

Risk Conditions for Stress, its Coping and its Relationship with Trait-State Anxiety in Nursing Students of a Public University in Guadalajara, Mexico

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Submitted: 2024, Jun 16; Accepted: 2024, Jul 19; Published: 2024, Jul 22

Citation: Blanca Elizabeth, P. R., Ana Rosa, P. C., María de Lourdes, P. S. (2024). Risk Conditions for Stress, its Coping and its Relationship with Trait-State Anxiety in Nursing Students of a Public University in Guadalajara, Mexico. *J Nur Healthcare*, 9(3), 01-09.

Abstract

The level of demand during the academic training of nursing students is high and when there is the presence of risk conditions for stress together with the lack of adequate coping styles, it is very likely that they may present high levels of trait-state anxiety, which can affect the academic performance and health of these students. Therefore, the aim of this study was to establish two multiple regression models, one to analyze the relationship of Trait-State Anxiety and the other for Trait-State Anxiety and its relationship with stress risk conditions and coping styles in nursing students at a public university in Mexico. A total of 740 students were assessed, the models were determined by multiple regression analysis. This study established that nursing students at a public university in Mexico, who make negative evaluations have a higher risk of presenting A-State, and that students who present type A behavior and make positive evaluations, as well as those who consume tobacco, alcohol and/or drugs, increase the risk of A-Trait. Therefore, it is recommended to implement educational programs aimed at providing coping strategies that help to lower the levels of Trait-State Anxiety, as well as to create the choice of healthy practices through the use of protective coping styles to prevent these conditions before they have a negative impact on the health, academic performance and university dropout of nursing students in Mexico.

Keywords: Anxiety, Stress, Coping Styles, Nursing Students

1. Introduction

Perceived or psychological stress results from the interaction between the individual, his or her environment and the appraisals considered as threatening, which may endanger his or her safety and well-being. This condition can biologically over-activate the organism, as a consequence of the cognitive and behavioral efforts made to tolerate, dominate or diminish situations valued as unpleasant and/or threatening [1].

Studies conducted in Latin America confirm that students in health sciences perceive high levels of stress, particularly nursing students, who are daily immersed in stressful academic situations that they need to face and know how to manage [1,2].

College students often have high prevalence rates of stress and

anxiety assessed during professional training. When the student has good coping practices in the face of stress, it can help him/her in overcoming and motivating him/her. Since it is considered that a certain level of anxiety stimulates the alert system to respond appropriately to environments that can be considered dangerous for the organism [3-7]. A study in nursing students reports that moderate or high levels of stress during their clinical training and problem solving as a coping technique were presented in the relationship with professors and nursing staff, due to the constant supervision and evaluation to which they were subjected [5]. Another study reports high levels of stress in nursing students, as well as problem-focused coping, in addition to social support and emotional palliative support as a way of dealing with their stress [6].

However, when the normal threshold of response to stress is exceeded, as well as the optimal level of anxiety, numerous problems are generated in students such as: fear, irritability, moodiness, lack of motivation, among others, which affect their academic performance [8]. In addition, high levels of anxiety are manifested with feelings of distress or anguish, excessive and inadequate fear of triggering stimuli, which can be considered risk symptoms for mental health [9].

The constructs Anxiety-Trait (A-Trait) and Anxiety-State (A-State), differ both conceptually and operationally. A-Trait is a personal tendency to react anxiously to situations interpreted as threatening. A-State, on the other hand, is a transient emotional state that can vary in intensity and duration; and is characterized by immediate, bodily arousal and the perception of subjective tension [10,11].

A high prevalence of self-perceived stress and anxiety is reported in nursing students, due to high demand for patient care in different clinical areas, higher levels of concentration to provide effective and accurate treatment, which can affect their academic performance. It should be noted that there is research that identifies social support, temporomandibular problems such as bruxism, sleep problems such as nightmares, insomnia, drowsiness, Internet addiction, as well as moderate or severe depression and suicide attempts, in addition to certain sociodemographic and work factors, socioeconomic status and family environment, associated with anxiety [12-14].

