:

1. Equation

$$ n = \left[\frac{Z_{\alpha/2} + Z_{\beta}}{\frac{1}{2} \log \frac{1+r}{1-r}} \right]^2 + 3 $$

n= sample size *(Dawson et al., 2004)*
Z α/2 = 1.96 (The critical value that divides the central 95% of the Z distribution from the 5% in the tail).
Zβ = 0.84 (The critical value that separates the lower 20% of the Z distribution from the upper 80%).
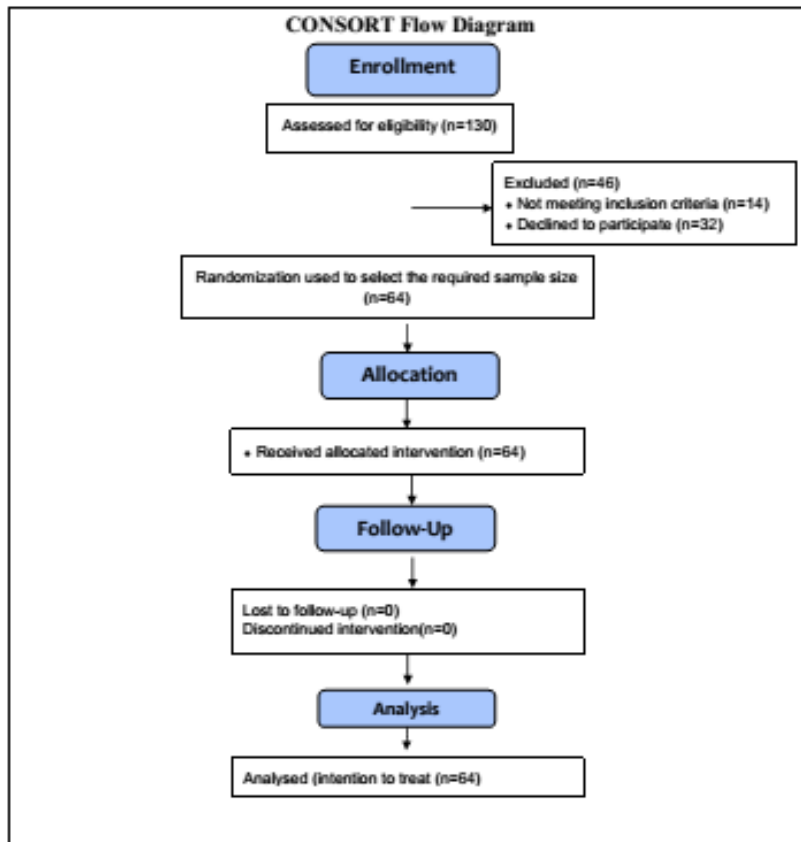r = .675, n = 64 after adding a 10% dropout rate.

CONSORT Flow Diagram

Figure 1.The flowchart of the study

Tools for data collection:

1. ***A demographic data questionnaire*** was developed by the researchers to collect information about students' age, gender, length of stay in the hosting country, marital status, grade, income level, health insurance, and current occupational status.

2. ***Acculturative stress assessment scale*** for IS (ASASIS) developed by ***Sandhu and Asrabadi*** **(1994)** and translated to Arabic by **Ahmad, Al-Jkhaideb, Alnassar, & Jadelrab (2022)** to assess acculturative problems. It consists of 36 items divided into seven subscales, including *perceived discrimination, homesickness*, *perceived hate/rejection*, *fear*, *stress due to change/culture shock*, *guilt*, and *nonspecific concerns/ miscellaneous*. The scale is a 5-point Likert-type ranging from one = strongly disagree to five = strongly agree. The total score is calculated by summations of items ranging from 36 to 180. The scoring

system was as follows: less than 90low, 90-125mild, 126-163 moderate, ≥164 have a high acculturative stress level. The internal consistency reliability Cronbach's alpha coefficients are 0.97 for the English and 0.93 for the Arabic.

3- **The Healthy Lifestyle of University Students Scale (HLUSS)** was developed by *(Wang, Xing, and Wu, 2012)* and translated to Arabic by *Shawkey et al., (2022)*. It contained 38 items divided into eight dimensions: exercise behavior, regular behavior, nutrition behavior, health risk behavior, health responsibility, social support, stress management and life appreciation. It is a 5-point Likert scale ranging from1 to 5 (1= never, 2= rarely, 3= sometimes, 4= usually and 5= always). The scale's overall score ranged from 38 to 190. The total score was classified into three levels; low (30% :< 60%), moderate (60 %:< 80%), and high level of adherence healthy lifestyle behaviors (80%:

100%). The reliability was Cronbach's alpha coefficient is 0.939for the English and 0.85 for Arabic.

4- **The Social adjustment scale (SAS)**: was developed by *(Gameroff, Wickramaratne and Weissman (2012)* and translated into Arabic by *Ismail et al., (2020)*. It consists of 20 items to measure the level of social adjustment among IS. It is a five-point Likert scale; totally agree, agree, not sure, disagree, disagree at all, and the scores are calculated in the order 5, 4, 3, 2, 1 for positive statements and vice versa for negative statements. The total score ranged from 20 to 100 which is classified into three levels: Mild 20-46, Average 47-73 and Good social adjustment from 74-100. The Cronbach's alpha coefficient is 0.823 and 0.799 respectively for the English and Arabic.

Method:

Validity of the study tools:

The tools were presented to seven experts in psychiatric and community health nursing to review and arbitrate their relevance to the study aim.

