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RESEARCH ARTICLE

Relationship between Health-promoting practices and the Health-related Quality of Life among Saudi University Students after the COVID-19 Pandemic Lockdown: Cross-sectional Study

Fuad H. Abuadas[1,*]

[1]*Department of Community Health Nursing, College of Nursing, Jouf University, Sakaka, Saudi Arabia*

Abstract:

Introduction:

Promoting healthy living activities among university students is acknowledged as an essential component in health maintenance and improvement.

Objectives:

This study aims to determine the extent to which Saudi undergraduate students are involved in health-promoting practices after the COVID-19 pandemic lockdown. It also investigates how the health-related quality of life (QOL) could be predicted from sociodemographics and health-promoting practices.

Methods:

This study adopted a descriptive correlational design and a convenience sampling method to recruit 542 Saudi students from 5 governmental universities in multiple Saudi regions between October and December 2022. University students were asked to complete an online survey consisting of sociodemographics, the health-promoting lifestyle profile II (52 Items, 4 points Likert scale), and the WHOQOLscale (26 Items, 5 points Likert scale).

Results:

In the health-promoting subscales, participants ranked best in spiritual growth (M = 2.79) but worst in physical activity (M = 1.82). Regarding the QOL subscales, participants scored the highest in social relationships (M = 14.32) and the lowest in psychological health (M = 11.36). Multiple linear regression revealed that 19% of the variance in the QOL was explained mainly by health-promoting variables, in which physical activity (β = .20, p < .001) was the strongest predictor. In addition, family income (β = -.14, p < .01), nutrition (β = .12, p < .05), stress management (β = .11, p < .05), and spiritual growth (β = .14, p < .05) were also significant predictors of QOL.

Conclusion:

Physical activity, nutrition, spiritual growth, and stress management have been found helpful in improving the QOL of Saudi students. Therefore, universities should consider planning curricula and establishing activities that encourage involvement in health-promoting activities.

Keywords: Health-promoting practices, Undergraduate students, Quality of life, COVID-19 Pandemic, Saudi students, WHOQOLscale.

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1. INTRODUCTION

Health promotion activities, including daily life activities, nutritional behavior, and healthy lifestyle commitment, are considered to be the main influential factors affecting individual health [1]. Such health promotion practices improve one's degree of wellness, personal fulfillment, and self-actualization, holding individuals accountable for their health [1 - 3]. Based on Pender's health promotion model, there are six main components of health-promoting lifestyles: physical exercise, stress management, health responsibility, nutrition, interpersonal support, and self-actualization [2]. Individual risk for non-communicable illnesses and other disorders later in life are influenced by health-related behaviors started at a young age [4 - 6].

* Address correspondence to this author at the Department of Community Health Nursing, College of Nursing, Jouf University, Sakaka, Saudi Arabia;
Tel: 00966508458778; E-mail address: fhabuadas@ju.edu.sa

Emergencies in public health, such as the COVID-19 Pandemic, can negatively affect people's health, safety, and well-being. These effects might emerge as a range of emotional reactions, such as anxiety, emotional distress, hazardous behaviors, or noncompliance with public health regulations [7, 8]. During the current COVID-19 epidemic, governments worldwide enacted lockdowns that significantly impacted most people's everyday lives, particularly students. Lockdowns imposed by governments around the world during the recent COVID-19 outbreak have significantly impacted most people's daily lives [9, 10] as it led to mandatory homestays, the closure of gyms, and the prohibition of other types of athletic activities [11]. University students have been proven to be more concerned about health-promoting behavior than other young adults [11, 12].

University students are going through physical, psychological, social, and sexual growth as they become mature adults [13]. Promoting healthy behaviors during this time increases their chances of growing up as healthy adults [14, 15] and could improve their QOL in terms of students' entire sense of well-being (physical, psychological, and social components) [16 - 18]. The undergraduate students' subjective evaluation of the QOL is embedded in their social, cultural, and environmental context [16, 19]. Despite the fact that the advantages of health-promoting activities are well-known, numerous studies have demonstrated that university students have an unhealthy lifestyle, such as physical inactivity, that requires further attention [20 - 24]. In Saudi Arabia, the impact of crises and pandemic lockdowns on students' health-promoting practices and their relationship with the QOL has received little attention. Few studies have investigated the student's health-promoting practices during and after the Pandemic lockdown [24, 25].