It is considered that people at some point in life have to face stressful situations, which establish certain styles, such as: cognitive and behavioral efforts, focused on remedying the problems and helping to decrease or eliminate the maladaptive emotional response. Particularly, it is identified that the education of nursing students who are exposed to a series of stressful experiences and anxiety such as academic loads, constant pressure for exams, complex relationships and challenges during clinical practices, can significantly affect learning, as well as their mental health [14,15].

The nursing career is a health profession that faces cultural, social and technological changes, which requires a holistic vision in decision making in the face of physical, psychological and social problems of the population it serves. National and international organizations recognize these personnel as key in the solutions to problems in health systems, so they are trained in decision-making skills in clinical practice and in the acquisition of various elements of knowledge, communication, development of confidence, coping with fear, among these factors to promote the quality of life and the academic environment of these students [17,18].

It is known that the potentially negative psychological impact of stressful or threatening situations can increase if coping skills are not available, so from the training of students who will care for the health of others, it is suggested to promote different functional strategies in relation to each specific situation that they will potentially encounter in the work context [16].

Under the cognitive-transactional model of stress, this study identifies the dynamic interaction between academic demands, coping styles and students' valuation of their own abilities and potential for learning. If academic demands are assessed as overwhelming material and cognitive resources, students will exhibit high levels of stress or anxiety symptomatology. According to this theory, students can identify sources of contrasting attitudes and aptitudes in search of relevant information to select relevant coping styles, as well as to promote self-knowledge and contrast with reality. Having transactional balance can have positive effects on a person's self-esteem, self-evaluation and self-concept, which has an impact on cognitive, emotional and behavioral levels in academic training [19].

Therefore, the purpose of this study was to identify two multiple regression models for anxiety (A-State and A-Trait) with stress risk and coping styles in nursing students at a public university in Mexico.

Hypothesis

Risk conditions for stress and inadequate coping styles are predictors of anxiety (A-State and A-Trait) in nursing students at a public university in Mexico.

2. Methodology

2.1 Design

The study was quantitative, correlational and cross-sectional, during the 2022 school year.

2.2 Participants

Nursing students from a public university in Guadalajara, Mexico. The total population was 1,205 students, a simple random sample was calculated, with an expected prevalence of 64.5% (minimum of 70%), and a precision level of 99%. Therefore, the sample consisted of 740 individual interviews of nursing students. Sixty-two percent (459) were women and 38% (281) were men. The age range was between 17-21 years, with an average of 19 (\pm 1.20) years.

2.3 Procedure

The population was selected using the proportional random number technique, according to sex and academic level. A list of students enrolled in the nursing program in the year 2022 was used. Each of the students identified with the random number was chosen and located, informed of the objective of the research and invited to participate.

The sample consisted of students from the first to the ninth semester (total number of school years of the course) and its distribution was as follows: 11% (81) from first to eighth semester and for the ninth semester it was 12% (92). Data collection was from January to December 2022, and the researcher in charge was in charge of collecting the information under double-blind validity for analysis by the other participating researchers.

The inclusion criteria were: to be an active nursing student who agreed to participate in the study. The exclusion criteria were: all those students from careers other than nursing, students who would be performing their social service, those who would be on university leave, as well as those who did not want to participate in the study. Incomplete data were eliminated according to the criteria of the instruments applied.

The instruments were requested to be answered voluntarily and under the status of informed consent. Confidentiality of the data collected and anonymity were guaranteed at all times. It was ensured that participants acknowledged their participation voluntarily and without any consequence in case of resignation before or during the survey. The research protocol is registered under reference number IISO/CI/2016-2020. The study was guided by the Regulations of the General Health Law on Research for Health in Mexico (*Reglamento de la Ley General de Salud en Materia de Investigación para la Salud de México* in Spanish), and was qualified as without risk. The Declaration of Helsinki was complied with; for the care of the information and the physical or mental health integrity of the participants. In addition, permission was obtained from the university authorities of the institution.