Pilot study:

A pilot study conducted on seven IS (10%) of the computed sample size where no modification was needed.They were not included in the study.

Fieldwork:

The study was carried out through Preparatory, assessment, planning, implementation, and evaluation phases.

1- **Preparatory phase:** A review of the past and current related literature covering various aspects of the research problem was done using available books, articles, periodicals, and other scientific references to acquaint with the research problem and finalize the study tools.

2- **Assessment phase:** The 64 participants were recruited according to the inclusion and exclusion criteria. They were then asked to fill out the self-administered questionnaire including the four tools, which were considered the baseline or pretest data. Each participant took about 45-60 min to complete the tools.

3- **Planning phase:** the researchers prepared the study educational program based on Pender's Model to be implemented for all participants. This was based on a review of pertinent literature. It also took into consideration the participants' needs identified in the assessment phase.

4- **Implementation phase:** The Educational Program based on Pender's Model was administered in the form of eight weekly sessions to all participants. Each session duration lasted from 60 to 90 minutes plus 15 minutes for any questions and clarifications.

- The program is experiential, with activities to be done within and outside of the classroom. Group discussions, simulations, and role-plays placed the students in typical situations where they would encounter or interact with locals and people from other countries. The activities included, for example, bringing program participants together with a class from a different demographic to improve their cultural understanding and holding receptions for them to practice their social networking skills with locals. The Educational Program based on Pender's Model was structured as follows.

Session 1. Focused on establishing rapport, confidence, and trust relationships with the students and providing an introduction about the aim, content of the program, and an overview of Pender's Model.

Session 2. Focused on the explanation of acculturation and acculturative stress, its symptoms, and consequences.

Session 3. Participants were taught adaptive coping techniques such as breathing exercises, stretching, mindful breathing, and mindful meditation techniques to face acculturation stress and empower international students in their adaptation.

Session 4. Focused on stress management techniques for alleviating acculturative stress and teaching the participants adaptive techniques to control or even positively express the manifestations of stress.

Session 5. Focused on progressive muscle relaxation technique to manage the physiological and psychological symptoms of acculturative stress as well as reduce the

harmful effects of stress on the mind and body.

Session 6. Focused on visualizations and positive self-talk techniques to effectively visualize the participants best possible themselves, and facilitate goals setting of participants.

Session 7. Focused on anecdote writing techniques; strengths vs. weaknesses. All the good things to reflect on and celebrate past achievements, especially upon arrival in the host country to remind participants of their efforts and successes to remind them that these successes can be repeated.

Session 8. The techniques taught in the previous sessions were reviewed and the scales were re-administered to collect data from participants for post-program assessment.

5- **Evaluation phase:** Post-test (T2) was done at the end of the implementation phase.

The study took 6 months, from October 2022 to March 2023.

Administrative and ethical consideration:

Official permissions were obtained from the administration of the study settings through letters from the Dean of the Faculty of Nursing, to explain the aim and procedures of the study then from the scientific research ethics committee (Approval Code: 122 /9 / 2021).The participants were informed that they had the right to withdraw from the study at any time without any adverse consequences. Code numbers were used to ensure confidentiality. This study was conducted in accordance with the Declaration of Helsinki and all applicable research ethics.

Conceptual Framework: Pender'sHPM was used as a theoretical framework. The model describes how individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcomes influence health promotion.

Statistical design:

Data were analyzed using SPSS v.21 and are presented in the form of descriptive statistics (frequency, percentages, mean, and standard deviation). The t-test for paired samples was used to compare mean scores at pre and post-test. The Pearson correlation coefficient (r) was used to analyze the association between variables. The independent predictors of acculturative stress scores were identified by multiple linear regression analyses. The threshold for statistical significance was established at P<0.05.

Results

Results showed that the age ranged between 18 and 24 years with a Mean ± SD of 20.13±1.95. Females were 84.4%and 89.1% had lived in Egypt for ≥ 6 years. 90.6 % of them were Arabs, 89.1% did not have a job.According to their academic year: 8 were in year1, 21in year 2, 21 in year 3, 2 in year 4, 4 in year 5 and 8 in internship.

Figure two demonstrates that 56 students were paying the cost of studying on their own, while only 8 of them were receiving scholarships.

Table 1 shows that there were statistically significant differences in all acculturative stress domains between the pre-and post-intervention. The total mean score of acculturative stress before the intervention program was 99.85 ± 30.52 compared to 74.77 ± 17.06 after the intervention at P value <0.001.

Figure 3 illustrates that nearly two-thirds of the studied international students experienced low levels of acculturative stress (66.4%) preintervention compared to 90.6% post-intervention. Additionally, more than a quarter of them (26.6%) exhibited moderate acculturative stress levels before the intervention, compared to 9.4% after the intervention.

Table 2 reveals that there were statistically significant differences between the pre- and post-intervention for every domain of healthy lifestyle behaviors. Prior to the intervention program, the total mean score of healthy lifestyle behaviors was 105.31 ± 12.51vs. 143.69 ± 18.46 post intervention, with a P value of <0.001.

Figure 4 illustrates that three-quarters of the studied international students practiced a low level of a healthy lifestyle (75%) preintervention compared to 4.7% post-intervention. Additionally, about two-thirds of them (64.1%) practiced a moderately level of healthy lifestyle before the intervention vs. 25% after the intervention.

