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PHARMACOLOGICAL AND NON-PHARMACOLOGICAL METHODS FOR COPING WITH STRESS AMONG FEMALE SAUDI UNIVERSITY UNDERGRADUATES

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ABSTRACT

Exposure to stress among undergraduate university students, without enough coping methodologies might lead to deterioration in academic level and psychiatric complications. The current study aimed at evaluating the stress prevalence among the undergraduates of Princess Nourah University (PNU), assessing their level of awareness of symptoms indicating stress, and comparing the pharmacological coping methods with the non-pharmacological methods in terms of effectiveness in reducing stress. For this, a questionnaire was developed in Arabic, based on the Four-Dimensional Symptom Questionnaire (4DSQ) as a reference, measuring the prevalence of distress, depression, anxiety or somatization. In addition, various strategies of stress management were assessed. The response rate among the study subject was 97.7% (n=510). The prevalence of self-perception of being stressed was significantly higher in health colleges compared to non-health colleges. A significant number of the participants diagnosed as having somatization, anxiety, depression or distress were aware of the problem and have stress self-perception (P<0.001). Different chronic co-morbidities were correlated with stress self-perception, where diabetes had the highest significant effect. Alarmingly, the method most significantly used to cope with stress was taking medications. In conclusion, the prevalence of stress was high, especially among health colleges' undergraduates. Most participants with stress self-perception used medications to cope with their stress. It is, thus, recommended that campaigns should be held among university students for raising the awareness of the dangers of persistent stress and the hazards of self-medication to cope with stress.

Contribution/Originality: This study documents the high prevalence of stress among the female undergraduate students of Princess Nourah bint Abdulrahman University, especially among health colleges' undergraduates. This study is one of very few studies which have investigated the relationship between stress self-perception and using pharmacological measures to cope with such stress.

1. INTRODUCTION

Stress is defined as disturbed equilibrium between someone's needs and the capability to attain them [1]. Studying is one of the top three factors of stress among youth with the highest percentage of more than 70% [2].

Thus, stress is a real challenge confronting university student, who has many worries about adapting to the new college environment, academic performance, grades attainment and future employment [3]. Acute stress has a limited impact, but chronic stress may have a dramatic effect on one's health [4]. High prevalence of stress has been reported among college students in different countries. For example, signs of stress were reported in Ethiopia, Iraq and Saudi Arabia to be about 47, 77 and 21%, respectively [5-7]. Interestingly, stress rate was reported to be higher in medical college students [8] probably due to their continuous adjustment of their sleep pattern to study for their frequent exams, leading to dysregulation of their circadian sleep cycle, resulting in hormonal imbalance that can cause stress [9]. Many students tend to cope with stress by various stress management strategies, for example time management, listening to music, performing physical exercises, meditating, as well as using home-made remedies and pharmacological medications [10]. Despite the impact of stress management, only few studies have analyzed the outcome of stress coping by medical drug approaches, and the majority studied non-medical practices used for coping with stress. The objective of this study is to evaluate the prevalence of stress among Princess Nourah bint Abdulrahman University (PNU) undergraduates, aiming at assessing their awareness of stress symptoms, determining the effect of stress on student's educational performance, and comparing between the effectiveness of pharmacological and non-pharmacological methods in coping with stress.

2. METHODOLOGY

2.1. Study Design

A cross-sectional study was conducted in PNU, Riyadh, from the end of November till March 2020. A survey to measure the prevalence of stress and methods for coping with it among PNU university students was distributed. The validated published English version of the Four-Dimensional Symptom Questionnaire (4DSQ) was adopted as a reference to develop an Arabic modified questionnaire (Ar_4DSQ) to measure the prevalence of any distress, depression, anxiety, or somatization among PNU students, after permission of the original author [11]. The questionnaire had been linguistically validated, as it was first translated to Arabic and translated back to English to be compared with the original English version. Thereafter, piloting to test face validity and reliability of it by distributing the questionnaire to 20 participants, where it was re-collected and evaluated. Experts reviewed the questionnaire, in addition to members of the Institutional Review Board (IRB).

2.2. Sample Calculation of Number of Participants

No previous literature has been performed to study the methods for coping with stress among university students in Saudi Arabia. However, few studies expected notable prevalence of stress especially during exams, so we assumed the prevalence of 75%, with accepted difference as low as 0.05, when level of confidence is 95% (alpha=0.05), power of study of 80% (beta=20%), the minimal sample size needed for the current study is 456. This calculation was performed using GPower software version 3.1.9.2 (GPower, 2014). Thus, 522 questionnaires were distributed, form which only 510 were completed, covering the minimal sample size needed, with response rate of 97.7%. The questionnaires were distributed among all the 13 colleges of health and non-health in PNU. The study used non-probability convenience sampling. The participants were interviewed by the study investigators, where the objectives of the study were explained, and a verbal consent was obtained. They were asked to fill out a self-reported questionnaire made up of 13 sociodemographic and methods of coping questions, in addition to the questions of the Ar_4DSQ tool.