2.4 Instruments and Variables Measured

a) Dependent variables: The State-Trait Anxiety Inventory (STAI), consisting of two independent self-assessment scales, was used. For each one, there are 20 statements related to the general feeling or to the feeling at the time of the survey. The response options are four-point Likert-type (0 = almost never; 2 sometimes; 3 = frequently and 4 = always). The STAI is a valid and reliable instrument, with Cronbach's alpha of 0.908 for A-State and 0.874 for A-Trait [11].

b) Independent variables: Nowack's Stress Profile (SP) was used to identify stress risk conditions and type of coping styles. The inventory is made up of seven dimensions, and for this study only the items of the following dimensions were applied: situations considered as risk for stress (health, work, finances, family, social or environmental surroundings), type A behavior, ARC reagent cluster (addictions, such as alcohol, tobacco and drugs), and coping style (divided into the scales of: positive appraisal, negative appraisal, minimization of the threat and concentration on the problem).

The questionnaire consisted of 58 items corresponding to the selected dimensions, each statement offers five response options on a Likert scale (1 = never to 5 = always) and its rating is specified in the manual. The time to be answered ranges between 20 and 25 minutes. The psychometric properties of the instrument report reliability in halves of 0.89 and 0.91 in populations of different races and educational levels. The homogeneity of the scales with

test-retest reliability shows a range of 0.51 to 0.92 Cronbach's alpha and factor analyses report low to moderate relatedness (0.41 to 0.75 eigen). Thus, it is confirmed that the constructs represented by these scales are sufficiently independent to justify their separate interpretation. Together, the scales explain 57% of the variance [20].

Under the reference tables, reliable, positive and significant protective resources for health were considered to be protective resources when their T value was $T < 40$, and T values > 60 were considered to be health risk alerts. Negative appraisal and threat minimization, considered as warning or health risk behaviors were T values < 40 , and $T > 60$ as health protective factors. Intermediate T-scores between 60 and 40 were considered average values, indicating that the minimum necessary to maintain health is performed on each scale [20].

2.5 Data Analysis

Prior to the regression models, the correlation between the study variables was established with Pearson's r statistic at the significant level ($p < 0.05$). To determine the predictive models, two multiple regression analyses were performed, with the stepwise method for A-State and A-Trait anxiety, introducing the risk conditions for stress and coping styles, in the equation under the significance level ($p < 0.05$).

The data were tabulated and processed with the statistical package SPSS-IBM (Statistical Package for Social Sciences), Version 26 for Windows XP, with university license.

3. Results

The descriptive analysis for the anxiety variable was as follows: for A-State 95% (699) scored high; 3% (20), medium and 2% (21), low; for A-Trait 92% (680) scored high; 5% (40), medium and 3% (20), low. Stress scores identified 38% (280) as at risk, 57% (420) as medium, and 5% (40) as a protective factor. Type A behavior rated 51% (380) as at risk, 43% (320) as medium and 5% (40) as a protective factor. The dimension referred to as ARC reagent cluster reported 40% (300) as being at risk, 57% (421) as being at medium level and 2% (19) as a protective factor. The negative assessment placed 62% (460) at risk, 30% (220) at medium level and 8% (60) as a protective factor. In the evaluation of coping styles, the positive assessment placed 16% (120) in a risk situation, 54% (400) in a medium level, and 30% (220) as a protective factor; for the threat minimization style, 11% (80) were rated in a risk situation; 62% (460), at medium level and 27% (200), as a protective factor; the problem-focused style recognized 22% (160) in a risk situation; 59% (441), at medium level and 18% (131), as a protective factor and its description according to the A-State can be seen in Table 1 and with the A-Trait in Table 2.

VARIABLES	STATE ANXIETY LEVELS					
	High		Medium		Low	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
CONDITIONS OF RISK FOR STRESS						
Stress perception						
Risk	280	37.8	0	0.0	0	0.0
Average	379	51.2	20	2.7	21	2.8
Protector	40	5.4	0	0.0	0	0.0
ARC reagent cluster						
Risk	310	41.9	15	2.0	0	0.0
Average	270	36.5	25	3.4	20	2.7
Protector	100	13.5	0	0.0	0	0.0
Type A Behavior						
Risk	230	31.1	20	2.7	0	0.0
Average	380	37.8	20	2.7	20	2.7
Protector	70	9.5	0	0.0	0	0.0
Negative valuation (variable also considered as a coping variable)						
Risk	439	59.3	0	0.0	21	2.8
Average	220	29.7	0	0.0	0	0.0
Protector	40	5.4	20	2.7	0	0.0
COPING STYLES						
Positive appraisal						
Risk	120	16.2	0	0.0	0	0.0
Average	379	51.2	0	0.0	21	2.8
Protector	200	27.0	20	2.7	0	0.0
Threat minimization						
Risk	80	10.8	0	0.0	0	0.0
Average	439	59.3	0	0.0	21	2.8
Protector	180	24.3	20	2.7	0	0.0
Focus on the problem						
Risk	160	21.6	0	0.0	0	0.0
Average	400	54.0	20	2.7	21	2.8
Protector	139	18.7	0	0.0	0	0.0