Figure 5 demonstrates that, more than two thirds (68.8%) of the studied international students had average social adjustment levels post-intervention, compared to 60.9% pre-

intervention, and that nearly a third (31.3%) of them had good social adjustment levels compared to no one having good social adjustment levels before the intervention.

Table 3 demonstrates that there was a statistically significant negative correlation between acculturative stress and healthy lifestyle behaviors (r = -.424), and between acculturative stress and social adjustment where r = -.411.

Table 4 shows that the statistically significant negative independent predictor of social adjustment score was acculturative stress among studied international students (p<0.001). It is noticed that the acculturative stress of studied international students was a negative predictor of their social adjustment, in which with every increase in acculturative stress, social adjustment decreases by .174. In addition, with every increase in healthy lifestyle behaviors, social adjustment increase by .078. The model explains 42% of the social adjustment score as shown by the value of r- square.
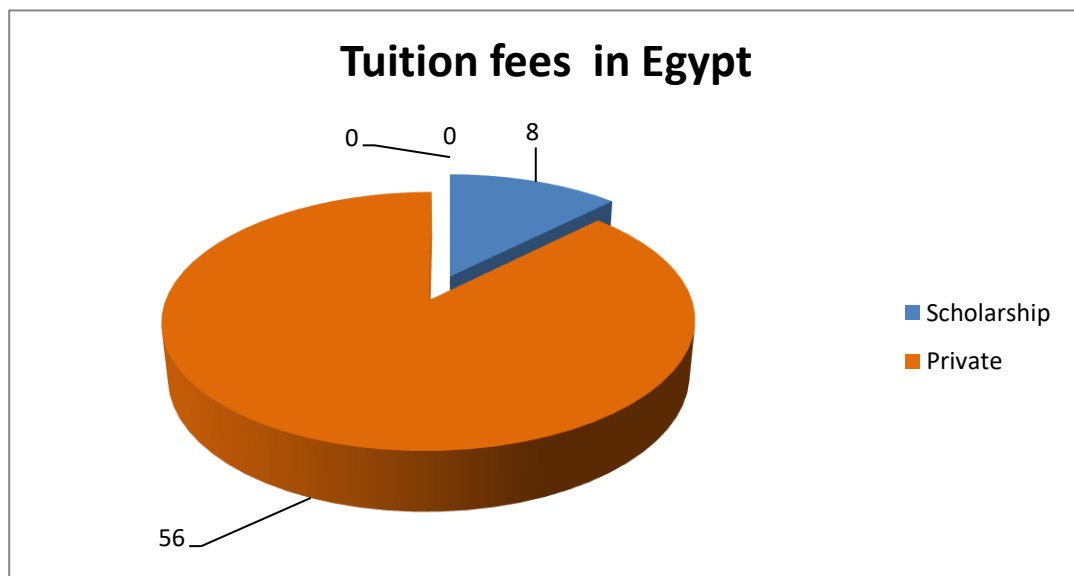

Figure 2: Tuition fees in Egypt among the studied students (n=64).

Table 1: Mean scores of acculturative stresses among studied IS before and after the intervention program (n=64).

Domains of acculturative stress scale	Pre-intervention Mean±SD	Post-intervention Mean±SD	Test (d)	P-value
Perceived discrimination	21.12±6.74	17.34±5.40	9.427 (.62)	<0.001*
Homesickness	11.64±4.33	8.69±2.97	8.216 (.80)	<0.001*
Nutrition behavior	13.19±5.28	10.30±3.50	7.686 (.65)	<0.001*
Fear	10.53±4.21	7.58±2.57	7.155 (.85)	<0.001*
Stress due to change/culture shock	8.81±3.06	6.41±1.95	6.935 (.93)	<0.001*
Guilt	6.19±2.39	4.16±1.64	7.765 (.99)	<0.001*
Nonspecific concerns/ miscellaneous	28.16±8.46	20.30±5.60	11.396 (1.1)	<0.001*
Total Score	99.85±30.52	74.77±17.06	11.98 (.90)	<0.001*

Note**:** The test is paired sample t-test; d is Cohen's d effect size *: Statistically significant at p ≤ 0.05.
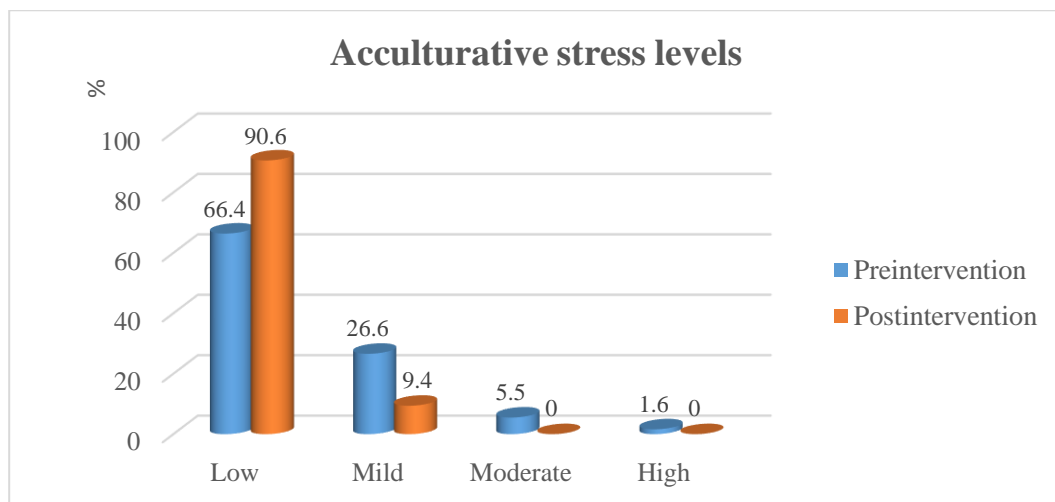
Figure 3: levels of acculturative stress among studied IS before and after intervention (n=64).

