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Level of stress and coping strategy in medical students compared with students of other careers

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Abstract

Objective: *To assess the levels of stress and the coping strategies in students of the faculties of Medicine, Law and Psychology at a private university in Lima.* **Materials and Methods***: Cross-sectional analytic and comparative study involving three university careers. For data collection, the SISCO inventory for academic stress and the questionnaire of stress coping (CAE) were used. For inferential analysis, Spearman's rank correlation coefficient, Kruskall Wallis and Dunn Test (multiple comparison post hoc) were used.* **Results:** *The average age was 19.5 ± 2.5 years. Of them, 33.9% were students from the Medical faculty and 92.4% were worried or nervous (stress manifestations). The students from the Medical faculty had the highest level of stress (median, 46.7) compared to the students from the Psychology faculty (median, 39.1) and the students from the Law faculty (median, 40.2) ($p < 0.05$). The most common coping strategies were focusing on the problem, positive re-evaluation, and social support. The least used strategy was religion.* **Conclusion:** *The Medical faculty students show the highest level of stress. Coping strategies in the three groups are focusing on the problem, positive re-evaluation, and social support. The least used strategy was religion.* (Gac Med Mex. 2015;151:415-21)

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Introduction

Currently, stress represents a series of problems that has acquired growing importance, since it does not only affect human behavior, but also impacts on physical and mental health, academic and work performance and it can even cause personal, familiar and social disturbances[1]. Stress is defined as the body's general response to any oppressive stimulus or situation[2]; however, there are different approaches to the meaning of this term. The most comprehensive approach is the bio-psycho-social approach, which presents stress as an individual and/or social imposition, the stressing situation, which exceeds the human being's adaptation resources and jeopardizes his well-being but, at the same time, drives him to develop certain skills, resources and abilities to control these situations[3], a phenomenon known as coping. This term is also defined by Lazarus and Folkman as "a cognitive and behavioral effort process in permanent change to deal with specific demands or external and/or internal conflicts that subjectively exceeds our resources"[4].

Based on its source, stress can be classified in different ways. One of them, on which this study will focus, is academic stress, which is defined as a systemic and

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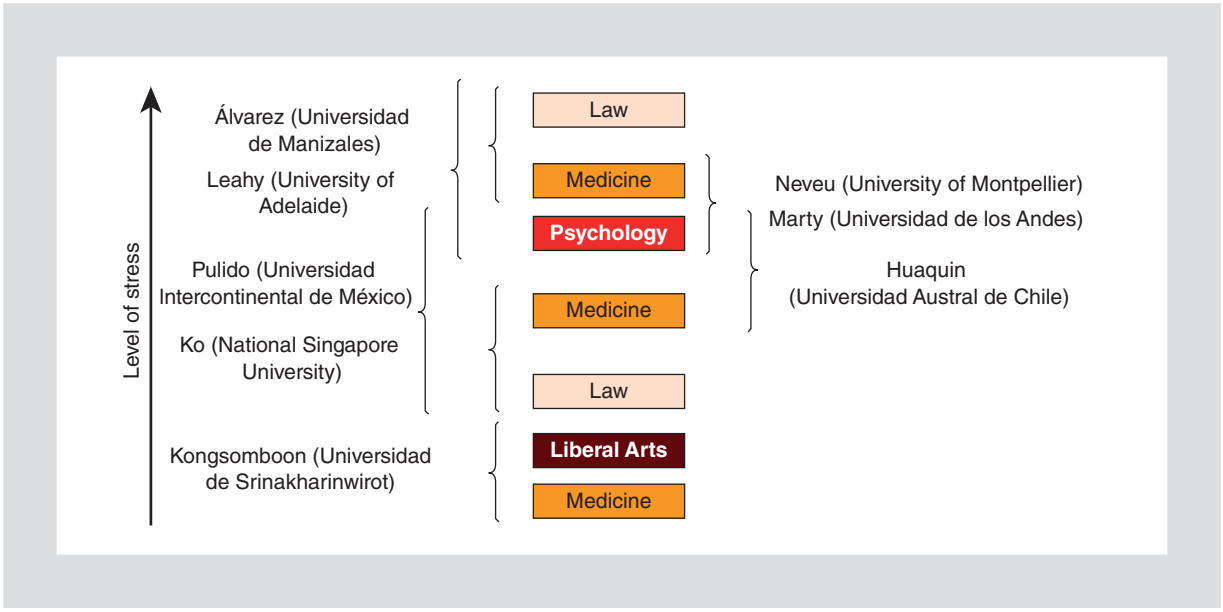