2.3. Details of the Questionnaire and Interpretation of Data

The questionnaire comprised of open and closed ended questions. Demographic information was collected to categorize the participants according to their personal data, including the college, the academic year, cumulative grade point average (GPA), marital status and number of children. Comorbidities were evaluated by asking about

any existing chronic illnesses. Three questions were used for evaluating the perception of stress by the participants and other people surrounding them, as family and friends. The answers were scored as extremely stressed, stressed, normal and extremely relaxed. Other questions were used to estimate stress coping methods including doing exercise or food intake, as well as drinking stimulant beverages as coffee, tea, and energy drinks. In addition, using other methods of stress coping were evaluated, including medications, herbs, listening to music, yoga, picnics, sleeping, shopping, and reading the Holy Qura'an, as well as doing nothing. The Ar_4DSQ was used as a diagnostic tool and was comprised of 50 questions: 16 of which for measuring distress, 6 for depression, 12 for anxiety and 16 for somatization.

2.4. Statistical Analysis

The data were analyzed using SPSS (statistical package for social science) version 16.0, employing t-test for the quantitative data, one-way ANOVA to compare means and Chi-square for the qualitative data. Statistical significance was confirmed if P <0.05.

3. RESULTS

3.1. Sociodemographic Parameters

In the current study, 522 questionnaires were distributed among the sampled population, but only 510 participants completed the questionnaires, with a response rate 97.7%. From all participants, about 40% were students from health colleges (medical, dental, nursing, pharmacy, and rehabilitation), whereas the rest were of non-health colleges Table 1. All college grades were represented in the study, starting from foundation year till fifth year. Around 83% of the participants reported that their cumulative GPA was above average (A+, A, B+ or B), while the rest were average or below. Most of the participants were single, with only around 5% were married. Among those who were married, 9 (1.8%) had children.

Table 1. Sociodemographic parameters.

Variable	Frequency	Percentage (%)
College		
Health	203	39.8
Non-health	307	60.2
College grade		
Preparatory year	112	22
First year	81	15.9
Second year	90	17.6
Third year	116	22.7
Fourth year	61	12
Fifth year	50	9.8
GPA		
A+ or A	208	40.8
B+ or B	217	42.5
C+ or C	67	14.1
D+ or D	15	2.9
H (failed)	3	0.6
Marital status		
Single	483	94.7
Married	27	5.3
Number of kids		
Not married (no children)	497	97.4
Pregnant	4	0.8
1 kid	6	1.2
2 kids	1	0.2
3 or more kids	2	0.4

3.2. Prevalence of Comorbidities, Stress Self-Perception and Methods of Coping

Percentage of participants who reported having chronic diseases and co-morbidities were 6%, out of which those reporting having anemia were 10%, bronchial asthma 3.3%, depression 1.8%, diabetes 1.2%, hypertension 0.8%, thyroid disease 0.6% and other diseases 3.3% Table 2. Out of the 510 participants, 2.7% reported that they have never been stressed. The rest used different anti-stress coping methods, where some participants used more than one method, as yoga 6.1%, medications 7.1%, herbals 13.3%, shopping 23.5%, picnics 23.7%, exercise 30.8%, music 42.4%, food 42.8%, reading Qur'an 56.8% and sleep 60.4% while 9.6% do nothing.

Table 2. Prevalence of comorbidities (A) and coping methods for stress (B).

(A) Chronic illness	Frequency	Percentage (%)
No chronic illness	424	83.1
Diabetes	6	1.2
Hypertension	4	0.8
Bronchial asthma	17	3.3
Thyroid disease	3	0.6
Anemia	51	10
Depression	9	1.8
Other diseases	18	3.5
(B) Stress coping methods	Frequency	Percentage (%)
Medications	36	7.1
Herbs	68	13.3
Listening to music	216	42.4
Doing exercise	157	30.8
Intake of food	218	42.7
Yoga	31	6.1
Picnics	121	23.7
Sleeping	308	60.4
Shopping	120	23.5
Reading Qur'an	287	56.3
Doing nothing to cope	49	9.6

Note: Participants were asked to choose more than one choice when applicable.

3.3. Effect of Type of Study, Marital Status and Chronic Diseases on Stress Self-Perception

Table 3 represents correlation between stress self-perception and being in health/non health college, as well as being married/unmarried, and shows that self-perception of stress is significantly related to being in a health college and not related to marital status.

Table 3. Stress self-perception vs (A) type of college and (B) marital status among PNU students.