Table 2: Mean scores of healthy lifestyle behaviors among studied IS before and after the intervention program (n=64).

Domains of healthy lifestyle behaviors scale	Pre-intervention Mean±SD	Post-intervention Mean±SD	Test (d)	P value
Exercise behavior	8.66±3.26	11.98±3.15	9.010 (1.02)	<0.001*
Regular exercise	9.30±2.69	14.38±3.52	13.114 (1.89)	<0.001*
Nutrition behavior	10.28±3.37	15.23±3.59	12.622 (1.47)	<0.001*
Health risk behavior	14.44±2.96	16.34±3.02	8.571 (.64)	<0.001*
Health responsibility	15.77±4.19	24.69±4.84	14.396 (2.12)	<0.001*
Social support	16.86±4.31	21.83±5.11	8.861 (1.15)	<0.001*
Stress management	14.44±3.38	18.02±3.64	9.537 (1.1)	<0.001*
Life appreciation	15.58±3.38	21.22±2.83	4.876 (1.67)	<0.001*
Total Score	105.31±12.51	143.69±18.46	12.851 (2.44)	<0.001*

Note:The test is paired sample t-test; d is Cohen's d effect size *: Statistically significant at $p \leq 0.05$.
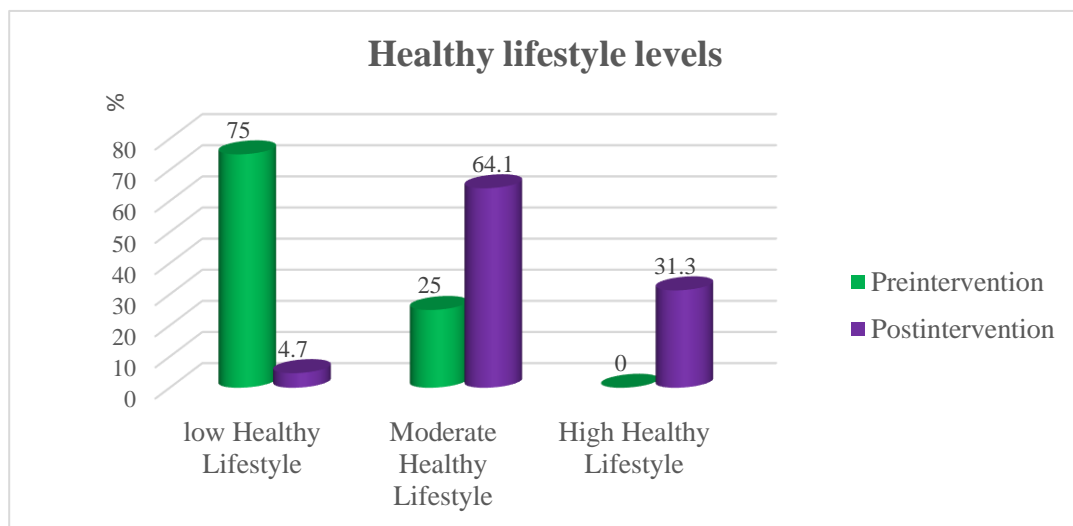

Figure 4: levels of healthy lifestyle behaviors among studied sample pre-post intervention (n=64).
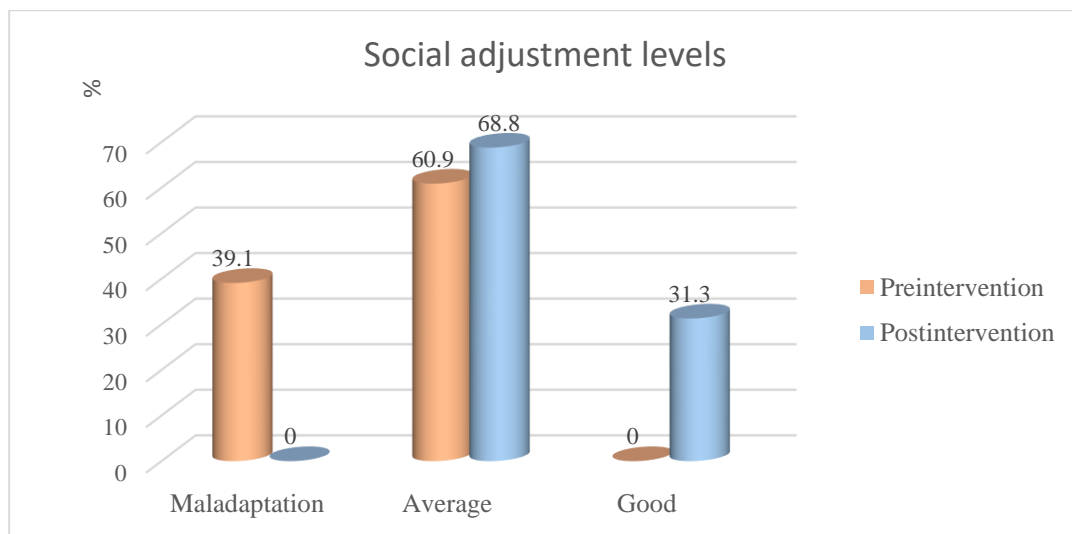
Social adjustment levels

Figure 5: levels of social adjustment among studied sample pre-post intervention (n=64).