Figure 1. *Comparison of the levels of stress between students from different faculties.*

adaptive process developed by the student to face different situations related to the college environment considered by the student to be stressing[5]. Causes that can be considered include different demands and the need to adapt to a new lifestye, which cause for this population to be exposed to a continuous level of stress[6].

Different studies have made comparisons between levels of stress in students from different faculties, with results showing discrepancies between them. This comparison is shown in figure 1[7-14]. All these data, so different between each other, reflect the lack of an integrating conclusion with regard to differences in the degree of stress between different careers.

On the other hand, relationship has been found between the coping strategy and academic performance: there are certain forms of coping with stress, known as active forms (positive re-evaluation and coping focused on problem solving), which are related to better performance, whereas passive forms (e.g., negative self-focusing), are associated with lower performance[15]. In addition, active forms, which imply adequate coping with one's own emotions, have been associated with higher psychological well-being and positive affective states[16]. For this reason, it is important to know the students' coping strategies in order to guide them towards the healthiest method.

In view of the presence of contradicting results in previous studies and an absence of national data, the purpose of this study is to assess the levels of stress and to document the coping strategies in students of the Medicine, Law and Psychology faculties from a private university of Lima, Perú.

Material and methods

A cross-sectional, analytical, comparative study was conducted in the faculties of Law and Psychology and the School of Human Medicine of the Universidad Peruana de Ciencias Aplicadas (UPC), Lima (Perú). The population included pregraduate students (from first to fifth year) of the UPC during the 2011-12 cycle. Students enrolled between the first and the fifth year of these careers was regarded as the main inclusion criterion. Exclusion criteria were considered students with previous diagnosis of mental disorders, students simultaneously working and studying (excluding pre-professional practices included in the curriculum), students with children, pregnant or with academic load lower than 4 courses or higher than 8.

To find the sample size, an expected proportion of 50%, an error of 5.5%, a 95% confidence level and a rate of rejection of 10% were considered. A stratified randomized sampling with proportional affixation to the number of students per career and then to the number of students year was performed. The final number of participants in the study is shown in figure 2.

The survey was anonymous, self-applied and comprised 89 questions. The first part included personal data (initials, age, sex, date, career and year of study)