(A) Which college?	N	Mean	Std. Deviation
Health colleges	203	2.153	0.739
Non-health colleges	307	2.375	0.779

There was a significant difference in stress self-perception between students in health colleges as Medicine, Dentistry, Pharmacy, Rehabilitation and Nursing (M=2.15, SD=0.74) and those in non-health colleges (M=2.37, SD=0.78); p=0.001.

Table 3. Continue….

(B) Marital status	N	Mean	Std. Deviation
Single	483	2.290	0.770
Married	27	2.222	0.801

There was no significant difference in stress self-perception between married and unmarried students; p=0.658.

Similarly, using Pearson Chi Square test, when participants were asked about their stress self-perception, there was significant difference between health and non-health colleges, as nearly half of interviewed health college students reported they were stressed, compared to only one third from non-health colleges (Table 4). To the contrary, using Pearson Chi Square test to compare stress self-perception among married and unmarried participants showed no significant difference (p=0.603).

Table 4. Comparison of stress self-perception among health and non-health college students.

Self-perception	Health colleges	Non-health colleges
Extremely stressed	36 (17.7%)	49 (16.0%)
Stressed	106 (52.2%)	102 (33.2%)
Normal	55 (27.1%)	148 (48.2%)
Extremely relaxed	6 (3.0%)	8 (2.6%)
Total	203 (100.0%)	307 (100.0%)

Note: Pearson Chi Square test (p=0.0001).

Since chronic illnesses may be the cause of stress, we compared different chronic diseases reported by the participants with their stress self-perception using one-way ANOVA, and found that only diabetes had significant effect on stress self-perception, while hypertension, bronchial asthma, thyroid disorders, anaemia, depression, as well as other diseases had no significant effect Table 5.

Table 5. Effect of chronic diseases on stress self-perception.

Variable		Sum of Squares	df	Mean Square	F	Sig.
Diabetes	Between Groups	0.194	3	0.065	5.702	0.001
	Within Groups	5.736	506	0.011		
	Total	5.929	509			
Hypertension	Between Groups	0.005	3	0.002	0.194	0.901
	Within Groups	3.964	506	0.008		
	Total	3.969	509			
Bronchial asthma	Between Groups	0.052	3	0.017	0.533	0.660
	Within Groups	16.382	506	0.032		
	Total	16.433	509			
Thyroid disorders	Between Groups	0.034	3	0.011	1.958	0.119
	Within Groups	2.948	506	0.006		
	Total	2.982	509			
Anemia	Between Groups	0.402	3	0.134	1.491	0.216
	Within Groups	45.498	506	0.090		
	Total	45.900	509			
Depression	Between Groups	0.072	3	0.024	1.388	0.246
	Within Groups	8.769	506	0.017		
	Total	8.841	509			
Other diseases	Between Groups	0.072	3	0.024	0.704	0.550
	Within Groups	17.293	506	0.034		
	Total	17.365	509			

3.4. Effect of Stress Self-Perception on the Methods used to Cope with Stress

By applying one-way ANOVA, we found that taking medications was the only method significantly used to cope with stress self-perception (p=0.036), while using other methods as taking herbs, listening to music, doing exercises, food intake, practicing yoga, going for a picnic, sleeping, shopping, reading Qura'an, or even doing nothing was not significant Table 6.

Table 6. Different methods used for coping with stress self-perception.

Variable		Sum of Squares	df	Mean Square	F	Sig.
Taking medications	Between Groups	0.562	3	0.187	2.879	0.036
	Within Groups	32.897	506	0.065		
	Total	33.459	509			
Taking herbs	Between Groups	0.363	3	0.121	1.045	0.372
	Within Groups	58.570	506	0.116		
	Total	58.933	509			
Listening to music	Between Groups	1.478	3	0.493	2.026	0.109
	Within Groups	123.039	506	0.243		
	Total	124.518	509			
Doing exercises	Between Groups	0.741	3	0.247	1.158	0.325
	Within Groups	107.927	506	0.213		
	Total	108.669	509			
Food intake	Between Groups	1.744	3	0.581	2.390	0.068
	Within Groups	123.072	506	0.243		
	Total	124.816	509			
Practicing yoga	Between Groups	0.226	3	0.075	1.320	0.267
	Within Groups	28.890	506	0.057		
	Total	29.116	509			
Going for a picnic	Between Groups	0.561	3	0.187	1.032	0.378
	Within Groups	91.731	506	0.181		
	Total	92.292	509			
Sleeping	Between Groups	0.883	3	0.294	1.230	0.298
	Within Groups	121.109	506	0.239		
	Total	121.992	509			
Shopping	Between Groups	0.578	3	0.193	1.069	0.362
	Within Groups	91.187	506	0.180		
	Total	91.765	509			
Reading Qura'an	Between Groups	0.482	3	0.161	0.650	0.583
	Within Groups	125.010	506	0.247		
	Total	125.492	509			
Doing nothing	Between Groups	0.595	3	0.198	2.295	0.077
	Within Groups	43.697	506	0.086		
	Total	44.292	509			

Table 7. Relation of stress self-perception with results of Ar_4DSQ.