Table 3: Correlation matrix between total mean of acculturative stress, social adjustment, and healthy lifestyle behaviors among studied IS' pre-post intervention (n=64).

Variables		healthy lifestylebehaviors	Social adjustment
Acculturative stress	r	-.424	-.411
	Sig. (2-tailed)	<.001*	.001*

Notes:r = person correlation, P = level of significance, *Statistically significant at p ≤ 0.0.

Table 4: Best fitting multiple linear regression model for social adjustment scores.

Independent variables	Unstandardized coefficients		Standardized Coefficients	t-test	P-value	Confidence Interval (95%) for B	
	B	**Std. Error**	**Beta**			**Lower Bound**	**Upper Bound**
Healthy lifestyle behaviors	.078	.022	-.411	-3.552	**0.001**	-.122	-.034
Acculturative stress	-.174	.047	-.424	-3.689	**<0.001***	-.268	-.080

r-square = .424
Model ANOVA: F=13.60, p-value< 0.001

Discussion

International students experience additional stress than usual about adjusting to university life in a foreign country with cultural and social nuances that are unfamiliar, and experience acculturative stress leading to the development of mental health issues such as depression and anxiety. Therefore, international students should participate in health-promoting behaviors for the benefit of their health *(Hwang, Younghui, and Jihyun 2020)*. Therefore, the present study aims to evaluate the effectiveness of an educational program based on Pender's model on acculturative stress, lifestyle, and social adjustment among international university students at Suez Canal University, Ismailia Governorate, Egypt.

The current study finding showed that after the intervention program, the total mean score of acculturative stress was 74.77±17.06 vs. 99.85±30.52 before intervention program. This result indicates that Pender's Model-Based program has achieved its goal of ameliorating acculturative stress among international students.

The program could be attributed to providing students with information about risks of acculturative stress, and guidance that they can use to cope with and manage a stressful situation.

This result is consistent with a study conducted by *Aljaberi et al., (2021)* about "Efficacy of Interventional Programs in Reducing Acculturative Stress and Enhancing Adjustment of International Students to the New Host Educational Environment: A Systematic Review and Meta-Analysis" who provide valuable insight into the implementation and effectiveness of educational intervention programs in reducing international students' acculturative stress, enabling them to cope with a new environment and enhancing adjustment to the host culture. In this regard, a study conducted by *Mehta and Beri (2018)* in India about "the Impact of intervention on acculturative stress among international students" stated that there was a statistically significant difference between the mean score before and after the intervention program.

However, a highly statistically significant difference was detected between the acculturative stress levels in the pre-test and post-test among international students whereas P=0.0001, this might be due to the program targeting all aspects of acculturative stress. This finding was consistent with a study done by *Saravanan, Alias, and Mohamad, (2017)* in Malaysia about "The effects of brief individual cognitive behavioral therapy for depression and homesickness among international students" who stated that the psychoeducational program demonstrated superior efficacy in reducing acculturative stress and enhancing adjustment. Moreover, a study done by *San-Juan, (2019)* in the Philippines about "Development of Intervention Program Based on Grit and Psychological Well-Being to Alleviate Acculturative Stress among Foreign Students." stated that the intervention program is effective in alleviating acculturative stress among foreign student participants.

In this regard, a study conducted by *(Atteraya 2021)* in South Korea about "Acculturation Stressors and Academic Adjustment among Nepalese Students in South Korean Higher Education Institutions. Concluded that "addressing acculturation stress among international students might yield higher levels of

personal satisfaction, enhance a productive academic life, and increase performance among international students. Additionally, a study done by *Al-Krenawi, Alotaibi, and Elbedour (2019)* in Israeli about "Acculturative stress among non-western female students in the West: The female Arab case. Concluded that "psychological counseling and guidance programs should be tailored to the specific needs of Arab international students, with special attention given to the roles of gender, acculturative stress, coping resources, and coping strategies."

According to the healthy lifestyle behaviors among studied international students, the current study finding illustrated that the total mean score of healthy lifestyle behaviors at post-intervention was increased than that of pre-intervention. This result might be because Pender's Model-Based program proved to be an important concern that provides students with the theoretical and technical information they need. However, if acculturative stress is not managed promptly and effectively, it could lead to adverse health effects. Therefore, Pender's Model-Based program should apply and implement as a preventive and health promotion intervention for international students to build their resilience and increase their adaptive adjustment to acculturative stress.

This outcome is consistent with a study done by **El Kest, Awad, and Mahmoud (2022)** in Egypt about "Effect of Pender's Model-Based Educational Intervention Program on Promoting Healthy Lifestyle Practices among University Nursing Students", who noted that the intervention program built on Pender's model was successful in raising the degree of adherence to healthy lifestyle behaviors; nutrition, stress management, and physical activity among the studied students throughout the study stages.

In the same context, a study done by *Citak Tunc, Citak Bilgin, and Cerit, (2021)* in Turkey about "The Relationship Between International Students' Health Perceptions and Their Healthy Lifestyle Behaviors who recommended that "it is important to disseminate intervention program aimed to improve the health perception and healthy lifestyle behaviors of international students within the university. Similar results were obtained in a previous study by *Sabooteh, Feizi, and Shekarchizadeh (2021)* in Iran about "Designing and evaluation of E-health

educational intervention on students' physical activity: an application of Pender's health promotion model." They concluded that providing tailored messages based on the health promotion model's constructs has a positive effect on promoting the physical activity of students. These results confirmed the effectiveness of Pender's Model-Based program in promoting students' physical activity.