Table 1: Distribution of Stress Risk Conditions and Coping Styles Distributed by the A-State

VARIABLES	TRAIT ANXIETY LEVELS					
	High		Medium		Low	
	n	%	n	%	n	%
CONDITIONS OF RISK FOR STRESS						
Stress perception						
Risk	260	35.1	20	2.7	0	0.0
Average	350	47.2	20	2.7	20	2.7
Protector	70	4.4	0	0.0	0	0.0
ARC reagent cluster						
Risk	200	27.0	05	0.7	0	0.0
Average	380	51.3	15	2.0	10	1.3
Protector	119	16.1	0.0	0.0	11	1.5
Type A Behavior						
Risk	305	41.2	0	0.0	0	0.0
Average	350	47.2	0	0.0	09	1.2
Protector	44	5.9	20	2.7	12	1.6
Negative valuation (variable also considered as a coping variable)						
Risk	440	59.4	20	2.7	0	0.0
Average	180	24.3	20	2.7	20	2.7
Protector	60	8.1	0	0.0	0	0.0
COPING STYLES						
Positive appraisal						
Risk	100	13.5	20	2.7	0	0.0
Average	360	48.6	20	2.7	20	2.7
Protector	220	29.7	0	0.0	0	0.0
Threat minimization						
Risk	80	10.8	0	0.0	0	0.0
Average	420	56.7	40	5.4	0	0.0
Protector	180	24.3	0	0.0	20	2.7
Focus on the problem						
Risk	160	21.6	0	0.0	0	0.0
Average	381	51.4	40	5.4	20	2.7
Protector	139	18.7	0	0.0	0	0.0

Table 2: Distribution of Risk Conditions for Stress and Coping Styles Distributed by A-Trait

The correlations between the A-Trait with the situations considered as stress risk and coping styles presented moderate and positive levels. While positive appraisal presented a significant and inverse correlation. The analyses between the A-State with the conditions as risk and coping styles only presented significant and positive correlation with the negative valuation. The validity of the predictive model was performed with the ANOVA variance test and was significant for trait anxiety ($F = 79.109$; $p < 0.01$) and for state anxiety ($F = 115.53$; $p < 0.01$). Thus, for A-Trait and A-State, the cognitive-transactional model is accepted.

The first model showed that the risk conditions for stress and coping style: of negative appraisal, was shaped as follows (A-State) = 0.171 (negative appraisal), with a strength of 442.3 % ($F = 115.53$; $p < 0.01$).

The second model indicated that the risk conditions for stress: ARC reagent cluster, A-type behavior and stress perception and the positive appraisal coping style were predictors for the presence of the A-Trait, conforming as follows (A-Trait) = 0.922 (ARC reagent cluster) - 0.259 (positive appraisal) + 0.020 (A-type behavior) + 0.021 stress perception, with a strength of 56% ($F = 19.109$; $p < 0.01$).

The coefficients of the regression model, the t-scores indicate that the independent variables contribute significantly to the prediction model and can therefore be generalized to the population. In this study, the independent variables: ARC reagent cluster ($t = 8.987$; $p = 0.000$), positive appraisal ($t = -8.323$; $p = 0.000$), Type A

behavior ($t = 5.687$; $p = 0.000$), stress perception ($t = 8.987$; $p = 0.000$) contribute significantly to the A-Trait predictive model, on the other hand, the independent variable of negative appraisal ($t = 42.280$; $p = 0.000$), contributed significantly to the A-State model (see Table 3).