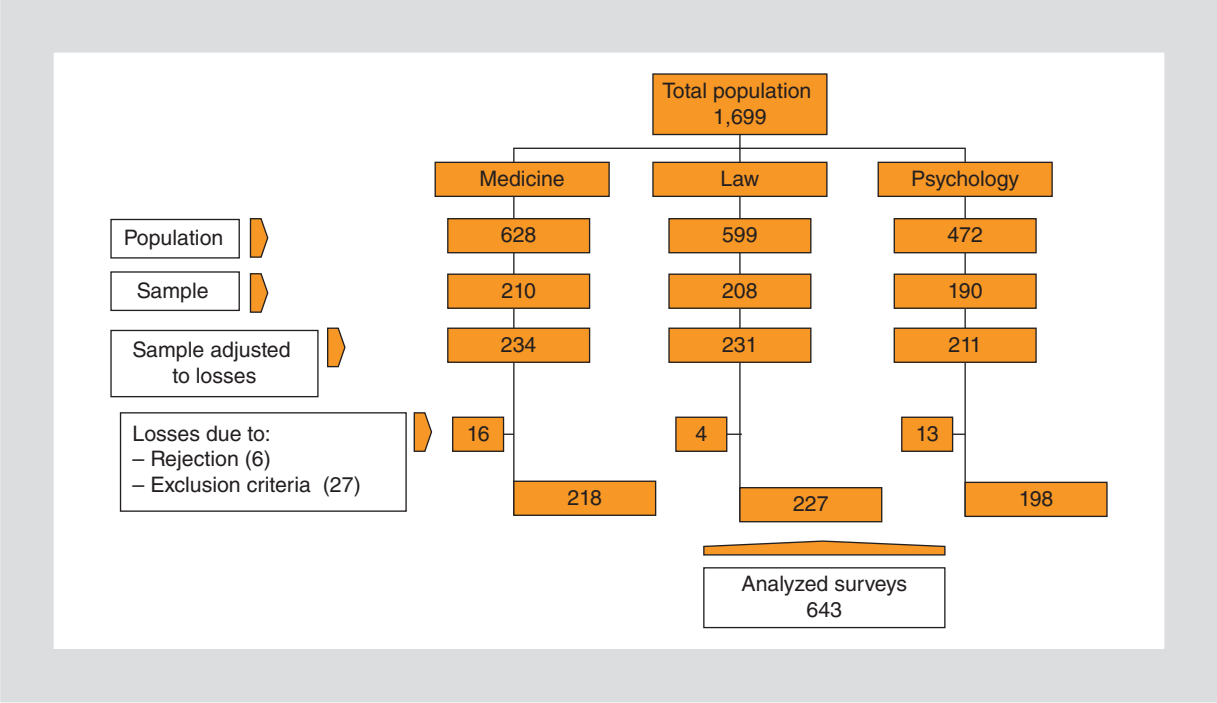

Figure 2. *Flow-chart of the selection of students participating in the study.*

and questions that allowed for exclusion criteria to be identified. The second part evaluates levels of stress and, for that, the SISCO academic stress inventory was used, which is measured with a Likert scale, where 1 indicates "never" and 5 indicates "always". This scale was validated in the city of Durango, Mexico, in 2007, obtaining a reliability value of 0.874[17]. It has an initial question that dichotomously (yes-no) allows establishing if the surveyed subject has experienced or not worry or nervousness during the past six months and, therefore, if he/she is a candidate to answer the inventory. Furthermore, it includes an 8-item section that allows identifying how often environmental demands are considered stressing stimuli and, additionally, 15 items that allow for the frequency of reactions (physical, psychological and behavioral) to the stressing stimulus to be identified. The third part assesses how the students cope with stress, for which the CAE was used, which is measured with of a 5-point Likert scale, where 0 indicates "never" and 4 "almost always". This was validated by means of the coping strategies scale review in Spain in 2003. The questionnaire has 42 items, related to 7 basic forms of coping with stress. These are: focusing on problem-solving, negative self-focusing, positive re-evaluation, open emotional expression, avoidance, search for social support and religion. Cronbach's alpha reliability coefficients for all 7 scales ranged from 0.64 to 0.92 (mean = 0.79)[18].

The participants were personally located, and electronical interviews were conducted with those persons could not be located in classrooms. The surveys were delivered to the participants by members of the research team. Survey duration did not exceed 15 min, time during which the survey taker was present to solve any doubt. The study was approved by the Research Methodology Professorship of the Health Sciences Faculty from the UPC. The survey included an informed consent form, where its confidential and voluntary nature was detailed. The results were provided to the participants upon request.The surveys' results were entered into an Excel data base and then processed with the STATA program, version 11.1 for Windows Vista. The SISCO and CAE scores were analyzed using the median as a summary measure and the interquartile range (IQR) as a dispersion measure.

The prevalence of stress, the degree of stress and the coping strategy were obtained by calculating the proportions, which were represented using absolute and relative frequency measures. Median comparison between the scores obtained for the SISCO and CAE scores, respectively, was made for each college career. A non-parametric Kruskal-Wallis test was used to establish if there were significant differences. Dunn's test (multiple *post hoc* comparisons) was used to determine between which groups there was such difference. A p-value < 0.05 was considered to be significant.