Furthermore, the current study findings illustrated that in the post-intervention phase; most international students had average social adjustment levels while one-third of them had good social adjustment levels during the pre-intervention phase. This result might indicate that Pender's Model-Based program may be an effective and inexpensive intervention for international students, which is crucial for stress management since it improves self-awareness, patience, and tolerance, as well as reduces negative feelings of acculturative stress and anxiety. This result leads to acceptance of the research hypothesis and points to the significance of Pender's Model-Based program in the current study.

The prior result is in line with a study conducted by *(Elemo and Türküm, 2019)* in Turkey about "The effects of psychoeducational intervention on the adjustment, coping self-efficacy and psychological distress levels of international students in Turkey" which indicated a positive long-term effect of the psychoeducational program in enhancing international students' adjustment. In addition, a study done by *Zhang and Garcia-Murillo (2018)* in the USA about "Improving International Students' Cultural Skills through a School-Based Program. International Research and Review" stated that the finding provides important insights for on-campus programs that aim to facilitate international students' cross-cultural adjustment.

Furthermore, the current study revealed that there was a statistically significant negative correlation between social adjustment, healthy lifestyle behaviors, and acculturative stress. As it was expected, the acculturative stress in this study not only directly affects social adjustment but also indirectly affects healthy lifestyle behaviors. It can be interpreted that as one's acculturative stress increases, healthy lifestyle behaviors

decrease. Explaining the possible mechanisms that link acculturative stress to healthy lifestyle behaviors is beyond the scope of this study. This also might be due to many participants reporting that the cost of Study Tuition fees in Egypt is private not a scholarship. In addition, the structuring of the sessions and timetable that matched the participant's needs was another factor in the current study intervention's efficacy in lowering acculturative stress and enhancing healthy lifestyle behaviors and social adjustment among studied international university students.

The preceding result goes along with a study conducted by *Nimako et al., (2021)* in the Philippines about "Social Support, Psychological Adjustment, and Acculturative Stress among International Students" which revealed a moderately negative significant association between psychological adjustment and acculturative stress. In this regard, a study conducted by *Jung, (2022)* in South Korea about "Effects of Acculturation Types on Acculturative Stress and Adjustment to South Korean Society: Focusing on Chinese Immigrants." Who recommended that there is an urgent need for policies and programs that support immigrants to live together by actively participating in the process of social integration that helps them adapt to the new culture.

Moreover, the multivariate analysis of the present study identified that the statistically significant negative independent predictor of social adjustment score was acculturative stress among studied international students. This finding made it clear that international students with good adjustment had lower levels of acculturative stress, whereas the association was significant. Additionally, this result could facilitate the planning of targeted strategies to address stress reduction and social support. Such strategies might be a new promising way to enhance social adjustment as these elements can be modified and respond to interventions such as programs based on Pender's Model. However, one of the possible pathways through which acculturative stress might affect healthy lifestyle behaviors is via the adoption of unhealthy behaviors, for example, diet and smoking.

This result goes hand in hand with a study conducted by *Riaz and Rafique (2019)* in Pakistan about "Psycho-social predictors of

acculturative stress and adjustment in Pakistani Institutions." they concluded that financial support is very important for international students to manage their acculturative stress and adjust to a new cultural environment. In addition, a study conducted by ***Kristiana et al., (2022)*** in Indonesia about "Social Support and Acculturative Stress of International Students." concluded that social support significantly reduces acculturation stress among international students.

Limitations of the study:

- Lack of a control group as the study was conducted for only one group using pre-post test.

- The study was limited to IS at Suez Canal University and used self-report scales.

Conclusion:

This study concluded that Pender's Model-Based Program intervention was an effective approach in reducing acculturative stress among IS, improving their lifestyle and social adjustment.

Recommendation:

1. A qualitative study is necessary to fully understand how acculturation stress, social adjustment to the new society, and lifestyle behaviors affect IS experience.

2. University administration boards should equip the faculties with Counselors for the students.

3. Additional follow-up is needed for IS who participated in Pender's Model-Based Program to assess its long-term effect.

4. Future research might be guided by the findings of this program to be used as stress management training can improve students' mental health.

N.B.

References

Ahmed H., Al-Jkhaideb A.H., Alnassar A. H., & Jadelrab H.F. (2022). Psychological and Acculturative Stress among the Arabic-speaking International Students at Kuwait University. Journal of Educational Sciences, 34(1):135 -160. Riyadh, King Saud University. http://jes.ksu.edu.sa.

Al Abiky W.B. (2021). Fighting Pressures: Successful Psychosocial Adjustment of Middle Eastern Students at US Universities. Front. Psychol, 12(5). https://doi.org/10.3389/fpsyg.2021.747321.

Alemi Q., Stempel C., Baek K., Lares L., Villa P., Danis D., & Montgomery S. (2016). Impact of postmigration living difficulties on the mental health of Afghan migrants residing in Istanbul. International Journal of Population Research, 9(28). Hindawi Publishing Corporation https://doi.org/10.1155/2016/7690697.

Ali S., Yoenanto N. H., & Nurdibyanandaru D. (2020). Acculturative Stress among International Students at Airlangga University - Indonesia. Society, 8(1), 123-135. https://DOI : 10.33019/society.v8i1.150.