Variables	Pearson's Correlation with Anxiety		B	EE	F	p	R ² Adjusted	Model
	A-STATE	A-TRAIT						
Constant			37.761	0.893	115.53	0.01	0.442	$t = 42.280$ ($p = 0.000$)
Negative valuation	0.368 ($p = 0.000$)		0.171	0.016				
		A-TRAIT						
Constant			47.298	1.695	19.109	0.01	0.562	$t = 23.661$ ($p = 0.000$)
ARC reagent cluster		-30.2 ($p = 0.000$)	0.922	0.250				
Positive appraisal		-0.392 ($p = 0.000$)	0.117	0.043				
Type A Behavior		-33.6 ($p = 0.000$)	0.020	0.224				
Perception of stress		-0.361 ($p = 0.000$)	-0.253	0.022				

Table 3: Multiple Regression Analysis with Stress Risk Conditions and Coping Styles and Trait-State Anxiety

An analysis was performed with the various contrasts related to the assumptions of independence, normality and homoscedasticity. It should be noted that the data do not show multicollinearity among the predictor scales. The average of the "Tolerance" statistic for the PE scales is 0.91, with no value below 0.89. This indicates that the variance of the residuals is constant, establishing that the residuals were normally distributed. The average value ($VIF = 1.11$) with no value below 1.05 showed that there is no collinearity problem.

4. Discussion

This study determined the existence of a significant and positive correlation in the A-Trait with stress situations, ARC reagent cluster and type A behavior, i.e. when one of these increases the A-Trait increases in constant proportion, the positive valuation presented a

significant and inverse correlation indicating that when it increases the A-Trait decreases. For the A-State, the only variable that was significant and positive was the negative valuation, indicating that the more negative valuations are made, the higher the A-State will increase.

When the A-Trait is present, it refers to the individual differences that people have when responding to situations perceived as threatening by increasing the intensity of the A-State, this means that when stressors appear in students, activation signals and acquired behavioral dispositions arise that involve past events that predispose them to see the world in a special way, manifesting response tendencies to satisfy their needs. However, when present the A-State is represented as a transient emotional state or period

of the human organism, which is determined by unwarranted and clearly perceived emotionality of tension and apprehension, and by an increase in the activity of the autonomic nervous system. Anxiety states can vary in intensity and over time [16, 21].

A similar study conducted in nursing students in the city of Murcia, Spain analyzed the A-Trait-State and showed the presence of both types of anxiety, it should be noted that the study presented here showed more variables associated with the A-Trait [14]. Another research conducted in Lima, Peru in students, showed a predominance in the A-Trait similar result to the one presented here, with the difference that it is conducted in different country with different school contexts, as well as related to different variables such as psychological well-being and sexual behaviors and COVID19 [22,23]. Other studies that have studied anxiety in this population of students report low levels of anxiety, the differences found may be due to the fact that they are conducted with different instruments, populations and related to different variables than the present study [17,18].

Regarding the studies with similar results that were found on the risk conditions for stress that were significant for the presence of the A-Trait-State, one of them was type A behavior, studies indicate that students with this type of personality may have more internalized or expressed anger, rushing time, performing activities quickly, impatience, constant search for improvement and competitive behaviors, this could be a negative factor and induce the emergence of inappropriate behaviors [24,25].

Another significant variable was the perception of stressful situations, where studies report that students express feeling discomfort, discomfort and major and minor frustrations of everyday life such as: Health, work, personal finances, family, social obligations, and environmental and global concerns, when major life events occur that can be considered very stressful, it can affect the level of health and it is considered to high perceived stress levels as the cause, rather than the presence of major events, they also state that stress can be increasing as they advance in school grade [25,26].

A study conducted in Nuevo Leon, Mexico, which included students in the health area, reported that students have a higher stress index, mainly in the first years in careers such as medicine and nursing, and that nursing students showed a higher perception of stress of up to 80% [27]. Another associated variable was the ARC reagent cluster (consumption of alcohol, tobacco and/or drugs), Teixeira et al. in (2022) report that 50% of nursing students in Brazil consumed alcohol in the last month of the study and that experimental use of illicit drugs and tobacco was observed, which were associated with poor health behaviors [28]. Correa-López in (2020) report that cigarette smoking increases arousal levels, acting as a support for mood control, but nicotine dependence for long periods can exacerbate stress, people with nicotine anxiolytic traits use tobacco to cope with different situations that can generate anxiety, so that tobacco consumption generates two

types of dependence: physical dependence, which is related to nicotine, the substance responsible for the withdrawal syndrome, and psychological dependence, which is observed when this habit occurs in various situations of daily life, such as waking up, after meals, when having drinks at meetings, among others [29].