Table 1. Population characteristics and comparison of stress levels and coping strategies between careers

	Total	Medicine School	Faculty of Law	Faculty of Psychology	p-value
Gender (%)					
Female	434 (67.5)	142 (32.72)	136 (31.34)	156 (35.94)	
Male	209 (32.5)	76 (36.36)	91 (43.54)	42 (20.1)	
Age (%)					
> 21 years	123 (19.13)	16 (13)	62 (50.41)	45 (36.59)	
≤ 21 years	520 (80.87)	202 (38.85)	165 (31.73)	153 (29.42)	
SISCO scale score, median (IQR)*		46.7 (19.6)	40.2 (19.6)	39.1 (15.2)	0.01
CAE scale score, median (IQR)*					
Focusing on solving the problem		15 (5)	15 (5)	15 (6)	0.65
Negative self-focusing		9 (6)	8 (8)	8 (6)	0.39
Positive re-evaluation		15 (4)	15 (4)	16 (6)	0.01
Open emotional expression		9 (7)	9 (8)	10 (7)	0.68
Avoidance		13 (6)	13 (6)	12 (6)	0.28
Search for social support		15 (7)	14 (10)	16 (7)	0.01
Religion		8 (10)	7 (11)	5 (10)	0.01

*The Kruskal-Wallis test was used.

Spearman's rank correlation coefficient was used to analyze linear association between each score of the coping scale dimensions versus the SISCO scale score according to the type of career.

Results

The percentage of males was 32.5% (Table 1), mean age was 19.5 ± 2.5 years and the percentage of students per career was 33.9% for Medicine, 35.3% for Law and 30.8% for Psychology. Of the students' total number, 33.4% are in the fourth and fifth year, 47.9% in sixth year and 18.7% in the seventh and eighth year. In addition, the percentage of subjects claiming to have experienced some moment of worry or nervousness during the semester was 92.4%, distributed as follows: Medicine 90.8%, Psychology 93.4% and Law 92.95%.

Level of stress

Median levels of stress (Table 1) of Medicine, Psychlogy and Law students were compared, and Medicine students were found to have higher levels of stress with a median of 46.7 (IQR = 19.6), followed by Law students, with a median of 40.2 (IQR = 19.6) and, finally, by Psychology students, with a median of 39.1 (IQR = 15.2). Using the Kruskal-Wallis test, the existence of difference was confirmed in levels of stress between careers. To determine beween which groups this difference exists, the multiple comparations test was used, and Medicine students were confirmed to have a higher level of stress than Psychology and Law students ($p < 0.05$). However, no difference was found in the level of stress between Psychology and Law students ($p = 0.38$).

Coping

Students of all three faculties were found to use more frequently the focusing on solving the problem, positive re-evaluation and search for social support coping strategies to deal with stress. On the other hand, the least used coping strategy by students of all three faculties is religion (Table 1). Using the Kruskal-Wallis test to assess which career is predominant in each coping strategy, Psychology students were found to use more positive re-evaluation and search for social support than Law students, whereas Medicine students use more religion as a coping strategy than Psychology students (Table 1). The four remaining coping strategies are used with equal frequency in all three careers.

Correlation between level of stress and coping strategy

Using Spearman's rank correlation coefficient, the linear association between the type of coping strategy (provided by the CAE inventory) and the level of stress (provided by the SISCO score) obtained for all three

Table 2. Correlation between the CAE inventory and the SISCO score according to the type of career (coping strategy with regard to the stress score)*

Dimension and stress coping	SISCO					
	Medicine (n = 198)		Psychology (n = 185)		Law (n = 211)	
	Rho	p-value	Rho	p-value	Rho	p-value
Focusing on solving the problem	0.007	0.92	–0.09	0.22	–0.02	0.79
Negative self-focusing	0.31	< 0.00001	0.24	0.0009	0.40	< 0.00001
Positive re-evaluation	–0.05	0.52	0.02	0.76	0.18	0.01
Open emotional expression	0.29	< 0.00001	0.35	< 0.00001	0.39	< 0.00001
Avoidance	0.12	0.10	0.01	0.85	0.27	0.0001
Search for social support	0.14	0.04	–0.04	0.60	0.20	0.004
Religion	0.17	0.02	–0.01	0.88	0.21	0.003