Identifying specific health promotion needs after the pandemic lockdown is critical to creating interventions that will assist Saudi undergraduate students in adopting a healthier lifestyle throughout their learning and in the future. Promoting healthy living activities among university students is critical to reducing illness risk later in adulthood. In addition, this may assist students in understanding the significance of practicing healthy living behaviors and eventually improving their QOL and health-promoting activities. Therefore, this study aims to assess the level of Saudi undergraduate students' involvement in health-promoting practices and its relationship with the quality of life after the Pandemic lockdown.

1.1. Purpose of the Study

1. Determine the extent to which Saudi undergraduate students are involved in health-promoting practices in the aspects of spiritual growth, health responsibility, interpersonal relationships, nutrition, physical activity, and stress management.

2. Determine the extent to which Saudi students' QOL could be predicted from sociodemographic characteristics and health-promoting practices.

2. METHODS

2.1. Study Design and Participants

A descriptive correlational cross-sectional design was used to examine the health-promoting practices and QOL among university students in Saudi Arabia. A descriptive correlational design provides a helpful structure when identifying the need to obtain knowledge in an area where little research has been conducted [26]. Participants were eligible to be included if they were students in any undergraduate program in Saudi Arabia and agreed to participate. The exclusion criteria were the presence of any disability or acute condition preventing the student from practicing health-promoting activities.

2.2. Sampling and Setting

This study adopted a non-probability convenience sampling technique in which university undergraduate students in Saudi Arabia were invited to participate. The calculation using G*Power 3.1.9.2 software (2014), assuming a significance level (α) of 0.05 (two-tailed), effect size (0.2), and a power of 0.80, would require a minimum sample of 396 students. Because of the expected attrition rate, additional students were invited and recruited. Participants were recruited from five Saudi governmental universities, and a total of 865 students were invited to fill out the online survey. In total, a sample of 542 students responded to the invitation, representing approximately a 63% response rate. The sample was recruited from multiple Saudi regions: 165 (30.4%) students were from the Northern region, 139 (25.6%) were from the Eastern region, 125 (23.1%) were from the Central region, 78 (14.4%) were from the Western region, and 35 (6.5%) were from Southern region.

2.3. Instrument

In addition to Sociodemographic characteristics (gender, age, academic year, marital status, school type, employment status, family income, place of university, and academic GPA), two main instruments (HPLP II & WHOQOL-BREF) were used to assess the health-promoting practices and the QOL among Saudi university students. HPLP II, developed by Walker, and Sechrist [27], consists of 52 items measuring self-reported health-promoting practices in the aspects of spiritual growth (9 items), health responsibility (9 items), interpersonal relationships (9 items), nutrition (9 items), physical activity (8 items), and stress management (8 items). Items are scored as routinely (4), often (3), sometimes (2), and never (1). The internal consistency of the original scale was .94, and it ranged from .79 to .87 for the subscales. Instrument validity (content, construct, convergent, criterion-related) was established and confirmed for the scale [27, 28]. WHOQOL-BREF, developed by the World Health Organization [29], consists of 26 items measuring the QOL in the domains of physical health, psychological health, social relationship, and environment. Items are scored on 5 points Likert scale in which higher scores indicate a higher QOL. The internal consistency of the whole scale was .91, ranging from .71 to .88 for the scale domains.

2.4. Data Collection

The Local Bioethics committee at Jouf University (IRB approval no. 4–03-44) examined and approved this study. A google form online survey was used for data collection. A QR code and web link were forwarded to the students via E-mail and social media (Messenger, WhatsApp) invitation. In

addition, a posting was placed on the students' bulletin boards of universities' college departments. The invitation link and the bulletin board poster included detailed information about the study, and informed consent was attached to the online survey. The data collection process was conducted between October and December 2022. Confidentiality and anonymity of data were ensured by a password-protected account in google drive.

2.5. Statistical Analysis

SPSS Statistics version 25 [30] was used to code and analyze the study variables. Data analysis included descriptive statistics to describe students' demographics, health-promoting practices, and QOL (means ±SD) for continuous variables and percentages (with frequencies) for categorical variables. Variance analysis (ANOVA) and an independent sample t-test were used to assess the differences in health-promoting practices and QOL according to sociodemographic variables. In addition, a multiple linear regression was used to identify and investigate the predictors of Saudi students' QOL from the sociodemographic characteristics and health-promoting practices.

2.6. Ethical Consideration

According to the Helsinki declaration [31], The bioethics institutional review board of Jouf university approved this study (approval no. 4–03-44), and several strategies were employed to ensure the confidentiality and anonymity of students. The researcher assigned a code number for each student; all data were reported in aggregate form. The submitted forms were handled electronically through a password-protected account. All participants signed an electronic informed consent before proceeding to fill google form survey.