Aljaberi M., Alsalahi A., Juni M., Noman S., Al-Tammemi A., & Hamat R. (2021). Efficacy of Interventional Programs in Reducing Acculturative Stress and Enhancing Adjustment of International Students to the New Host Educational Environment: A Systematic Review and Meta-Analysis. International Journal of Environmental Research and Public Health, 18(15). 7765. https://doi: 10.3390/ijerph18157765.

Al-Jaberi MA, Juni MH, Kadir Shahar H, Ismail SIF, Saeed MA, Ying LP. (2020). Effectiveness of an Educational Intervention in Reducing New International Postgraduates' Acculturative Stress in Malaysian Public Universities: Protocol for a Cluster Randomized Controlled Trial. JMIR Res Protocol. 27;9(2): e12950. Doi: 10.2196/12950. PMID: 32130180; PMCID: PMC7068465.

Al-Krenawi A., Alotaibi F., & Elbedour S. (2019). Acculturative stress among non-western female students in the west: The female Arab case. Acad. J. Edu. Res., 7(10): 326-335.https://DOI: 10.15413/ajer.2019.0100.

Alvarez-Alvarez M, Vega-Marcos R, Jiménez-Castuera R, and Leyton-Román M. (2021). Psychometric Properties of the Healthy Lifestyle Questionnaire for Ecuadorian University Students (EVS-EUE). Int. J. Environ. Res. Public Health, 18(3). https://doi.org/10.3390/ ijerph18031087.

Aqtam I, & Darawwad M. (2018). Health Promotion Model: An Integrative Literature Review. Open Journal of Nursing, 8(7) 485-503. https://doi: 10.4236/ojn.2018.87037.

Atteraya M.S. (2021). Acculturation Stressors and Academic Adjustment among Nepalese Students in South Korean Higher Education Institutions. Int. J. Environ. Res. Public Health, 18(1)1-9. https://doi.org/10.3390/ ijerph18126529.

Butts J.B., & Rich K.L. (2018). Philosophies and Theories for Advanced Nursing Practice. 3rd Edition. Burlington, MA: Jones & Bartlett Learning. Philosophies- Theories-Advanced- Nursing-Practice, Available at: https:// www. amazon. Com.

Cha J., Kang H., Yu J., & Choi MJ. (2022). The Factors Associated with Health Promotion Behavior of International Students in South Korea. Iran J Public Health, 51(1):56-66. PMID: 35223626; PMCID: PMC8837880. https://Doi: 10.18502/ijph. v51i1.8292.

Citak Tunc G, Citak Bilgin N, Cerit B. (2021). The Relationship Between International Students' Health Perceptions and Their Healthy Lifestyle Behaviors. J Relig Health.;60(6):4331-4344.   doi: 10.1007/s10943-021-01336-0. Epub 2021 Jul 10. PMID: 34245435; PMCID: PMC8272445.

Darch J., Baillie L., & Gillison F. (2017). Nurses as role models in health promotion: a concept analysis. British Journal of Nursing, 26(17):982-988. https://Doi: 10.12968/bjon.2017.26.17.982.

Dawson B., Trapp R.G., & Greive A. (2004). Basic & Clinical Biostatistics 4th Edition. Lange Medical Books/McGraw-Hill, New York. https://www. researchgate. net/ publication/ 281238586.

El kest H.R., Awad E.Y.,& MahmoudNvS. (2022). Effect of Pender's Model-Based Educational Intervention Program on Promoting Healthy Lifestyle Practices among University Nursing Students. International Egyptian Journal of Nursing Sciences and Research (IEJNSR), 2 (2). 59-69   https://DOI: 10.21608/ejnsr.2021.94385.1083.

Elemo A.S., &Türküm A.S. (2019). The effects of psychoeducational intervention on the adjustment, coping self-efficacy and psychological distress levels of international students in Turkey. Int. J. Intercult. Relat., 70,   7–18. https://DOI:10.1016/j.ijintrel.2019.02.003

Fleary S., Joseph P., & Pappagianopoulos JE. (2018). Adolescent health literacy and health behaviors: A systematic review. Journal of Adolescence,   62:116-127. https://doi.org/10.1016/j.adolescence.2017.1 1.010.

Galal S. (2021): Number of students in higher education in Egypt 2013-2020, by nationality. Accessed at 17\10\2021 at 11pm,   Available   at https://www.statista.com/statistics/1193448/ number-of-students-in-higher education-in-Egypt-by-nationality/.

Gameroff M.J., Wickramaratne P., Weissman M.M. (2012). Testing the Short and Screener versions of the Social Adjustment Scale-Self-report (SAS-SR). Int J Methods Psychiatr Res. Mar;21(1):52-65. doi: 10.1002/mpr.358. Epub 2011 Dec 5. PMID: 22139969; PMCID: PMC3433762.

Gündüz M., & Alakbarov N. (2019). Analysis of Social Adjustment Factors of International Students in Turkey. Journal of International Students, 9, 4; 1155-1171, Doi: 10.32674/jis.v9i4.917,   Available   at SSRN: https://ssrn.com/abstract=3496897.

Heydari A., and Khorashadizadeh F. (2014) "Pender's health promotion model in medical research." JPMA. The Journal of the Pakistan Medical Association vol. 64,9: 1067-74.