*Results obtained according to Spearman's rank correlation coefficient.

careers was analyzed ($p < 0.05$). In Medicine, Psychology and Law students, significant positive correlations were found between certain coping strategies and the degree of stress. This means that as stress increases in the students, these coping strategies increase as well. Correlation was found between the degree of stress and negative self-focusing and open emotional expression in all three careers. Additionally, correlation with avoidance, search for social support and religion was found in Law students (Table 2).

Discussion

The findings of the study indicate that Medicine students experience higher levels of stress than Psychology and Law students. These results are consistent with the research conducted by Ko, Kua and Fones at the Mississippi University in 1999[8], and the study carried out by Marty, et al. in the Chilean Universidad de los Andes in the year of 2005[9] (Fig. 3).

To explain the reasons for increased stress in Medicine students, Radcliffe, et al.[19] found that transition periods of the student from the basic science years to the years of clinic is the most common cause of stress. This is owing to a sense of uselessness, inability to aid the patient due to a lack of knowledge and to a feeling of being faced with an apparently endless amount of knowledge. Fatigue and lack of energy related to less hours of sleep add up to this. Finally, the competitive environment and the burden of care-associated responsibilities, which involve having to face situations of pain, suffering and death, are also causes of stress.

According to the study conducted by Murphy and Gray[20] in Philadelphia (USA), stress experienced by Medicine students is caused by financial insecurity due to increased costs of education and student debts. Other referred cause is associated with a lack of professional identity, since students experience insecurity with regard to their knowledge and skills. Furthermore, over time, they also experience doubts about their thoughts on disease and death, and discomfort when communicating with patients with regard to these subjects.

Al-Dabal, et al., in the University of Damman (Saudi Arabia) in 2011, found the contents of the curriculum (84.2%), teaching methods (77.2%), fear of failure (70.7%) and the environment at the faculty (40.5%) to be stress triggering factors[21]. Toro, et al., at the Universidad Médica de Santiago de Cuba in the year of 2010, concluded that first-year Medicine students have overload of school assignments, assessment by teachers and limited time to complete assigned duties as the most common causes of stress[22].

In our country, Celis, et al. published in 2006 the results of their investigation in Medicine students from the Universidad Nacional Mayor de San Marcos, and indicated that academic overload, lack of time to fulfill academic duties and taking an exam are the most common stressing factors in first and sixth year Medicine students[23].

On the other hand, the studies with different results to those found in the present research work are: the study by Huaquín and Loayza, conducted in 2004 at the Universidad Austral de Chile, where Medicine