3. RESULTS

3.1. Students' Sociodemographic Characteristics

A total of 542 Saudi undergraduate students completed the survey. The mean age of the Saudi students was (21.03 ± 1.43), ranging between 19 and 26 years old. Most of the students were female (59.8%, n = 324) and single (81.4%, n = 444), with more than two third (69.7%, n = 378) coming from families earning between 5000 and 10000 SAR per month. The sample was composed of students from various school types and years of study. Almost 36.7% (n = 199) of the study sample were affiliated with health sciences colleges. Most students (61.6%, n = 334) had a GPA of less than 4 out of 5 in their academic achievement. Details of the sociodemographic characteristics are displayed in Table **1**.

Table 1. Descriptive statistics (frequencies and percentages) of students' sociodemographic characteristics (N = 542).

Variables	Mean (SD)	N (%)
Age	21.03 (1.43)	-
Gender	-	-
Male	-	218 (40.2)
Female	-	324 (59.8)
Marital Status	-	-
Single/Divorced	-	444 (81.9)
Married	-	98 (18.1)
Employment Status	-	-
Employed	-	33 (6.1)
Non-Employed	-	509 (93.9)
Place of University	-	-
Central Region	-	125 (23.1)
Eastern Region	-	139 (25.6)
Western Region	-	78 (14.4)
Northern Region	-	165 (30.4)
Southern Region	-	35 (6.5)
Family Income (*SAR)	-	-
Low income (<5000)	-	70 (12.9)
Intermediate income (5000-10000)	-	378 (69.7)
High income (> 10000)	-	94 (17.3)
School Type	-	-
Health Sciences	-	199 (36.7)
Scientific Sciences	-	142 (26.2)
Humanistic Sciences	-	138 (25.5)
Information Technology	-	63 (11.6)
Academic Year	-	-
1st year	-	104 (19.2)
2nd year	-	109 (20.1)

(Table 1) contd.....

Variables	Mean (SD)	N (%)
3rd year	-	125 (23.1)
4th year	-	93 (17.2)
5th year	-	58 (10.7)
Internship Year	-	53 (9.8)
Academic GPA	-	-
< 4 out of 5	-	334 (61.6)
> 4 out of 5	-	208 (28.4)
Smoking Status	-	-
Yes	-	105 (19.4)
No	-	437 (80.6)

Note: SAR is Saudi Riyal, 1 SAR = 0.267 United States Dollars (USD).

Table 2. Descriptive Statistics (mean and standard deviation) of students' health-promoting practices and QOL (N = 542).

Variables	Mean	SD
Health-promoting practices (HPLP II)[a]	-	-
Spiritual growth	2.79	.61
Interpersonal relations	2.59	.57
Stress management	2.45	.50
Health responsibility	2.28	.51
Nutrition	2.22	.52
Physical activity	1.82	.35
Total score	123	18.1
Quality of life (WHOQOL-BREF)[b]	-	-
Social relationships	14.32	2.51
Environmental	12.18	1.45
Physical health	11.48	1.62
Psychological health	11.36	1.80
Total Score	52.10	7.30

Note:[a] HPLP Π subscales mean scores ranged from 1 to 4, and the total scale mean score ranged from 52 to 208.
[b] WHOQOL-BREF subscales mean scores ranged from 4 to 20, and the scale mean score ranged from 25-100. Higher scores in HPLP Π and WHOQOL-BREF subscales indicate a higher frequency of health-promoting practices and a better QOL, consecutively.

3.2. Students' Health-promoting Practices and QOL

The mean score of the total health-promoting practices (HPLP Π scale) among Saudi students is 123 ± 18.1 (possible range 52 – 208). The health-promoting practices of Saudi students differed greatly, ranging from 81 to 174, with a higher score indicating a higher frequency of health-promoting practices. In the health-promoting subscales of HPLP Π, the Saudi students scored the highest in the spiritual growth subscale (mean ± SD = 2.75 ± .6) and the lowest in the physical activity subscale (mean ± SD = 1.82 ± .35). The possible HPLP Π subscales' mean score ranged from 1 to 4. Table **2** illustrates the other HPLP Π subscales results.

A two-tailed independent sample *t*-test and ANOVA were used to assess any significant differences in the mean score of the Saudi students' health-promoting practices (HPLP Π scale) with sociodemographic characteristics. The mean score of the total scale of HPLP Π was significantly higher (F= 6.24, *df* = 2, $p < .01$) for students coming from families with a high monthly income (mean = 128.2) compared with students coming from families with intermediate (mean = 122.6) or low (mean = 118.5) monthly income. No statistically significant differences were found with other sociodemographic characteristics.