Hwang Y., & Oh J. (2020). Factors Affecting Health-Promoting Behaviors among Nursing Students. Int J Environ Res Public Health, 17(17):6291. PMID: 32872367; PMCID: PMC7503930doi: 10.3390/ijerph17176291.

Ismail W.M., Awad Z.A.M., Zailaini, M.A., & Di Xuan A. (2020). Malaysian Students' Social Adjustment to the University Campus in Egypt, Morocco, And Jordan. Humanities & Social Sciences Reviews, 8, (2): 240-247 https://doi.org/10.18510/hssr.2020.8228.

Jung B.E. (2022). Effects of Acculturation Types on Acculturative Stress and Adjustment to South Korean Society: Focusing on Chinese Immigrants. Sustainability, 14(20). 1-18 https://doi.org/10.3390/ su142013370.

Kristiana I.F., Karyanta N.A., SimanjuntakE.Prihatsanti U., Ingarianti T.M., &Shohib M. (2022). Social Support and Acculturative Stress of International Students. Int. J. Environ. Res. Public Health, 19(11) 1-15.https://doi.org/10.3390/ ijerph19116568.

McFarland M.R., &Wehbe-Alamah H.B. (2019). Leininger's Theory of Culture Care Diversity and Universality: An Overview with a Historical Retrospective and a View toward the Future. Journal of Transcultural Nursing, 30(6):540-557. doi:10.1177/1043659619867134

Mehta A., & Beri N. (2018). Impact of intervention on acculturative stress among international students, the Eastern anthropologist, 71: 1-2. https://DOI:10.21922/srjis.v4i37.10529

Mostafa M.H., & Mohamed S.M. (2020). Acculturative Stress, Assertiveness, and Self Efficacy among Undergraduate International Nursing Students Evidence-Based Nursing Research, 2: 120-130. ISSN: 2636-400X, print ISSN: 2636-3992. https://doi.org/10.47104/ebnrojs3.v2i2.133

Nimako B., Bobie-Nimako O., Peprah W., Osei S. Antwi F., Nimako N., & Agyenim-Boateng A. (2021). Social Support, Psychological Adjustment, and Acculturative Stress among International Students in Baguio City of the Philippines.

International Journal of Nursing Sciences, 11(1):1-7. DO.5923/j.nursing.20211101.01. http://creativecommons.org/licenses/by/4.0/

Park S.H., Abdin E., Nan L., Subramaniam S., Tan LW, & Van Dam R.M. (2021). Adaptation and Validation of a Short Acculturation Scale in a Multi-Ethnic Asian Population. Psych, 3:25–38. https://doi.org/10.3390/psych3010004.

Pender N.J., Murdaugh C.L., & Parsons M.A. (2011). Health Promotion in Nursing Practice. 6th Edition, Pearson, Boston. Main Stacks; Healey Library. RT67.2011.

Riaz M.A., & Rafique R. (2019). Psycho-social predictors of acculturative stress and adjustment in Pakistani Institutions. Pak J Med Sci., 35(5):1441-1445. doi: https://doi.org/10.12669/pjms.35.5.1214.

Sabooteh S., Feizi A., &Shekarchizadeh P. (2021). Designing and evaluation of E-health educational intervention on students' physical activity: an application of Pender's health promotion model. BMC Public Health, 21(657) 1-10. https://doi.org/10.1186/s12889-021-10641-y.

Sandhu D.S., & Asrabadi B.R. (1994). Development of an Acculturative Stress Scale for International Students: preliminary findings. Psychol Rep, 75(2):435-448. https://doi: 10.2466/pr0..75.1.435. PMID: 7809315.

San-Juan F.M., & Bance L.O. (2019). Development of Intervention Program based on Grit and Psychological Well-Being to Alleviate Acculturative Stress among Foreign Students. IAFOR Journal of Psychology & the Behavioral Sciences, 5(1) 55-70. https://doi.org/10.22492/ijpbs.5.1.05.

Santi D.B.,& Baldissera V.D. (2023). Adolescent health promotion: Nola Pender's model through participatory virtual workshops. Rev. Enferm. UFSM. [Access at: Year Month Day]; vol.13, e40:1-19. DOI:https://doi.org/10.5902/217976928414 7

Saravanan C., Alias A., & Mohamad M. (2017). The effects of brief individual cognitive behavioral therapy for depression and homesickness among international students in Malaysia. J. Affect. Disord, 220: 108–116. https:// doi. org/ 10. 1016/ j. jad. 2017.05.037.

Schlaudt V.A., Suarez-Morales L., & Black R.A. (2021). Exploring the Relationship of Acculturative Stress and Anxiety Symptoms in Latino Youth. Child Youth Care Forum, 50:26–27. https://doi.org/10.1007/s10566-020-09575-0.

Shawkey M.N., Abd El-Hameed H.S., Mohamed A.E., & Abdalla H.M. (2022). Healthy Lifestyle Model among Benha University Town Students. Journal of Nursing Science Benha University, 3(1): 486-499. https://doi: 10.21608/jnsbu.2022.214416.

Wang D., Xing X.H., & Wu X.B. (2012). The Healthy Lifestyle Scale for University Students: development and psychometric testing. Aust J Prim Health, 18(4):339-45. https://doi: 10.1071/PY11107. PMID: 22950906.

Zhang Y. & Garcia-Murillo M.A. (2018). Improving International Students' Cultural Skills through a School-Based Program. International Research and Review: Journal of Phi Beta Delta, 7(2): 42-64. https://files.eric.ed.gov/fulltext/EJ1188727.pdf.