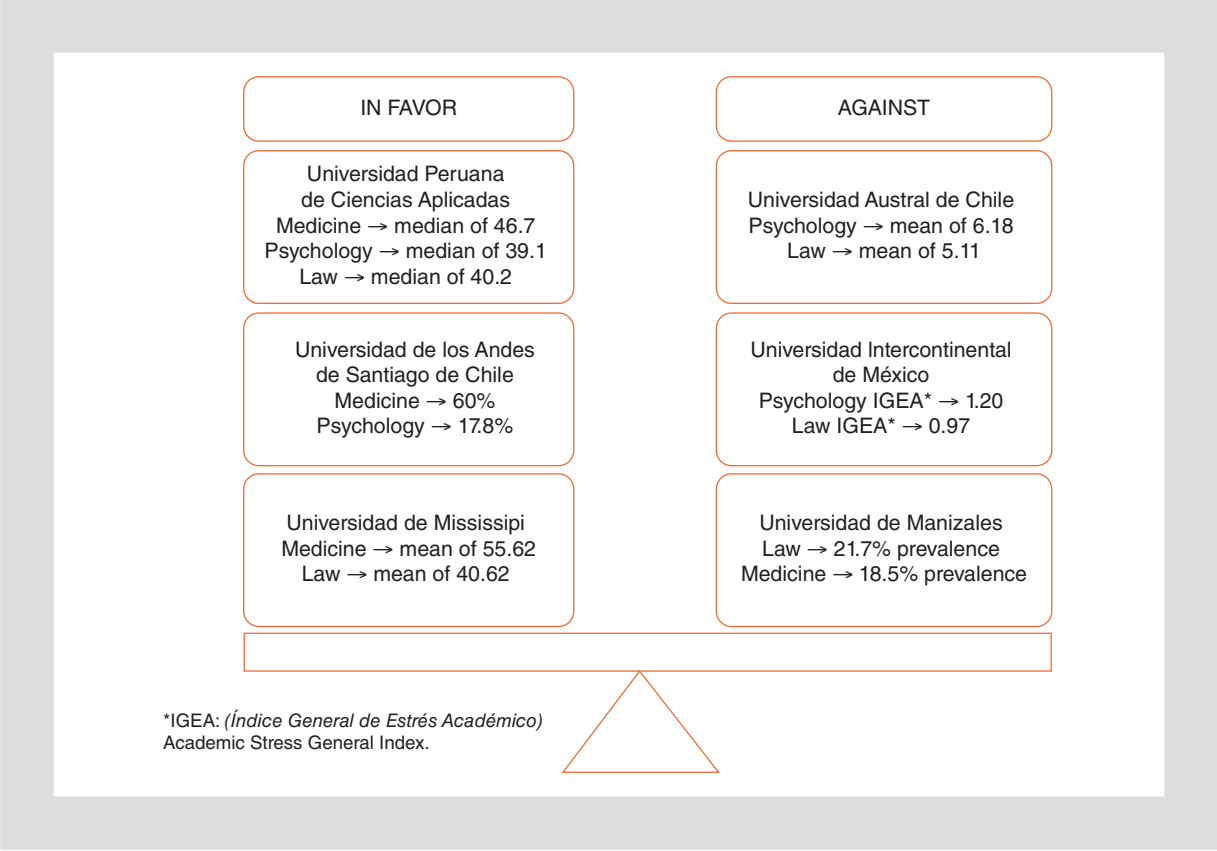

Figure 3. *Comparison of previous studies with the results of the present study.*

students were found to have less stress than Psychology students[7], and the study by Pulido and Serrano, conducted in 2011 at the Universidad Intercontinental de México, which concludes that Psychology students experience more stress than Law students[10]. Similarly, the research conducted by Álvarez, et al. at the Universidad de Manizales in 2006 concludes that Medicine students experience less stress than Law students[14]. These results – apparently conflicting –, can be explained by the different personality profiles of the students, the design of the programs of study or the level of academic requirements of each school[10].

With regard to the results for the academic stress coping strategies in this study, Medicine students were found to use active (positive) coping strategies more often: focusing on solving the problem, positive re-evaluation and search for social support. Consistent with these results, the study conducted at the Instituto Superior de Ciencias Médicas de Camagüey in 2010[5] describes that the most commonly used coping strategy by Medicine students is active coping (71.4%) (Fig. 3). However, other recent investigations in settings different to ours[24,25] report that an increasingly growing percentage of Medicine students tend to use negative strategies (e.g., alcohol and drug consumption) to cope with stress.

One limitation of the present study is the fact that the Medicine School at the UPC is relatively new and, therefore, there were no sixth or seventh-year students available. For this reason, the conduction of studies with participation of students of these years (externship and internship) is suggested, since the level of stress is likely to be different in them. Furthermore, the large prevalence of high levels of stress found in Medicine students, evidences the need for preventive programs to be developed in order to enable full development of the student in the academic setting, without stress affecting his/her mental health. In addition, there is a clear need for future investigations to be developed in order to assess the most effective coping strategies and which variables could be regarded as risk factors for an increase in the level of stress.

We conclude that the level of stress in Medicine students is significantly higher than in Psychology and Law students, but no significant difference was found between both these two last careers. Additionally,

focusing on solving the problem, positive re-evaluation and search for social support were the most common coping strategies, with religion being the least used.

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