The mean score of the total quality of life (WHOQOL-BREF scale) among Saudi students was 52.1 ± 7.30 (possible range 25 – 100). The quality-of-life perception of Saudi students differed considerably, ranging from 37.7 to 64.7, with a higher score representing a perception of a higher QOL. In the WHOQOL-BREF subscales, the Saudi students scored the highest in the social relationship dimension (mean ± SD = 14.32 ± .51) and the lowest in the psychological health dimension (mean ± SD = 11.36 ± 1.80) and physical health dimension (mean ± SD = 11.48 ± 1.62). The possible WHOQOL-BREF subscales' mean scores ranged from 4 to 20 (Table **2**).

Table 3. Standard multiple linear regression that predicts students' QOL from the Sociodemographic characteristics and health-promoting practices (N = 542).

Predictor variables	*b*	*β*	*t*	Sr^2_{unique}
Sociodemographic variables				
Age	.28	.06	1.25	.05
Gender	.78	.05	1.26	.05
Marital status	-.85	-.045	-1.05	-.04
Employment status	.67	.02	.53	.02
Family Income D1 (low-income) D2 (high-income) Reference group (Intermediate income)	- 2.96 4.01	-.14 .19	- 3.40 4.53	-.13 ** .17 ***
Academic GPA	-.79	-.05	- 1.33	-.05
Smoking status	.58	.03	.77	.03
Health-promoting practices variables				
Stress management	1.55	.11	2.30	.09*
Nutrition	1.65	.12	2.58	.10*
Health responsibility	-.86	-.06	- 1.28	-.05
Spiritual growth	1.38	.12	1.97	.08*
Physical activity	4.07	.20	4.65	.18***
Interpersonal relations	- 1.37	-.11	- 1.78	-.07
Overall model ($R = .458$, $R^2 = .21$, adj R2 = 0.189, $F = 9.98$, $p < .001$)				

Note: *$p < .05$, **$p < .01$, ***$p < .001$, b, unadjusted regression coefficient; β, adjusted regression coefficient; Sr^2, squared semi partial correlation; and D, dummy variable

3.3. Predictors of QOL

Multiple linear regression was used to determine the extent to which Saudi students' QOL could be predicted from sociodemographic characteristics and health-promoting practices. The overall regression model was statistically significant ($R = 0.458$, $R^2 = 0.21$, adj $R^2 = 0.189$, $F(14, 527) = 9.98$, $p < .001$). The total students' QOL score could be predicted well from a set of five predictors (family income, physical activity practices, nutrition practices, stress management practices, and spiritual growth), with approximately 19% of the variance accounted for in the regression model. To assess the contribution of each predictor, the *t* ratio of predictor regression slopes was examined. Five of the predictors were significantly predictive of the students' total QOL score; these included the dummy-coded variable of income (high-income), $t = 4.53$, $p < .001$; income (low-income), $t = -3.40$, $p < .01$; physical activity, $t = 4.65$, $p < .001$; nutrition $t = 2.58$, $p < .05$; stress management $t = 2.30$, $p < .05$; and spiritual growth $t = 1.97$, $p < .05$ (Table **3**).

The proportions of variance uniquely explained by each of these predictors (Sr^2 unique) were as follows: $Sr^2 = -.13$ for D1 (low income), $Sr^2 = .17$ for D2 (high-income), $Sr^2 = .18$ for physical activity, $Sr^2 = .10$ for nutrition, $Sr^2 = .09$ for stress management, and $Sr^2 = .08$ for spiritual growth. In the context of this set of predictors, the physical activity variable was the strongest predictor of students' QOL. Thus, students who revealed more frequent physical health-promoting practices were more likely to perceive a better QOL. Table **3** illustrates the standard multiple linear regression for the QOL by sociodemographic characteristics and health-promoting practices.

4. DISCUSSION

This study offered evidence of the impacts of socioeconomic status and health-promoting practices on QOL by identifying the patterns of health Promoting behaviors and QOL among a group of Saudi university students. The mean score of the total HPLP Π scale among Saudi students in this study was consistent with previous international studies [15, 21, 23, 32 - 34] and national studies [24, 35]. In the health-promoting subscales of HPLP Π, the Saudi students in this study scored the highest in spiritual growth, interpersonal relations, and stress management but the lowest in physical activity, nutrition, and health responsibility. These findings and those from other studies [15, 24, 34, 36, 37] are relatively comparable.