Among the best strategies adopted by the WHO for the prevention and control of non-communicable diseases are: reducing tobacco consumption and the harmful consumption of alcohol [30]. Other studies have determined that alcohol intake is one of the main health problems worldwide, constituting its intake and the diseases derived from its consumption the third triggering factor of physical and psychological diseases, creating behavioral problems such as increased aggressiveness. The influence of physiological, social, emotional, cultural and economic factors generate important changes in the way of life, producing modifications that negatively affect and can provoke an increase in the consumption of alcohol and cigarettes, which can impact academic performance. In addition, it is considered a "bridge drug" because it increases the risk of consuming other substances such as cannabis, ecstasy or cocaine in the future [31,32]. Similar results between the present study and other studies conducted in Mexico where alcohol, tobacco and drug use are reported as present in the nursing student population were a study conducted in Veracruz reported that 59.6% of these students presented 4.6% of high-risk drinking habit and 0.4% reported dependence. Another study in Michoacan, established that 56.4% consumed tobacco, with males presenting the highest frequency. [7,33].

In relation to studies with similar results on coping styles and variables related to the presence of the A-Trait-State, this study determined that nursing students present anxiety and perceived stress in the course of their academic training and that they use coping strategies to manage them. In a review of previous literature on coping strategies among university nursing students during their education, studies were found with results similar to the study presented here, among these variables is the negative appraisal in the A-State, indicating that students who make negative appraisals of events that could be considered stressful could result in having thoughts of self-blame, being very critical or catastrophic. Students use this coping strategy when they focus on the worst aspects or consequences of a situation, think about what they should or should not do in a particular situation, or a solution they are not happy with so they may feel constantly observed and evaluated by teachers and nursing staff [5,34]. Unlike when using the A-Trait related positive appraisal coping variable, this is considered a protective practice in the face of stress such as use of autonomous support and motivational comments to reduce perceived stress, when students use this coping strategy, they focus on the positive aspects of the situation, thus minimizing the impact of the problem or failure. Recent memory works by recalling a happy experience or imagining a positive solution to a problematic situation, there is strong evidence to support the hypothesis that the use of this coping strategy in stressful situations and life situations can lead to reduced fatigue, as well as high levels of stress and anxiety and

conversely the failure to use good coping strategies could lead to illness and in the worst case to death [5,6].

The possible differences between the studies that were reviewed lie in the recording of the A-Trait-State, the type of stress and their coping styles, as well as to the diversity of contexts and variables of the study participants.

5. Limitations

The study has among its strengths the size of the sample, which is large and representative; with a greater inclusion of nursing students. In the same way, it is convenient to refer to the limitations of this study and that reside, primarily, in the presence of other factors that could have an influence on A-Trait and A-State, stress and its coping at the time of the application of the questionnaires; such as social, economic, and family characteristics that were not evaluated in this study.

6. Conclusions

In conclusion, this study answered the research question and determined that nursing students of a public university in Mexico, who make negative evaluations have a higher risk of presenting the A-State, than students who present type A behavior and make positive evaluations, as well as those who consume tobacco, alcohol and/or drugs increase the risk of presenting the A-Trait.

The presence of stress can provoke anxiety and cause alterations to health, reducing the quality of life and well-being, as well as low academic performance and an increase in morbimortality. This work provides knowledge on the PE stress risk scales involved in the presence of A-Trait and A-State, as well as the coping styles that nursing students of a public university in Mexico are using. Therefore, it is recommended to establish work actions with a view to the implementation of educational programs aimed at providing tools that allow students to use coping strategies that help lower the levels of both A-Trait and A-State, as well as stress, and to create the choice of healthy practices through the use of protective coping styles, to prevent these conditions before they have a negative impact on the health, academic performance, and university dropout of these students.

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