Variable		Sum of Squares	df	Mean Square	F	Sig.
Somatization	Between Groups	6049.048	3	2016.349	19.325	0.000
	Within Groups	52795.667	506	104.339		
	Total	58844.716	509			
Anxiety	Between Groups	2831.644	3	943.881	16.792	0.000
	Within Groups	28441.589	506	56.209		
	Total	31273.233	509			
Depression	Between Groups	1764.966	3	588.322	17.209	0.000
	Within Groups	17298.438	506	34.187		
	Total	19063.404	509			
Distress	Between Groups	17045.110	3	5681.703	36.330	0.000
	Within Groups	79134.359	506	156.392		
	Total	96179.469	509			

3.5. Using Ar_4DSQ for Evaluating Stress

The percent of interviewed participants that showed somatization, anxiety, depression, or distress using Ar_4DSQ was 14.9±0.5%, 8.2±0.3%, 4.8±0.3% or 19.3±0.6%, respectively. There was significant relation between the results of the 4DSQ and stress self-perception (Table 7), suggesting that a significant number of the participants

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diagnosed by Ar_4DSQ as having somatization, anxiety, depression, or distress are aware of the problem and have stress self-perception.

4. DISCUSSION

Experiencing prolonged excessive degrees of stress imposes high psychological, social, and academic risks, especially for undergraduate students. Using inappropriate methods to cope with such a stress may even hold higher risks and challenges. To the best of our knowledge, this is the first study to estimate the prevalence of different methods used to cope with stress among college students in Saudi Arabia. Perception of stress during college education due to continuous challenges is expected, particularly during times of exams. However, healthy methods of coping with stress should be used. The aim of the current study was to estimate the prevalence of stress among PNU students and to investigate the different methods they use to cope with their stress.

In the current study, about 57% of all participants interviewed reported that they were either stressed or severely stressed. This is considered a relatively higher percentage than reported in literature, where in Qassim university in Saudi Arabia for example, only 28.2% were suffering from stress [12]. The reason for such discrepancy may be that the sample interviewed in that study was comprised mainly of males, whereas the current study was conducted on females only, emphasizing the previously reported gender differences in stress conditions [13]. In the present study, there was a significant relation between stress self-perception and the actual stress symptoms, including somatization, anxiety, depression, and distress reported through the Ar_4DSQ tool, suggesting that most sampled participants were aware of being stressed.

Stress, in the current study, has been significantly related to being in health colleges. This is in line with previous studies suggesting that health colleges' students may suffer from higher levels of anxiety and depressive symptoms, that may lead to reducing their academic performance [14]. Interestingly, marital status among participants was not related to stress self-perception in this study. The effect on marital status among undergraduate students have not been thoroughly studied, as it is globally relatively rate to get married in the age of undergraduates. A study performed on the effect of marital status on stress in postgraduates indicated that single postgraduates suffered of more stress related to their future career, educational duties and trusting their decision-making capability, while married postgraduates were only stressed while competing in research [15].

In the current study, there was significant relation between stress self-perception and being diabetic, whereas other chronic co-morbidities were not significantly related. Diabetes discovered at early age is usually type I diabetes. It has been reported that stress perception is strongly related to type I diabetes especially in adolescents [16]. The present study showed that there was significant correlation between self-perception of stress and using medication to relief such stress, which were preferred than using non-medical approaches as taking herbs, listening to music, doing exercises, food intake, practicing yoga, going for a picnic, sleeping, shopping, reading Qura'an, or even doing nothing. Using medication to cope with stress has been previously reported, especially among female health colleges' students [17]. It is alarming that several drugs may be misused to cope with stressful conditions. Self-medication without medical consultation may lead to several problematic conditions, including addiction [18]. To prevent such complications, awareness campaigns should be conducted among university students to assess and increase their knowledge about the dangers of self-medication and proper ways to cope with stress.

5. CONCLUSION

In conclusion, prevalence of stress self-perception in more than 50% of tested participants is an alarming sign, especially among health colleges' undergraduates. Most of these participants are suffering from somatization, anxiety, depression, or distress, as diagnosed by the Ar_4DSQ tool. Significant number of student perceiving stress use medications to cope with their condition.

6. RECOMMENDATIONS

Campaigns should be held among university students for raising the awareness of the dangers of persistent stress, encouraging alternative coping strategies. In addition, workshops should be held, especially among health colleges, to direct the attention of the hazards of self-medication with drugs inappropriately used to cope with stress.

7. LIMITATIONS

The limitation of this study is that the participants were all females and that the sample in this study was convenient sampling technique.

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