In this study, spiritual growth obtained the highest score among all the subscales of a healthy lifestyle. This finding is in line with studies conducted by Al-Momani [24], Shaheen, Nassar [37], and Al-Khawaldeh [36]. The culture and beliefs of Saudi society may have an impact on spiritual development. In contrast, the physical activity of the Saudi students obtained the lowest score in this study. Physical inactivity has been widely observed worldwide among students and other young populations [34, 38]. Interestingly, many other studies conducted in Saudi Arabia [24, 35] and other countries [15, 21, 37, 39, 40] revealed similarly low scores in the physical activity domain. University students are insufficiently physically active, possibly because they are preoccupied with intense studying and academic obligations at the university [34]. In addition, Lockdowns imposed by governments around the world during the recent COVID-19 outbreak have had exaggerated the impact on most people's daily lives [9, 10] as it led to a mandatory homestay, closure of gyms, and the prohibition of other types of athletic activities [11]. Compared

to other young adults, university students have been proven to be more affected physically and emotionally [11, 12].

This study revealed that Saudi university students do not have healthy lifestyles in terms of physical activity and nutrition and tend to have bad dietary habits. These results were slightly lower than previous national Saudi studies conducted by Alzahrani, Malik [35], and Al-Momani [24] during the COVID-19 outbreak, which indicate an urgent need to add physical and nutrition education dimensions as an integral part of the curriculum to help students overcome the COVID-19 outbreak consequences. In addition, students in this study reported lower scores on the subscales of stress management and health responsibility compared with previous national studies [24, 35, 41]. This highlights the importance of introducing class sessions that could teach students methods and techniques to reduce stress and enhance health responsibility.

In line with earlier findings [15, 35, 42], we found that health promotion practices had a more significant health impact on Saudi students' QOL than socioeconomic variables. Our data show that many elements of HPLP Π, such as physical activity, nutrition, spiritual growth, and stress management, are substantially related to Saudi students' QOL. We found that Saudi students showed more significant impairment in psychological and physical QOL domains. These results were consistent with international studies [34, 43 - 45]. However, students in this study reported lower scores on the subscales of psychological and physical domains in the WHOQOL-BREF compared with previous national studies [46, 47]. Based on the overall picture provided in the literature, there is an urgent need to incorporate health promotion programs and interventions into education to balance university students' academic achievement and overall well-being [34, 45]. School administrators and faculty members need to explore barriers and start initiatives that focus on raising awareness regarding the importance of healthy lifestyle behaviors among university students.

The current findings offer pertinent data for decision-makers who want to put strategies in place to find physical, psychological, social, and environmental obstacles to improve university students' health promotion practices and total QOL [45]. In this context, implementing programs aimed at enhancing socialization and physical health, creating health education initiatives to change students' unhealthy lifestyle choices, and preparing educators to recognize the immediate psychological needs of university students would all be significant and effective ways to enhance the QOL of university students [34, 45].

The cross-sectional design of this study may make it difficult to conclude a definite cause-and-effect link, which is one of the main limitations. Therefore, further research utilizing longitudinal designs and combined qualitative and quantitative methodologies are required. Another limitation is using a convenience sampling approach; thus, this sample may not be entirely representative of the community. In addition, the response rate of 63% suggests that Saudi students who didn't respond to the invitation may have encountered more obstacles to health-promoting practices. However, the response rate of 63% is not unusual in online surveys, according to Nulty [48].

CONCLUSION

The current study adds to the growing body of knowledge concerning health-promoting practices and QOL among Saudi university students. Physical activity, nutrition, spiritual growth, and stress management, in particular, have been found helpful in improving the QOL of Saudi students. Through the early detection of students' health risk behaviors, school officials and staff would be better able to plan and develop health promotion programs to overcome negative consequences. The responsible faculty in Saudi universities should consider planning curricula and establishing on-campus activities that encourage involvement in health-promoting activities.

LIST OF ABBREVIATIONS

QOL	=	Quality of life
IRB	=	Institutional Review Board
ANOVA	=	Variance analysis

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The Local Bioethics committee at Jouf University (IRB approval no. 4–03-44) examined and approved this study.

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and research committees and with the 1975 Declaration of Helsinki, as revised in 2013.

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants.

AVAILABILITY OF DATA AND MATERIALS

The data sets analyzed during the current study are available from the corresponding author [F.A] upon request.

STANDARDS OF REPORTING

STROBE guidelines were followed in this study.

FUNDING

None.

CONFLICT OF INTEREST

The author declares no conflict of interest, financial or otherwise.

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